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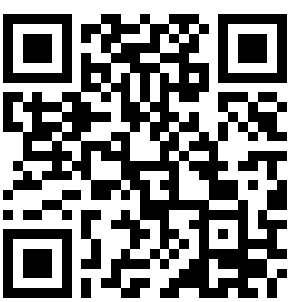

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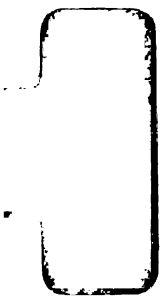

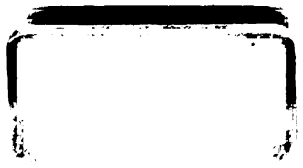

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Volume 61

January to June, 1923

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Instructions for Use of Index

This index is essentially a subject index, not an index of titles, and articles treating a number of different subjects are indexed under each of them. In addition, a geographical reference is published wherever the article relates to any particular railway company, or to the state matters of any particular state. The geographical method of grouping serves to locate in the index any article descriptive of practices, conditions, events, etc., when the searcher knows the electric railway, city or state to which the article applies. Groupings are made under the name of the city in which the main office of the company is located, but an exception is made in the case of electrified sections of steam railroads, such entries being made direct under the name of the railroad. City or state affairs appear under the names of the city or state involved.

In the subject index, the alphabetical method is followed, and if there is a choice of two or three keywords the one most generally used has been selected, cross references being supplied. Below will be found a list of the common keywords used in the index to this volume. This list has been subdivided for convenience into thirteen general subjects, but the general subject headings, shown in capital letters, do not appear in the body of the index unless, like "employees," they appear also in small type. As an example of how to use the index, if a reader wishes to locate an article on special trackwork he would obviously look in the list under the general subject Track and under this caption, only Special trackwork could apply to the article in question. The reader would therefore refer to this keyword under S in the body of the index.

In addition to the groups of articles covered by these headings the papers and reports from railway associations are grouped under the names of the various organizations. Proceedings of other associations and societies are indexed in general only in accordance with the subject discussed. Short descriptions of machine tools appear only under the heading "Repair shop equipment" and are not indexed alphabetically, because of the fact that there is a wide choice in most cases of the proper keyword to be used.

CLASSIFIED LIST OF KEYWORDS

ACCIDENTS AND ACCIDENT PREVENTION
Accident claim department
Accidents (including wrecks)
Safety work
Storm and fire damage

CARS AND OTHER VEHICLES
Automobiles
Cars (including car design)
Locomotives
Motor buses
Motor trucks
Service and tower trucks
Trackless trolley
Work and wrecking cars

CAR EQUIPMENT
Bearings
Brakes and compressors
Current collection
Electrical equipment
Fixtures
Gears and pinions
Motors
Trucks
Wheels and axles

EMPLOYEES
Employees
Labor
Strikes and arbitrations
Wage decreases
Wage increases
Wages and working agreements

FARES
Fare collection (including apparatus)
Fare decreases
Fare increases
Fares
Traffic investigations
Traffic stimulation

FINANCIAL, LEGAL AND STATISTICS
Abandoning of lines
Accounting
Appraisal of railway property
Financial
Franchises
Insurance
Legal
Legislation for railways
Market conditions
Operating records and costs
Public service and regulative commissions
Statistics
Taxes

HEAVY ELECTRIC TRACTION
Heavy electric traction (general)
Locomotives

MAINTENANCE OF EQUIPMENT
Insulating materials
Lubrication
Maintenance practice
Repair shop practice
Repair shops and equipment
Stores
Tests of materials and equipment
Welding

POWER
Energy checking devices
Energy consumption
Fuel
Overhead contact system
Power distribution
Power generation
Power stations and equipment
Substations and equipment

STRUCTURES
Carhouses and storage yards
Power stations and equipment
Repair shops and equipment
Substations and equipment
Terminals
Waiting stations

TRACK
Pavements
Rail joints and bonds
Rails
Special trackwork
Ties
Track construction
Track maintenance

TRAFFIC AND TRANSPORTATION
Freight and express
Interurban railways
Merchandising transportation
Publicity
Public, Relations with
Schedules and timetables
Signals
Stopping of cars
Traffic investigations
Traffic regulation
Traffic stimulation
Transportation, Metropolitan

MISCELLANEOUS
Electrolysis
Engineers
Living costs
Management
Municipal ownership
Radio telephone for railways
Railways (general)
Snow removal
Standardization
Subways

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ELECTRIC RAILWAY JOURNAL

Consolidation of Street Railway Journal and Electric Railway Review

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New Features of the Annual Statistical Number

THIS issue of the JOURNAL, the Annual Statistical and Progress Number, contains several new features in connection with the statistical studies. One entirely new compilation has been made to develop the figure representing what the industry will expend for new plant and equipment in 1923, with the similar figure for 1922 for sake of comparison. In the study to show the rolling stock purchases of the year, the information was compiled in more detail than heretofore to show the trend in the utilization of one-man cars in both city and interurban service and the extent to which trailers are coming into use. The cars purchased for train operation in rapid transit service have been segregated this year for the first time. Also the number of cars modernized by remodeling is given. For the first time, the purchases of automotive equipment by the railways were compiled and listed as to type—truck, bus and trolley bus. A new column has been added to the table of total trackage and total cars owned for the entire industry to show the number of buses owned by electric railways. Track abandonments are divided between city and interurban.

Aside from the statistical studies, another new feature appears in the form of an electric railway engineering review in which are recorded the notable achievements of the year. This review will serve to give specialists in the several branches of the engineering work a summary of the important developments going on in other phases than their own.

Prosperity Is Returning to Electric Railways

JUST as the curtailment of expenditures by the electric railways in the past few years has been a direct reflection of their financial difficulties, the very large expenditures during 1922 show the rapidly returning prosperity of the industry taken as a whole. The statistics compiled by this paper and detailed elsewhere in this issue present a heartening confirmation of the generalizations that have been made about the improving conditions. In every branch of the statistical studies is the greatly improved financial condition evident. During 1922 the electric railways built and rebuilt 960 miles of track—more than in any year since before the war. New cars to the number of 3,538 were purchased, which is nearly three times as many as in 1921 and practically the equal of any year since 1913. In addition, very large sums of money were spent in rebuilding 1,579 cars.

The number of receiverships occurring during 1922 (fourteen) is the smallest in any year since 1909, except for 1910, when eleven roads failed, and 1914, when the number was ten. Furthermore, increased earnings enabled six companies to lift themselves out of receivership during 1922, and there is very good prospect of several other large companies being able to do this early in 1923.

These few figures provide justification for the statement that the railway industry is greatly improving its position and in a fundamental way. The new cars ordered and the large number of cars rebuilt show how the railways are wisely endeavoring to modernize their service, while conserving the value in the best of the older cars by reconstruction to conform to the development in the art, and particularly to take advantage of the growing use of one-man operation and thus bring down operating costs. While the mileage of new track added to the electric rail systems has been small, the very large amounts of money that have been put back into the properties in rebuilding 740 miles of track represent an exceedingly important pursuit in re-establishing the railways' financial standing and insuring the continuance of their position of first importance in providing local transportation.

Furthermore, the indications are that the betterment process of existing rail systems will go on at an even greater rate, measured in expenditures for new plant and equipment, during 1923. The expenditures in this direction to be made during the year would appear, from the data compiled by the JOURNAL, to amount to probably 60 per cent more than for 1922.

Car Design Tending Toward Lightness and One-Man Operation with Larger Units

ROLLING STOCK purchases constitute an excellent barometer of the volume of electric railway business. New cars ordered this year have reached the levels of pre-war days and reflect the progress that electric railways have made toward reconstructing their properties and increasing their service. The figures for 1922 are especially encouraging because of the increased number of railways which ordered new cars. The total number of companies reporting new rolling stock this year is about 50 per cent more than last year. Another point of encouragement comes from the fact that while car orders for the first six months of 1922 were greater than for the whole year of 1921, there were more than twice as many cars ordered during the last half of the year. Manufacturers of railway equipment can thus look forward to a still more prosperous year for 1923. There is no doubt that the purchasing power of the electric railways is being restored and should increase during the coming year.

Previous to 1914 the electric railways of this country were ordering from four to six thousand cars a year. The number dropped to 3,000 in 1914, and since then this number has been exceeded but twice. Once was in

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1916 with a total of 3,942 and again in 1920 with 3,598 new cars. The total of new cars and locomotives for 1922 again exceeds the 1914 figures.

The number of cars purchased this year which can be properly classified as safety cars is greater than for 1921, but when compared with the total number of cars ordered the percentage took a considerable drop. In fact the ratio of the number of safety cars ordered to the total cars purchased for city service has been decreasing since 1919. This, however, does not mean a decrease in one-man operation, for in addition to the new cars purchased many old cars have been reconstructed for one-man operation. One-man operation of large cars took a decided jump in 1922 and for the first time orders have been placed for new double-truck one-man cars, and the interurban field has also been opened up to one-man operation.

New designs of large double-truck cars with provision for operation by either one or two men form an interesting development. There appears to be a large field of usefulness for such cars in congested city service where one man cannot handle the peak period loads without serious delays.

Light weight has been a particular feature of car design this year and in fact for several years past. While the statistics show that electric railways are turning to more extended use of large cars, still the light-weight feature and one-man operation which were introduced through safety car design are advantages that are being continued with large economies. An analysis of eight types of light-weight double-truck cars that were bought this year shows a weight per passenger seat ranging from 513 lb. to 676 lb. with an average of 600 lb. This is 100 lb. per passenger seat heavier than the average single-truck safety car, but still is considerably less than that for the usual double-truck cars of previous years.

There are three outstanding features shown by a study of the rolling stock statistics. First, operation of cars by one man is increasing rapidly and a conservative estimate shows that 10 per cent of all motor passenger cars now used have provision for one-man operation. Second, there is a decided tendency toward the use of larger cars than the single-truck one-man car. Third, light weight in car construction is receiving particular attention.

Real Engineering Is the Hope of the Future

SEVERAL pages of this issue are devoted to a discussion of the accomplishments of electric railway engineers, particularly in 1922, and the prospects for 1923 and beyond. This is based, in part, on the suggestions of a large number of engineers who were asked to devote a little "concentrated thinking" to the subject. Many of them did so, with the result that it has been possible to evoke a fairly complete record of the high spots in recent achievement and immediate probability.

There is one development, however, that the review does not reflect, and that is the picture of the engineer himself which shines out through what he says about his work. In this picture he appears as one who is interested in engineering only as a means to an end. His object is to further the cause of transportation service, and good engineering to him means only that which will produce the most and best transportation within the financial limitations imposed by conditions over which he has little control. The railways are in as good condition as they enjoy today in large measure because their engineers have been on the job.

However, for fear that they may be too much "set up" by reflections like the above, a private word in the ear of the engineers will not be taken amiss. As attention is directed more to the broad objects of engineering, rather than to detail, there is danger that interest in, and working knowledge of, its fundamentals will suffer. Criticism is heard to the effect that utility engineers are becoming superficial. They are probably not more so than men in other departments, but their work is of such character that any lack of fundamental knowledge which they may possess is very conspicuous. The only antidote to this is study. Engineering is moving on; one cannot live on the mental accomplishments of the past. A good slogan for 1923 is the interrogation point; either real reasons should be found to justify existing practice or this should be so changed that it can be defended.

Governor Smith Recommends Municipal Ownership

GOVERNOR SMITH'S recommendations to the New York State Legislature on transit matters, as given by him on Jan. 3, are bound to create a tremendous amount of discussion both within and without the state. While they were foreshadowed to a large extent by his platform and pre-election statements, they appear very definite and concrete when made part of recommendations to the Legislature for action. Briefly, Governor Smith declares: (1) For city instead of state control of purely local utilities where that policy is preferred by any city, (2) that municipalities should be permitted to purchase, build, own or operate utilities where they determine this to be in their best interest, and (3) that, as far as transit is concerned, the cities should be free to adopt any form of conveyance found suitable to their needs, whether railroads or omnibuses.

The advisability of each of these recommendations is open to serious doubt. In the case of state versus local regulation, New York was one of the earliest states to introduce the modern state regulatory commission plan, and it has worked well, in spite of the fact that there has been an unfortunately large number of changes in commission personnel with each change of state administration. To change now from state to city direction will be a backward step. The suggestion about buses is proper if coupled with the proviso that all means of transportation should be co-ordinated, but buses run as competing jitneys will be worse for the transportation of New York City as a whole than if there were no buses at all.

Finally, the recommendation in favor of municipal ownership sounds strange when coming from the Governor of New York State, within whose confines the largest financial, commercial and fiduciary organizations in the country have their homes. Many of these, as well as many citizens of New York State, are largely interested in utility enterprises in all parts of the country, and they will hardly look with enthusiasm upon the adoption by the Empire State of a policy which is likely to be inimical to utility investments without as well as within the State and opposed to economical utility administration. The nation had all the experience it needed during the war to learn that public direction of

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business enterprise is bound to be inefficient and wasteful. Municipal operation under the conditions which prevail in our large cities is certain to be worse than if the power were exercised by state authorities.

Those citizens of New York State who realize the unfortunate effect of turning over the utilities in the cities of the state to a set of hungry politicians must take the responsibility of opposing the plan, if they do not wish to see it prevail. They cannot and ought not to assume that the utilities will do all the fighting. As for the various utilities themselves, they should unite in this matter, because the message makes no distinction except as regards extent of territory served. What may be of principal concern at this season to the railways may be followed later by a similar policy toward the power, gas, water and telephone companies.

Double-Track or Three-Track Elevated Structure Costs About a Million a Mile

AS CITIES arrive at the point where they must have rapid transit they naturally turn first to elevated railway as the least expensive means for getting cars off the streets. There are many objectionable features in this form of railway, but they are not so great as in the early days of the lines in New York and Chicago, when puffing steam locomotives furnished the motive power. The advantages, however, outweigh the objections where traffic is sufficiently dense to support some kind of rapid transit, but not dense enough for a subway.

The recent publication in this paper of the results of a detailed study of the new Frankford Elevated Railway in Philadelphia suggests a comparison of its cost with that of other elevated lines. In trying to make such a comparison, however, one is confronted with almost insurmountable difficulties. The principal one is due to the tremendous fluctuations in costs of materials. Another follows from the radical differences in design details. In each case, also, there are many items which must be at least in part eliminated for purposes of comparison. In Boston, for example, the total cost of the 9 miles of elevated railway, as of Dec. 31, 1921 (not including power plant and rolling stock), was $19,529,000. But this total includes nearly $10,000,000 for right-of-way and other land and for right-of-way damage. The item of stations, waiting rooms and other buildings, also, is a large one, $2,384,000. With cost items not chargeable to the elevated structure, track and incidentals eliminated, the cost figures out about a million dollars per mile.

This checks fairly well with some of the recent Interborough Rapid Transit elevated construction in New York City. The three-track 1.7-mile elevated railroad on Webster Avenue and Gun Hill Road, for which bids were received in 1915 and construction completed Dec. 13, 1920, cost, with three stations but exclusive of rolling stock, $1,000,000 per mile of structure. Section 1, Jerome Avenue line, three-track, for which bids were received in 1913, cost, exclusive of rolling stock and electrical equipment, $820,000 per mile. The two-track Livonia Avenue line in Brooklyn, for which bids were received in 1915, cost $990,000 per mile.

In considering the cost of the Frankford line it must be remembered that this was built with certain specifications which made construction more expensive than would have been strictly necessary if the designers had had a free hand. There are compensations, however, for most of the extra expense, which cannot well be evaluated in dollars. For example, the support of the structure from the ends of the transverse girders required more steel than would have been necessary with the columns directly or nearly under the track centers. This, however, eliminates obstructions to traffic in the streets. The center-column construction in Frankford was special and involved expensive foundations. At the same time it keeps the sidewalks clear of obstructions, which was what the Frankford property owners insisted upon. The concrete deck, stipulated by City Councils, was a costly construction, but it eliminates drip from overhead and provides a quiet track. The maintaining of a separate entity of the city-owned property was also a complication in Philadelphia, but was considered necessary to permit independent operation if suitable operating contracts with the P.R.T. proved not to be feasible. All of these and other considerations affected the Philadelphia designs, coupled with the desire of the designers to minimize maintenance costs even at some additional expense in first cost.

Since the article was published, the revised cost data of this line, as of Dec. 1, have become available, tallying closely with the estimates given on page 843 of the issue for Nov. 25. Roughly the total cost of the Frankford "L" was $15,500,000, or about $2,100,000 per mile. This includes 100 steel cars ($3,026,000), interest ($1,253,677), which is a large item due to war-time and other delays; real estate for station buildings, etc. ($726,999), three equipped substations ($444,000), signal system ($412,000), and sundry other items which are not properly a part of the elevated structure cost. Eliminating those parts of the cost which are not chargeable to the elevated structure and track, the cost figures out somewhat more than a million dollars a mile. It is higher than the other lines mentioned, but not more so than would be expected from the unusual construction. It is close enough to the other unit costs, however, to warrant classing it with the others and to permit a general statement that elevated lines of modern design cost about a million dollars a mile. Each job is, however, a special one and generalizations cannot be too sweeping.

Has M. Coué Any Lesson for the Electric Railway?

EMILE COUÉ, the famous auto-suggestion expert of Nancy, France, has come to the United States for the purpose of spreading the gospel of "day by day, in every way, I'm getting better and better." His philosophy, if correctly comprehended, is that good health, physical and mental, is promoted by thinking health rather than disease, by fixing the thought on the goal desired rather than on the apparent obstacles in the way of attaining it.

But what has this to do with electric railways? Everything! Until recently, for several years, the electric railway industry has looked upon itself as ill, seriously ill. Undoubtedly it was ill, but too much introspection of the subject made the matter worse. Now is the time to apply the Coué principle. Let the thoughts of railway managers turn primarily from remembering how sick the industry has been to the subject of service. They have talked service increasingly and, to a corresponding degree, tried to give it, but there is a need to go further. Concentration on the idea of service should

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be so complete that the better health of the industry will result as a matter of course.

To be sure, there is only a limited parallel between the human organism and a national industry. The human body constantly tends toward health if given half a chance. This can hardly be said of the electric railway, but there is no doubt that if the slogan is: "Day by day, in every way, our service is being made better and better," and if this is the ambition of every one in the organization, the industrial conditions of the company will improve also.

A Pertinent Request Regarding Employee Training

THE educational committee of the American Association, of which Edward Dana, general manager Boston Elevated Railway, is chairman, has just issued a call for co-operation in its work. The request is made for a simple and perfectly definite thing to be done, namely, the appointment of some man on each property who will specialize on the employee-training problem of his own company. This is not necessarily a whole-time proposition, but it is a vital-interest proposition; that is to say, the appointee should be some one who has shown by his deeds and words that he believes in education in the broad sense.

It ought not to be difficult to find a man on each property to "fill the bill" in this case. In fact, a live property without at least one enthusiast for vocational and higher training is inconceivable. The main thing is to get him started to doing something definite. The idea of being one of a large group of specialists in this field should make a strong appeal.

The committee proposes a definite service, not according to any ready-made or preconceived program, but according to the needs of the individual property. This is a great deal to offer. A prompt response will show that the offer is appreciated.

Paramount Advantage of Electrification Is Improved Transportation

TWO or three electrifications of note were decided on during 1922, but progress in this line fell short of showing the concrete results that were anticipated early in the year. Fortunately, however, there has been some advance in the industry in trying to improve the method of approach to the problem of electrification and of presentation to railroad executives. This augurs well for the future. And it indicates that the electrical industry has come to realize that part of the blame for the slow advance in electrification may properly be laid at its door.

Until the transportation advantages of electrification and the unquestioned success of every existing installation can be made clear in discussions of the subject, electrification progress is bound to be slower than it should be. Railway executives are not interested in details of the equipment. What they want to know is that the system works, that it will improve the transportation efficiency of their properties and that it will pay. On these points, the electrical industry can satisfy them and should proceed to do so.

But this does not mean any stoppage of work or discussion, properly conducted, in connection with advance in engineering development. If anything, it should be a spur in several ways. For one thing, there is opportunity to realize even greater dependability of service and an approach to engineering perfection in the product. Again, while the advantages of all systems of electrification so far applied may be recognized, their relative advantages are of far less importance than the need of fitting electrification to the job, and engineers should work toward the best answer for the case at hand rather than carry their debates into the open and cause the failure of the entire plan. That there are concrete signs of a willingness to approach future electrifications in this manner is most gratifying.

It is not inconceivable that electric railway engineers may soon arrive at some solution which will involve the admitted advantages of alternating-current distribution and at the same time the good points of the direct-current motor equipment. The problem is being attacked from several angles today, and if it is ever satisfactorily solved it will do more to advance the cause of electrification than any other one thing. Meanwhile, a better functioning of consulting engineers and a proper viewpoint of manufacturers' engineers *and commercial men* with reference to putting the advantages of electrification ahead of the satisfaction of having their own individual ideas win out will do much to advance the whole program. One great advantage of more electrifications, no matter what their kind, is the opportunity they will provide for further knowledge and therefore advancement toward perfection.

Equipment Department Rehabilitation Will Be Especially Active This Year

THE estimates of expenditures made during 1922 and to be made during 1923, which appear in an article elsewhere in this issue, give considerable material for study. It will be noted that the largest increase in expenditures will be for equipment. A vast sum will nevertheless be spent on the track, but considering the relative investment in track and rolling stock, the equipment department will lead in activity. There will be a big development, too, in the power end of the electric railway properties.

There probably will be more than one explanation of the changes in the relative estimated expenditures tabulated at the end of the article mentioned. Here are some of the circumstances, however, that affect them. During the war period track was allowed to run down proportionately more than the other parts of the railway plant. This point is touched upon in the article by Frank R. Coates, also printed in this issue. As he states, cars had to be kept up and, while he did not mention the fact, power had to be kept on the line. The track, being inert and of slow deterioration, naturally took the brunt of the cuts in expenses. However, the track became so bad, in many cases, that it had to be brought up to condition, and the first money available for the railways had to be spent in that direction. This has been going on during the last two years and has involved very large expenditures.

Now the companies have largely caught up with their deferred maintenance of track, although the track is by no means yet up to par. This year it appears from the table to be the turn of equipment, and the companies are planning to improve cars, shops, etc., on a large scale. In the power department, also, the automatic substation, new power house machinery and line and other equipment will come in for some real attention.

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Britton I. Budd

J. N. Shannahan

F. R. Coates

W. H. Sawyer

The Four Vice-Presidents Give Their Views

They Sum Up the Principal Accomplishments of Last Year, Draw Lessons from These Experiences and Point to What They Consider Are the Most Important Issues Before the Industry for Solution in 1923

THE four vice-presidents of the American Electric Railway Association have kindly consented to give to readers of this paper their personal views on the electric railway situation. Each was asked to say what in his opinion were the outstanding accomplishments of 1922 and what are the most important question or questions before the industry today and his thought on how these questions should be answered. These statements, taken with the extended interview with President C. D. Emmons, published in the issue of this paper for Dec. 2, give the thinking of the five executive officers of the American Electric Railway Association. This may be said to represent the best thought on the various subjects considered.

What of 1923?

By Britton I. Budd

President Chicago Elevated Railroads and Chicago, North Shore & Milwaukee Railroad
First Vice-President American Electric Railway Association

We Should Bend Every Effort Toward Modernizing—If Railways Show Eagerness for Improvement in Methods, the Manufacturers Will Be Stimulated in Research and Development Work

MUCH has been accomplished in the last three or four years in the way of meeting and overcoming some of the difficulties with which our industry was long confronted. The World War and its aftermath of inflated prices brought about a crisis in the electric railway industry that imperiled its very existence. Concerted action became imperative if the industry was to be saved from utter ruin, and, while that action was taken rather late to save some companies, the industry as a whole is to be congratulated on the results.

One lesson of vital importance was brought home to the industry during the crucial period, a lesson which we should not forget. That lesson was the value of publicity, of informing the public on our needs and taking our customers into our confidence to a greater extent than we had done in the past. The work of the Committee of One Hundred did much to clear the atmosphere and remove the clouds of suspicion which hung over the industry. It resulted in a general improvement of our public relations, and of a restoration, in some degree at least, of confidence on the part of investors in the soundness and stability of the electric railway industry.

This work must not only be continued but should be intensified in the coming year. We must have nation-wide publicity. State committees on public utility information, such as now exist in Illinois and a number of other states, should be organized in every state, to keep constantly before the public what we are doing. It has been shown conclusively that the press is eager for facts concerning the service and operation of public utilities, when such news is presented in an interesting way. We should in addition to this publicity make larger appropriations for advertising. We have something to sell and we should adopt up-to-date merchandising methods and the liberal use of advertising space if we are to be successful salesmen.

The importance of educating our own employees on our individual problems and business affairs has been fully demonstrated and we should in the coming year give even more attention to this phase of our business than we have done in the past. In this day of public regulation we have nothing to conceal, so that our employees should be kept fully informed on the financial affairs of the company for which they work. Our contact with our customers is through our employees, and if they are well informed on conditions, they are in a position to remove much misunderstanding and improve our public relations.

Determined efforts should be made in the year 1923 to give better service by increasing speed and comfort wherever possible. The standard of transportation has undergone a marked change in the public mind and

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we should endeavor to modernize our operation to conform with this changed standard.

Most of our companies could well afford to send a number of their employees, selected from the supervisory forces, on a tour of inspection through various parts of the country, to gather information on modern developments and to learn what other companies are doing. The cost of such inspection trips would be returned in economies resulting from the increased knowledge and broader vision of the men in charge of operation.

There is always a danger of our becoming too self-centered and satisfied with ourselves. We are too apt to think that because we have done things in a certain way for years, that way is the best in which they can be done. First-hand study of what others are doing, both inside and outside our industry, is an excellent antidote for self-complacency.

If our companies will show an eagerness for improvement in methods, it will stimulate manufacturers in research and development work and enable them to supply us with better equipment and apparatus. Many companies in our industry are handicapped by obsolete and uneconomical apparatus. So far as it is possible liberal expenditures should be made to replace worn-out and obsolete tools and equipment with the most modern on the market. We would not think today of using soft tool steel, such as we used 20 years ago, because we know that the present tool steel does the work with much greater economy. Yet that is exactly what we are doing, in many cases, with our car equipment. Liberal expenditures for equipment will enable manufacturers to spend more money on development, which has been at a standstill, and the industry as a whole will be greatly benefited thereby.

The message for 1923, as I see it, is to bend every effort toward modernizing our service. This applies to our merchandising methods through advertising, our business and office methods, our shop and track work and everything else that goes to make an effective, successful, modern business organization. By adopting such methods we can best serve the interests of the public, the employees and the investors.

The Bus as a Common Carrier

By John N. Shannahan
President Newport News & Hampton Railway, Gas & Electric Co.
Second Vice-President American Electric Railway Association

It Should Be So Recognized for the Well-Being of the Public, the Existing Transportation Companies and the Bus Owners Themselves

THE bus question is the most important one before the electric railway industry at the present time. The bus is a common carrier, and should be subject to adequate state regulation such as is in force in practically all the states for the other public utilities. Such regulation is essential for the well-being of the public, the existing transportation companies, and even of the bus owners themselves.

It may be argued that the same reasons for regulation do not apply to a bus company as the other utilities mentioned. From their nature gas, telephone, electric light, electric railway and water companies have almost necessarily to be monopolies. In each case a very large investment in plant and equipment is required per customer served, and when once in place much of this equipment can be removed only with great loss. This means that the state must grant to such a utility a practical monopoly to encourage investment in and extension of the plant, and in turn to protect the public, it must exercise a control over the rates charged and the service given.

Bus Governed by Same Rules

These conditions, it is urged, do not apply in the same degree to bus transportation. With a bus, the investment per customer served is small and if the profits from an enterprise are not sufficiently attractive the equipment can be readily removed to another point. Hence, it is claimed by some, competition is the best means for protecting the public against extortionate rates and insuring good service.

This, however, is a narrow view to take of the situation. It disregards entirely several important essentials of good transportation. Service, as understood by electric railway companies, is not simply the operation of cars on some profitable route, but means transportation where it is needed in an entire community. Such a service cannot be insured by competition. It implies not only cars on some unprofitable routes but cars at unprofitable hours and often cars at unprofitably short headways.

Equally important with these aspects of transportation is reliability of both the service and the operator. Persons who have built residences along a bus or trolley route depending on the bus or car to carry them between their homes and places of business want to know that the line is going to continue in operation. Those having legitimate claims against such a company have also the right to know that these claims will be satisfied. No bus line should be permitted to operate without a certificate of convenience and necessity, and without giving some assurance to the franchise-giving authorities that the service will be maintained, at least for a specified period, and that the company will meet all just claims which may be brought against it.

Finally, regulation of electric railways and other public utilities came into force to some extent because of abuses in financing. It was considered, and properly, that in a quasi-public enterprise like a utility, both the operating and the capital accounts should be subject to supervision by the state to protect the investor. This same need in the case of bus companies is obvious.

The absence of proper regulation of bus companies in many states is responsible for a large part of the financing difficulties which certain railway companies are now experiencing, particularly in refunding maturing obligations. Capital is loath to participate in these undertakings until it knows that they will not be subject to the unrestricted competition of unregulated business.

Railways Have a Duty to Perform

Electric railway companies have a duty to perform in regard to buses, as well as rights to respect. If they object to competitors they should be prepared themselves to furnish transportation to sections in their territory which have sufficient population to warrant such service. If they are not willing to build a trolley line for this traffic, they should install a bus line. For this purpose, and particularly as a feeder, the trackless trolley seems the logical form of bus for an electric railway to install in most conditions.

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Improve the Service—Reduce the Leaks

By Frank R. Coates
President Community Traction Company, Toledo, Ohio
Third Vice-President American Electric Railway Association

President of Railway Operating Under Service-at-Cost Plan Sees in This Scheme a Satisfactory Solution of Utility Difficulties and Advocates Development of the Personal Side of Operation

THE electric railway business is going to be better in 1923 than it has been in recent years. I base this statement not so much upon the improving figures that are coming from the accounting department, but rather upon certain fundamental conditions which to me seem very encouraging. In the first place, industries are opening up and producing more traffic for the transportation companies. Further, the public is coming more and more to realize the necessity for electric railway transportation, in spite of the considerable development of the passenger bus and the phenomenal spread of the private automobile. The public is beginning to realize, as electric railway men have realized for a long time, that railways furnish the only means for handling people in large groups, in other words, for what has been aptly termed "mass transportation."

It is true that there are sparsely-settled districts which cannot support electric railways. Existing electric railways in these districts must be abandoned, and service in these and other such districts furnish an excellent opportunity for the motor bus. I see a very promising field here for the trolley bus.

Looking ahead, we railway managers are apt to wonder where the money is coming from for desired improvements and extensions, and refinancing of present securities. It seems to me that this money is coming fairly easily, for the reasons mentioned above, especially if the securities are sold in reasonably small denominations to the patrons of our service. When assured of a reasonable rate of return, our patrons will be willing to finance or to assist in financing their local utilities because they will realize that in so doing they are helping to give the community in which they live the service which they desire.

Fix Up the Track First

The place where we need to take hold most vigorously at the present time is in track rehabilitation. This needs to be done not only because our run-down track is increasing operating expenses, but because we need good track to help us promote good public relations.

It was perfectly natural during the war period to let the track run down, and we cannot blame ourselves for following the course marked out by necessity. We were not earning money enough to go around, and some expenditures were inevitable. Wages had, of course, to be paid, and we could not let the cars go to pieces. We felt, very properly I think, that the track maintenance could be reduced somewhat, although we realized that we should have to make up for lost time later. That time has come now. Track everywhere shows the effect of the necessary cost cutting. Now we need not only to bring the track back to proper condition, but we should at the same time take the opportunity to bring it up to present-day standards. We can charge to capital that part of the cost which represents actual improvement over the old track.

Keeping Ahead of the Procession

I have mentioned the track because it is such a conspicuous part of the electric railway property and because it sadly needs rehabilitation. Now for some suggestions as to forward movements. The first one relates to the merchandising of transportation.

The efforts of the electric railways in the direction of selling their service are beginning to bear fruit. Look, for example, at the ways in which local attractions are being capitalized for the benefit of the public and at the same time for the stimulation of traffic. "Tell the people where to go" is a slogan which may well be kept in mind. In Philadelphia the rapid transit company is advertising Independence Hall, Carpenters' Hall, the art galleries, Horticultural Hall, William Penn House, etc., linking therewith the numbers of the routes by which these attractions can be reached. This company is also pushing the "trolley hike" idea with a view to stimulating long walks with a trolley ride home. In New York City the Interborough Rapid Transit Company is extolling the beauties of Central Park and other municipal investments, with good results as to riding.

The weekly pass is another merchandising "stunt" which has the merit that it encourages larger use of the cars. The advertising plan carried out in Tacoma recently, in connection with the inauguration of the weekly pass, is a good example of transportation merchandising.

In this matter of "Where to go" the railways are the best agency for advertising local attractions. They carry the people to the points of interest and they benefit most directly when the attractions are appreciated. Moreover, advertisements in the cars are seen by people who travel, and the latter are apt to accept with interest statements as to routes leading to places which they have always intended to visit. In other words, advertisements which give the people something that they are glad to know and that they feel sure will benefit them are good advertisements.

If the Service Is Worth Advertising, Advertise It

Advertising of "Where to go" is only one good form of publicity. Advertising of the quality of the service is also good, if the service is good enough to warrant this. Take, for example, the successful efforts of that master of publicity methods, Britton I. Budd, in the way he has played up his North Shore line with wonderful results. His advertising has put the North Shore on the map.

A campaign to show the relative economy of automobile and rail transportation ought also to be effective with the thinking public. In some cities the electric railway companies are trying to get the people to see the economy of laying up their automobiles in winter and using our cars. I understand that publicity along this line has been effective.

Another thing we ought to do is to put on more rolling stock. More cars, in general, produce more business, although of course this can be carried too far. More cars and lighter cars go together, because we cannot afford to increase greatly the aggregate weight of our rolling stock. However, it is possible to go too far in this matter of lightness. Cars may be made so

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light as to be difficult and expensive to maintain. The general principle, however, holds.

One more thing that we can do in merchandising our service is to speed it up. It is the speed of the automobile that constitutes its great appeal to the people. We must learn the lesson of getting more speed out of our cars. Co-operation with traffic officers will help in this connection and at the same time will help to eliminate causes of accidents. By advertising and in other ways, also, we can educate our patrons in promptness in boarding and alighting from cars.

Along with Better Service Must Go Operating Economy

Good service, well sold, will please the public. But if the electric railways are to make a reasonable profit, they must introduce all sorts of economies. The place to begin is on the car platform. The operation of double-truck cars by one man is one of the most promising developments. I feel strongly that we must make every effort to get out of the "two-man" habit.

I realize that we cannot buy as many new light double-truck cars as we should like. We must make the best possible use of our old rolling stock until it wears out, because the total investment of the industry in cars is enormous. It must be amortized gradually.

When we are fortunate enough to get some new cars, we must handle them more carefully than we have been doing in the past. Our men must be taught the value of the property which is placed in their hands, and the extent to which they control the life of the cars.

Eliminating Waste Is True Economy

A good slogan to use in connection with our efforts to operate economically is: "Stop the leaks." We find such leaks everywhere, one of the most serious being through the payment of accident claims. If accidents are caused through the neglect of our men, of course we must and ought to pay for them, but there ought not to be so many accidents. Co-operation with the men will reduce their number.

We need better inspection, too, in all parts of our properties. This should be done by departments, because workers in a given department are experts and they, better than outsiders, ought to be able to detect the places where leaks need stopping. Great care should be exercised in selecting inspectors—men who are alert, thorough and practical.

In recent years great progress has been made in the fitting of service to transportation requirements, both as to routes and schedules on those routes. Here, I believe, is still a great opportunity for economy. The giving of useless service is a leak which can be easily stopped.

I have mentioned several leaks of a real but rather intangible nature. There are many which are easier to detect and to stop. For example, the waste of lubricants is serious on most properties. We could all, also, give more careful attention to the bonding of the rails in our tracks, and to the condition of the overhead. Every scrap pile contains promise of effective efforts at reclamation, although here judgment must be exercised not to spend more in reclaiming material than it is worth.

All properties that are spending more to produce their own power than they can purchase it for are obviously permitting a big leak to continue. The labor in a large plant is so much less than is required in a number of scattered small plants that in general the central station ought to be able to produce electrical energy more cheaply than can one operated exclusively for a railway, especially a small railway.

It seems to me that the people who use our cars are becoming more considerate in their thinking and treatment of our utility and other utilities. There was a time when it seemed as if a large number of communities would wish to take over their electric railways and try the experiment of municipal ownership and operation. The wave of interest in this matter is receding, as the public becomes better acquainted with the results of the experiments that have been made. Municipal ownership, in my opinion, is not the solution of the transportation problem, but it is rather in customer ownership. This might be called civic ownership; that is, ownership by the people as individuals, as opposed to municipal ownership—ownership by the people as a community. The difference here is largely in the elimination of politics and the development of good will and interest through a sense of personal ownership. This arrangement, to my mind, combines the advantages of public and private ownership and operation.

The "community traction" plan, as it is being operated in Toledo, is a step in the right direction. Here we have private operation with city supervision, and a large participation by the patrons in the financial results of operation. At the present time the service-at-cost plan in some form seems necessary, if the electric railways are to survive and, surviving, to give the service that the public demands.

The successful manager of today is one who is personally acquainted with his organization. All along the line the importance of the personal element must be stressed. The officials and department heads must travel with the men on the cars and become acquainted with them. They must frequent the recreation rooms and other places where men gather while waiting for their runs. They must get the men together for conference as often as circumstances warrant.

Developing Esprit de Corps in the Organization

In Toledo we have an association of employees which performs an important function for us. Visitors to our property have remarked the enthusiasm and good-fellowship which seem to prevail. The personality of our chief, Henry L. Doherty, seems to permeate the organization, and all of his associates try to carry out his ideas of personal acquaintance. Our organization conducts educational work, welfare work and entertainment features. We have found affiliation with the national organizations of the utilities which we represent to be very effective. The good-fellowship fostered through our employees' organization is in evidence in their relations while on duty.

I am a strong believer in the value of frequent departmental meetings for the consideration of matters affecting operation. The suggestions of the actual operators of cars should be secured and acted upon after conference at these meetings. Attention should be paid to suggestions of minor officials and inspectors, and every effort should be made to let them know that their interest is appreciated.

In the foregoing remarks I have tried to give a basis for my optimism regarding the immediate future of the electric railway business and have endeavored to direct attention to means for increasing income and reducing

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expenses. To many progressive men these suggestions may seem trite, but there is no doubt that we can all make definite progress along the lines indicated. The first of the year is a good time to resolve to practice more completely some of the principles which we know to be sound.

Better Public Relations

By W. H. Sawyer
President East St. Louis & Suburban Railway, East St. Louis, Ill.
Fourth Vice-President American Electric Railway Association

This Was the Outstanding Accomplishment of 1922 and It Is the Greatest Need for 1923—Handling of Bus Competition, Easier Financing and Most of Our Major Problems Depend on It

THE progress made in the appreciation of the mutual relations between public and company stands out as the greatest step forward in the affairs of the industry during the past year. The year 1922, particularly, has shown that the earlier endeavor in the matter of public relations is bearing fruit. Something very definite has really been accomplished, and it gives inspiration to renew the effort, for the importance of this matter is far greater than the discovery or development of any new type of car, however efficient.

Fundamentally, the industry is really in a more sound condition than it has been for ten years or more, because the circumstances which came along with the war have caused us to go to the bottom of our difficulties, and having determined them, to start cleaning out the cobwebs and the mushroom foundation and to supplant these with a foundation and structure that are solid in the light of public opinion. The strength of our situation is that we are now looking the facts squarely in the face and have started knowingly to pull ourselves out of our troubles. We are more sound than before the war because we know and have admitted our fallacies and, with that behind, are going ahead constructively. When one knows and admits his faults, it is not hard to work out the remedy. And with this as the goal there is every reason for optimism, for the cities cannot go on without the street railways.

The opportunity still exists, perhaps more than ever, to accomplish much through the medium of keeping the public informed and doing all that is possible to promote friendly relations. It can hardly be expected that we can undo in a day the results of an attitude that has been with us through several generations. But the accomplishments of the last five or six years have really begun to show the improvements that may be expected with the development of the understanding of mutuality of interests between public and railway.

The prosperity of local industry depends very much on the street railway. On the other hand, the prosperity of the street railway is assured, not only because of this improved understanding of the railway by the public, but due to the general abolition of a standard fare. If the street railways had now to face a uniform level of 5 cents or 10 cents as the rate of fare for the next five or twenty years, there could not be as great assurance in going after new capital as there can now with the understanding that fares must vary with cost. While I cannot enthuse over the strictly service-at-cost type of franchise, such a franchise is better than one carrying a fixed fare as one of the terms. The fixed maximum return on the investment, which is usually a clause of the service-at-cost franchise, goes too far, for it takes away the incentive for high efficiency in operation.

We have not yet done our share as operating men fully to inform the public of the fact that future extensions of railway lines depend solely on our ability to get new money. There is not yet a full appreciation of the necessity that the railways shall earn a full return on the present money invested in their systems, so that investors may have the confidence to put more money into the property with reasonable prospect of a good return and repayment of the investment.

Incidentally, those investment bankers who have advertised that their utility securities do not include railway securities have unduly and unfairly hurt the railways and themselves. I do not believe any one ever gets anywhere by pushing some one else down. In my opinion street railway securities are a better investment today than they have been at any time in ten years, for the reasons pointed out with respect to public relations, and because the worst is past and the securities are on the up-grade. Present prices now reflect decidedly past faults rather than future possibilities.

What Is the Bus to Mean?

We have divergent views with respect to the bus and how it will affect the electric railways. It is apparently a fact that neither street railway earnings nor riding habit are going to increase as rapidly in the future as they have in the past, due primarily to the privately owned automobile. But this does not mean that electric railway securities will not be a good investment. There are isolated spots where the street railway is not going to be as well off as it is today. In those places where the population is stagnant, with the use of automobiles on the increase, there must naturally be less business for the street railway.

Of course the bus is going to be a less formidable problem to city lines than it is to the interurban railways. And even on the interurban lines, the bus is not going to bother as much as the private automobile, because we are rapidly coming to the time when the bus is not going to be a free-lance jitney, but instead a public utility in every sense of the word. And as such it is going to work as a part of the whole transportation scheme and work with the street railway and the interurban to handle the transportation of the communities. Buses are not going to be permitted to supersede either street railway or interurban as a competitor. This is as it should be, because if the men who have put money into the present transportation systems are not reasonably protected, as they deserve to be for the development of the territory which they have fostered, no one is going to put up the necessary money to develop fully a new public service.

The interurban still has a real field of service. Buses are going to operate, to be sure, but not paralleling interurban lines, because the regulators are not going to allow this. It is not sound and both are needed and both cannot live in many cases. The solution is co-operation between the two forms of passenger transportation. When the rails wear out on some of the traction lines, the bus will probably take the place of the rail cars, and it will be buses operated by the railway people, as it should be.

Where commissions have no jurisdiction over the buses at present, they must be given this authority.

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Conditions in the transportation field will be chaotic until this is done. If the bus is to come, it must come as a dependable public utility. There are no instances yet of a community being properly served on a permanent basis by an irresponsible bus system. The buses need the regulation of the commissions to give them a dependable and permanent character.

What is the best way to attack these problems in 1923? Public relations again. An understanding on the part of the public regarding the true aspects of transportation services will cause commissions to exercise their power where they have authority, and where they have not, will cause them to be given it. We will never get anywhere by simply damning the other fellow. I do not believe this ever gets any one anywhere. We must work with the bus.

Whether or not the improvement in public relations and general financial improvement of the industry has gone far enough so that there will be a noticeable easing in financing for the electric railways is questionable. I think the cycle has hardly progressed far enough yet for this. The readiness with which financing can be done will lag behind improving public relations. But this is not at all discouraging. A building program is not necessary. We have not yet reached the ultimate goal in our understanding of ourselves and in our mutual relations with the public. While we may not be able at a safe cost to finance great extensions, we must find it possible to make those improvements necessary to keep faith with our customers, such as more cars and better service. But it is better not to do too much. It is better to perfect what we have than to reach out in extending our rail lines. I never expect to see new street railways financed along the lines we have been accustomed to in the past. In any event we must live within our income.

Employees Must Co-operate

We have talked about our obligations to our customers and to our employees, and these are of foremost importance. But if we fulfill our obligations in these respects we have a right to expect fair treatment from others. Our employees must co-operate with us to fulfill our obligations to our customers. They must sell our service to satisfied customers. They must not expect to dictate the policy of the executives nor to interfere with proper efficiency of operation, assuming always that we have treated them fairly as our associates.

When we give our customers good, efficient service, with courteous conductors and clean cars, the customers must pay for the cost of that service, including the cost of money. When our service is condemned, I am embarrassed and regretfully apologetic, until the fault is corrected. But when the charge for the service which allows only a fair return on the investment is attacked, I am ready to fight, if necessary, for in the final analysis it is our business as executives to secure a fair return on the investment—to make a profit if you will—or there will be no new money available for improvements and betterments in service. And if no new money is available, we cannot do those things which we all know must be done for the benefit of the community served. It is just a plain business proposition. If we are not allowed to make a fair return, we cannot give the needed service, and every progressive community needs good progressive service from its most essential industry.

Conditions in the Industry

C. D. EMMONS, president American Electric Railway Association, has issued the results of an analysis of the situation of the electric railways of the country. His general conclusion is that conditions have improved during the past year. A summary of his analysis follows:

Despite the growing use of pleasure automobiles and keen bus competition in many sections, more rode on electric railways during 1922 than in 1921, the total number having been in excess of fifteen billions.

Net operating revenues increased 7.4 per cent, although gross revenue was off 2½ per cent owing to general fare reductions per passenger from 7.49 to 7.33 cents. A decrease of 5.9 per cent in operating expenses served largely to offset the fare reduction loss. The operating ratio dropped from 75.2 to 72.4 per cent.

Receivership records, as compiled by the association Bureau of Information and Service from Jan. 1 to Dec. 15, 1922, show that properties with a total mileage of only 517 and total outstanding securities of $30,986,000 went into receivership, while roads with 458 miles of track and total securities of $88,729,350 came out.

Receiverships throughout the industry have decreased gradually since 1919, when the peak was reached with forty-eight companies, embracing total securities of approximately $535,000,000, going into receiverships. Financial conditions with some of the largest companies now in receivership are improving, and at least one and possibly more of them may emerge at any time.

The general tendency among regulatory bodies is to keep fares at a level proportionate to increased material and labor costs. The average fare today in a group of 275 representative cities is approximately 43 per cent higher than it was at the outbreak of the war, while the average wage increase is 91 per cent and the average material cost increase is 102 per cent.

Fares range from 5 to 10 cents in 607 leading cities. The 7-cent fare is operative in the largest single number of cities, 184; the 10-cent fare comes second in 144, and the 6-cent fare third in 102. Other cities of this group are paying as follows: Eight cents, 79; 8 cents fare, 1-cent transfer charge, 26; 5 cents, 20; 5 cents city zone, 5 cents outside, 14; 5-cent fare reduced from higher fare, 13; 6-cent city zone, 7; 5-cent fare, additional charge for transfers, 7; two 5-cent zones, 2; 6-cent zones, 1; 6-cent city zone, 1-cent charge for rides outside, 1; 6-cent zones, average length two miles, 1.

Entirely aside from earnings, the local transportation situation is improved in most communities. The bus situation particularly is clarifying. Whereas a year ago bus competition had reached such a point that electric railways in several cities were compelled to suspend operations temporarily, today managements, regulatory bodies and the public gradually are co-operating more generally in an effort to find the proper place for the bus. Many electric railways are adding supplemental bus service and regulatory bodies are restricting bus lines to territory not served by electric railways and classing them as common carriers, with the same responsibilities as electric railway lines.

A dozen cities have relieved their companies of paving charges, and others doubtless will take similar action during the coming year. Recognition of the fact that present paving requirements are largely relics of horse-car days when the company horses actually wore out pavement is becoming general.

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The Double-Truck, One-Man Car Is Popular in Detroit

Electric Railway Engineering Progress of the Past Year

An Analysis of the Accomplishments Which Have Been Made in Recent Months in Track, Car, Power Plant, Power Distribution and Heavy Traction Engineering, Together with Some Comments on the Relation of Engineering to the General Problems of Transportation

AS ONE year closes and another opens it will be beneficial to all of us to reflect upon what engineering has done recently for electric railway transportation and what it may do in the future. In the conviction that the impressions of many engineers in both the manufacturing and the operating fields would be more helpful than the notions of any one man, the co-operation of several scores of such were sought in the preparation of the following notes.

The subject will be examined under the respective heads of track, cars, power generation, power supply and electrification. Before details are examined, however, it is suggested that the messages from a number of engineers given on pages 14 and 16 be perused to form a background for what follows.

Track and Paving

Good track has been seen to be one of the requisites of good service. What are way departments doing to insure continuously good track? Well, among other things they are industriously working to improve joints, foundations, paving and other details. Victor Angerer, of William Wharton, Jr., & Company, Inc., says that the special trackwork manufacturers see a decided tendency to settling down to more uniform practice. The standard sections of grooved girder and girder guard rail are now given preference by probably one-half of the street railways. Several manufacturers have discarded their own systems of track spirals and now follow the "uniform system." Recommended lengths of tongue switches, mates and frogs are being generally followed. H. P. Hevenor, Dwight P. Robinson & Company, is impressed by the way in which the rail joint is developing, by the increased use of the steel tie in paved streets, with a consequent growing tendency toward the use of rigid track construction, of which the recent installation of 40 miles of such track in Detroit is an example, and by the intelligent way in which labor-saving devices are being used in new construction and maintenance work, as on the Pittsburgh, Cleveland and other progressive properties.

Outstanding in interest to way engineers, and winning their hearty approval, was the recent appropriation of $10,000 by the American Electric Railway Association for rail-joint tests, followed by subscriptions from railways for a similar amount. E. M. T. Ryder, way engineer Third Avenue Railway System, New York City, reports that the committee on welded rail joints, which is functioning under the auspices of the American Bureau of Welding, is now at work on the proposed rotary service testing machine (see ELECTRIC RAILWAY JOURNAL, Jnue 17, 1922, page 977) and upon the preparation of sample joints to be tested by various other methods. Testing work will probably be under full headway during the coming summer.

According to Francis Tingley, Washington (D. C.) Railway & Electric Company, the urgent question in trackwork has been to select the proper labor-saving tools and, having them, to find extra work for them so as to increase their usefulness. A typical manufacturer's slant on this matter is given by E. P. Seymour, president E. P. Seymour Rail Grinder Company, who reports increasing appreciation of the possibilities of track grinders. The same is true with regard to tie tampers, track drills and other track tools. In the field of larger track machines, H. M. Steward, for example, reports excellent results with the Clark concrete breaker installed last year by the Boston Elevated.

Mr. Tingley also calls attention to the large increase in the use of electric welding equipment, especially in

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keeping switches, mates and frogs in service for years after they would otherwise have had to be junked. The unofficial affiliation with the American Welding Society, which has come about through the rail-joint test program, will enable way engineers to utilize the best information available regarding the welding art.

The way experts did a good thing last year in securing the appointment of a special committee on rail head and wheel contours. They have believed that rail life can be lengthened by adaptation of these contours to each other. Many wheel experts are dubious about this. A committee with nothing to do but determine the facts ought to get somewhere. If the members differ as to the fundamental facts, all they need are data to determine these. In the opinion of H. Fort Flowers, president Differential Car Company, the work of this committee will eventuate in startling reductions in the number of necessary contours.

The establishment of friendly relations with the welding society was not the only accomplishment of the year in this line. As a result of suggestions from the utility men, the American Society for Municipal Improvements opened its membership to them. There is thus afforded an opportunity to thresh out among engineers the many track and other problems that are of mutual interest to municipalities and utilities.

Another way department salient, so to speak, in the past year or so was the progress made in wood preservation. Railways seem actually to be coming to realize that it pays to make timber last longer. Here is another case where a special committee is at work, and including in its membership men who are practical timber preservationists.

J. N. Dodd, consulting engineer, says that probably the most conspicuous advance in the transportation field last year was the completion of the Frankford Elevated line in Philadelphia. While its mileage is but 6½, this structure is notable for its solid track roadbed, which, with other elements of the design, insures noiseless operation. Other features are the outside platforms and the artistic station buildings. Mr. Dodd gives large credit for the success of the undertaking to the manufacturers for the perfection of detail of the products which went into this enterprise.

Track Must Have Good Foundations

To quote Mr. Flowers again, way engineers have recently realized as never before that next to rail-joint weakness in causing expensive track maintenance comes the laying of the track on inadequate foundations. Where concrete foundation is used it must be of the highest grade, which means the use of labor-saving machines for mixing and transporting materials. He believes in central mixing plants, or mixing cars, recent experiments having shown that an hour can elapse between the mixing and pouring of the concrete without damage.

In this connection T. J. Lavan, assistant general manager International Steel Tie Company, says that during the past year his company has been giving special attention to the method of tamping concrete under the tie structure. Failures of concrete-foundation track, either with wood or steel ties, have been found to be due to faulty installation, principally poor tamping. An example of good tamping which he cited was that done in Kansas City recently under the direction of A. E. Harvey, Kansas City Railways.

As to wood ties, the past year has brought out more forcibly than before the importance of treatment with preservatives. Also the Philadelphia Rapid Transit Company installed a large number of ties of Douglas fir, an innovation in the East, the result of which will be watched carefully. The interest in substitute ties also seems to be on the increase, according to reports received from the manufacturers.

Considerable perturbation was caused during 1922 by some marked deviations from standard rail sections for use in paved streets, particularly in San Francisco and Cleveland. These were exceptional, however, and affect a small part of the total city mileage. Whether they will ultimately affect the standards depends upon the later extent of their use.

In the meantime the present sections will be assumed to be satisfactory for most cases and attempts will be continued to reinforce their position by securing more users for them. Aside from changes in rail sections, a real and radical accomplishment was made last year, in the opinion of Howard H. George, Public Service Railway of New Jersey, in the substitution for the drop test of the modified Brinell impression test for rails.

Joint Practice Is Changing Most Rapidly

While rail specifications are now reasonably stable, joint practice is far from being so. In 1922 great activity in this field was manifest. Manufacturers have made noteworthy additions to, or improvements in, their products. An example is the practical application of the Jacobs butt-weld joint. (See ELECTRIC RAILWAY JOURNAL, June 10, 1922, page 940, and Aug. 26, page 285.) This is now in use to an extent sufficient to give confidence in its future. Seamweld joints have also made substantial progress. On account of their novelty they will be made the subject of early tests by the rail joint committee, which it is believed will yield data such as to reinforce confidence in this type of joint.

That even as well established a proposition as the thermit joint can be improved was demonstrated in 1922 by the change in the reinforcing collar so as to produce a weld with less thermit than was formerly believed necessary. Some rearrangement was also made in the proportions and location of the pouring gate, the heating gate and the riser. A narrower gap is also used between rail ends. J. H. Deppeler, chief engineer thermit department Metal & Thermit Corporation, mentions also as improvements the perfecting of the self-luting mold box and the light-weight pre-heater, as well as the substitution of aluminum for wood patterns in making the rail molds.

Mr. Angerer sums up the present situation in regard to special trackwork about like this: Several electric railways are experimenting with carbon and alloy steels, like nickel-chrome steel, in place of manganese in order to facilitate repair work with the aid of the electric welder. The applications consist mostly in solid castings for switches, mates, frogs and crossings, the same general sections as are made of manganese. The Milwaukee and other properties have successfully installed such structures. In some cases carbon or nickel-chrome inserts or centers were used in place of the manganese-steel centers of the conventional hard-center-construction frogs. The ultimate economy of this practice remains to be demonstrated.

A departure from usual practice which, although not new, made notable progress during 1922, was the carrying through of the flange bearing between intersec-

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tions of crossings and in layouts where intersections came close together. While this has been done in some cases in the past in solid manganese-steel structures, and was the practice in early days, the effect on wheel flanges limited its application. With modern steel wheels and improved chilled wheels the objections are removed. The smoother riding qualities and long life of the flange-bearing special trackwork have led to the bringing out of girder guard rail sections with shallow grooves for this purpose, and special trackwork utilizing these sections in certain portions is a probable development for the future.

The hope of way engineers and special trackwork manufacturers is greater uniformity in wheel equipment and other features of rolling-stock so as to make possible the designing of special trackwork on closer lines for wear and final economy to the users.

Paving and Track Are Intimately Related

An important point of contact between municipal and utility engineers comes about through the intimate relation of street paving and track structure. Their points of view are naturally diametrically opposite. E. P. Roundey, New York State Railways, sees a tendency on the part of the municipal engineers to recognize that the railways are carrying more than their share of the paving responsibility and expense. It is to be hoped that he is correct in this. Certainly the conference held on Oct. 9, 1922, under the auspices of the Philadelphia Engineers' Club, with the purpose of bringing out all sides of this question was a notable event of recent months.*

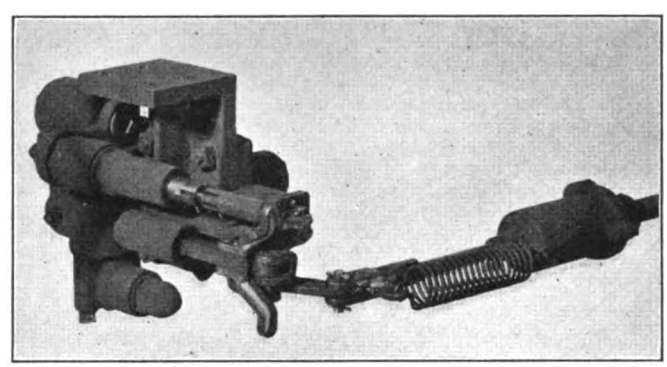
Way engineers have taken an active part in pushing the campaign for paving-burden relief, as the burden affects their department primarily. Mr. Ryder calls attention to the fact that the special committee of the New York Electric Railway Association considering this question concludes that the maximum obligation that should be imposed is the cost of repairing and renewing pavement in the railway area in excess of the cost of repairing the same amount of pavement in adjacent city-maintained areas. This viewpoint was clearly set forth in addresses by A. T. Davison, Third Avenue Railway System, last year.†

J. B. Tinnon, Chicago & Joliet Electric Railway, emphasizes the failure of most types of pavement to withstand the excessive loads imposed in the track area by motor trucks, which in many cases now far exceed the car loads. In his opinion the whole design of track construction will have to be changed on this account.

Some Notes on Rolling Stock

Never in the history of the electric car has its evolution been taking place more rapidly than it is at present. Testimony is unanimous to the effect that weights must come down, and designs must be made for one-man operation to the maximum possible extent. Weight reduction in city cars has been in the lead, but this movement has now reached the interurban field. A notable feature is the development of light cars for schedule speeds of 25 m.p.h. and over, with a maximum speed of say 50 m.p.h. This will result in power and maintenance saving and in general operating economies. In many cases present heavy cars can profitably be replaced with the lighter ones. W. G. Stuck, Lexington (Ky.) Traction & Terminal Company, goes so far as to believe that there are cars weighing 75,000 lb. and equipped with 75-hp. motors that should be replaced with others weighing 25,000 lb. and carrying 25-hp. motors. A report from another source states that this development is illustrated by Mr. Stuck's company and others in the vicinity. For example, the Cincinnati, Milford & Blanchester Traction Company has, in four and one-half years of operation of a type of car weighing 25,600 lb., saved in operating more than $15,000 per car. At the end of this period maintenance costs are low. Operation of this type of car costs 17 to 19 cents per mile.

Many cities also have had success with the one-man double-truck car, although its design is still in the development stage. A complication is the provision for rush-hour traffic, but this is being met by various mechanical devices or by provision for putting on an extra man in the rush hour. An outstanding example of the double-truck one-man car is the type of car now being built by the Chicago Surface Lines.* Dissatisfaction that has developed in some places regarding the operation of one-man double-truck cars is at least partly due to the way in which old bodies, not inherently well adapted for this purpose, have been changed over. Obviously, to be successful such a car must combine safety, comfort, good loading qualities and general convenience of operation.



The Variable-Load Air-Brake Attachment, Applied to Surface Cars, Is One of the Technical Developments of 1922

There is a proper division of the transportation field among one-man single-truck, one-man double-truck and other types of cars which has not always been appreciated. This was recognized practically in 1922.

In all of this design the possibility of using stronger and lighter material needs consideration. A consistent advocate of this has been J. M. Bosenbury, Illinois Traction System. He recommends superior material, such as alloy steels, in order to reduce weight, insure safety of passengers and minimize maintenance costs. In line with this is the increasing extent to which lumber and sheet metal substitutes, such as Agasote, Haskelite, Plymetl, etc., are being employed for roofs and sides. These minimize weight and increase strength. For example, Haskelite plywood roof is claimed to be 30 to 40 per cent lighter than ordinary wood, and many times stronger and stiffer.

The statistics printed elsewhere in this issue tell the story of present preferences as to general features of car design. They illustrate what has been said above and indicate a great change as compared with a few years back. The changes in car equipment show prog-

*See issues of this paper for Nov. 4, 1922, page 747; Nov. 11, page 7[illegible] and Nov. 18, page 822.

†See issues of this paper for July 1, 1922, page 19, and Nov. 18, page 823.

*See issue of this paper for Sept. 30, 1922, page 514.

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ress also, but are not so radical. In the case of motors, for example, these have been brought to a degree of ruggedness and serviceability which was never before approached.

The insulation of the motors has been bettered by the use of materials and methods which give greater protection from the effects of vibration, heat and moisture. Mechanical strength has been added to enable the motors to withstand the racking punishment of present-day railway service.

Noteworthy is the rapidly increasing popularity of the field-control motor which was installed on several hundred subway cars during the year. This motor is adapted to severe duty, high speed and difficult schedules, which are incidental to subway passenger service. One manufacturer reports that a total of 175 equipments of electro-pneumatic control have been installed on city and light interurban cars, nearly all of these being mounted in cabinets. This control embodies switches of the unit type, the idea being to provide flexibility in mounting the switches, lightness and accessibility.

The aluminum field coil for motors was a development that aroused much interest. This is made of rectangular wire by the following process: The bare wire is wound into a coil, paper spacing strips being inserted between layers. The coil is then heated and immersed in an oxydizing solution. It is then reheated

New Year's Messages from Engineers You Know—I

How 1922 Forwarded the Cause of Electrification

There are fundamental reasons for electrification which are now being more fully recognized by steam railroad executives and banking interests behind them, so that immediate construction can be anticipated. Perhaps no single factor has contributed more to this conclusion than the shopmen's strike during the past summer and its effect upon steam motive power. I therefore regard 1922 as having contributed largely to our understanding of the advantages of electricity over steam and expect that 1923 will witness active construction growing out of this knowledge.

—A. H. Armstrong.

Automobile Is Here to Stay

Experience gained prior to and during the past year has shown more clearly than ever that the automotive vehicle is here to stay, and must be met by electric railways in a spirit of co-operation rather than in one of antagonism. The railways must constitute themselves as transportation companies and utilize the bus as an aid, either as a feeder to existing lines or as a substitute in certain cases for existing lines.

—John A. Dewhurst.

The Automatic Substation a Factor

The active interest in the automatically controlled substation indicates an effort to reduce operating costs. This is necessary to effect ultimate lowering of fares from war-time figures and to meet competition, in some cases, from other transportation agencies. Along with this interest, and for the same purpose is the tendency to collect and study data on general operating conditions, such as trolley-wire wear, life of poles, etc.

—Adrian Hughes, Jr.

Help Along the Cause of Standardization

At this time there should be emphasized the substantial step forward that has been taken the past year by the American Association in co-operation with the American Engineering Standards Committee. The latter is making remarkable progress, not only in the review and approval of standards but in the co-operation with the Federal Specifications Bureau. There never before has been the opportunity that we have today in getting substantial results in standardization. All electric railways, as well as the associations, should renew their efforts in the direction of standardization to the fullest possible extent.

—Martin Schreiber.

As the Engineer Sees It

Although outside the range of engineering, the following appear to me to be the significant elements of the electrical railway business at present: (a) Growing recognition of the fact that the business of a transportation utility is to transport by the means best adapted to get business; (b) growing appreciation of the necessity for going after business, by convincing the public that the service given is just what it wants, and really trying to give such service; (c) continuation of rational policies of economy.

—Charles Rufus Harte.

Sentiment Favors Labor-Saving Tools

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It seems to me that the most significant thing that has recently occurred, although of course it was not confined to the past year, is the tendency for engineers, manufacturers and others concerned to get together for the purpose of setting standards. This is a real co-operative movement and one which must be productive of good, even though some of us may have to sacrifice some of our pet ideas. *—H. S. Murphy.*

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The fuller realization, which is in evidence on every hand, of the importance of research work as applied to some of the stubborn problems facing the industry, with actual research work now under way on the rail-joint problem, leads to the hope of early inauguration of a real study of that cancer of the industry known as rail corrugation. The past year was a milestone in electric railway engineering because of the conviction on the part of executives that expenditure of money on research by the association is a wise investment. *—R. C. Cram.*

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The electric railways are alive to the growing competition from other means of transportation. To meet this the operation of cars should be made as noiseless as possible and their speed should be increased. Speed should be had both by increasing the running miles per hour and eliminating unnecessary stops. The old saying "time is money" applies to car riders, and their time should be conserved up to the safe limit of speed approved by modern practice. *—J. H. Haylow.*

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Undoubtedly the most important development of the year in this field was made by the Johnson Fare Box Company in its new combined fare box and register. This is motor-driven and provides three separate registering features: The usual disk on the side of the fare box, a large register located on a rod above the box and in plain view throughout the car and an indicator at the level of the conductor's eye which is a telltale on the fare deposited by individual passengers.

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An illustration of the way in which reduced car weight brings about other developments is furnished by the variable-load air brake, recently adapted to surface cars and applied initially for the Eastern Massachusetts Street Railway. On light cars the required braking force required for uniform stopping distances varies notably with the load, which at times may equal that of the empty car. The air brake lends itself well to the addition of an attachment which controls the available braking force through variation in distance between the body and truck bolsters under varying load.

Other illustrations are found in the many devices recently developed to relieve the operator of miscellaneous operations. Air operation of doors and steps, thermostatic control of temperature and other features of a modern car, while not new, fit in well with the one-man plan of operation.

Gearing offers another attractive field for investigation. During 1922 service tests of the helical gear continued, more than 30,000 gears being in use, and practice tended to settle down to a steady gait. A new pinion design, involving the use of the so-called "wisdom tooth," made its appearance. This is a thicker-root tooth which can be run successfully with worm gear teeth. It requires more room on the pitch circle and, for a given size, runs one less tooth to the pinion. The manufacturer states that a considerable number of railways are using the pinion either regularly or experimentally and that comments regarding it are favorable.

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In and Around the Power Plant

In his annual review of the power-plant situation, John Liston, General Electric Company, notes as the outstanding tendency that toward the concentration of generation, transformation and distribution of electrical energy in large units of constantly higher guaranteed efficiencies. The maximum size of steam turbine sets was advanced to 62,500 kw. during the year, and of water-wheel generators to 65,000 kw., with corresponding increases in capacities of switching and auxiliary apparatus.

Coupled with this tendency is another in the direction of further use of automatic control. E. H. Scofield, engineer of power Twin City Rapid Transit Company, who has made a close study of this matter, states that many features of automatic equipment applicable to the governing and controlling of boiler and stoker equipment operation are available. There is needed, however, a co-ordinating of all of these to perfect a complete system, including all elements essential to full automatic control.

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ress also, but are not so radical. In the case of motors, for example, these have been brought to a degree of ruggedness and serviceability which was never before approached.

The insulation of the motors has been bettered by the use of materials and methods which give greater protection from the effects of vibration, heat and moisture. Mechanical strength has been added to enable the motors to withstand the racking punishment of present-day railway service.

Noteworthy is the rapidly increasing popularity of the field-control motor which was installed on several hundred subway cars during the year. This motor is adapted to severe duty, high speed and difficult schedules, which are incidental to subway passenger service. One manufacturer reports that a total of 175 equipments of electro-pneumatic control have been installed on city and light interurban cars, nearly all of these being mounted in cabinets. This control embodies switches of the unit type, the idea being to provide flexibility in mounting the switches, lightness and accessibility.

The aluminum field coil for motors was a development that aroused much interest. This is made of rectangular wire by the following process: The bare wire is wound into a coil, paper spacing strips being inserted between layers. The coil is then heated and immersed in an oxydizing solution. It is then reheated

New Year's Messages from Engineers You Know—I

How 1922 Forwarded the Cause of Electrification

There are fundamental reasons for electrification which are now being more fully recognized by steam railroad executives and banking interests behind them, so that immediate construction can be anticipated. Perhaps no single factor has contributed more to this conclusion than the shopmen's strike during the past summer and its effect upon steam motive power. I therefore regard 1922 as having contributed largely to our understanding of the advantages of electricity over steam and expect that 1923 will witness active construction growing out of this knowledge.

—A. H. Armstrong.

Automobile Is Here to Stay

Experience gained prior to and during the past year has shown more clearly than ever that the automotive vehicle is here to stay, and must be met by electric railways in a spirit of co-operation rather than in one of antagonism. The railways must constitute themselves as transportation companies and utilize the bus as an aid, either as a feeder to existing lines or as a substitute in certain cases for existing lines.

—John A. Dewhurst.

The Automatic Substation a Factor

The active interest in the automatically controlled substation indicates an effort to reduce operating costs. This is necessary to effect ultimate lowering of fares from war-time figures and to meet competition, in some cases, from other transportation agencies. Along with this interest, and for the same purpose is the tendency to collect and study data on general operating conditions, such as trolley-wire wear, life of poles, etc.

—Adrian Hughes, Jr.

Help Along the Cause of Standardization

At this time there should be emphasized the substantial step forward that has been taken the past year by the American Association in co-operation with the American Engineering Standards Committee. The latter is making remarkable progress, not only in the review and approval of standards but in the co-operation with the Federal Specifications Bureau. There never before has been the opportunity that we have today in getting substantial results in standardization. All electric railways, as well as the associations, should renew their efforts in the direction of standardization to the fullest possible extent.

—Martin Schreiber.

As the Engineer Sees It

Although outside the range of engineering, the following appear to me to be the significant elements of the electrical railway business at present: (a) Growing recognition of the fact that the business of a transportation utility is to transport by the means best adapted to get business; (b) growing appreciation of the necessity for going after business, by convincing the public that the service given is just what it wants, and really trying to give such service; (c) continuation of rational policies of economy.

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spect to the needs of the time. Aside from providing mechanical perfection in their product, the boiler builders can assist in reducing energy costs by providing for a higher pressure and higher temperature. A. G. Pratt, vice-president Babcock & Wilcox Company, states that improvement in stokers, mechanical oil burners and economizers have resulted from the endeavor to get more economical and efficient service from given boiler, superheater and economizer areas. His company has, as a result, developed the Waukegan type of boiler, which is being built for pressures from 350 lb. up. Boilers of this type for 600 lb. pressure are now being constructed.

The Waukegan boiler is built with two decks of tubes, the lower of 3¼-in. and the upper of 2-in. tubes. The superheater is between decks. The lower tubes are exposed throughout their entire length to the fire and there are no baffles in the lower section. The higher pressure is permissible in this boiler due to the small tubes and the extra strong headers.

Mr. Pratt states that for pressures from 250 to 350 lb. engineers have shown interest in the new Cheswick type of cross-drum boiler, in which the superheater is placed between an upper and a lower deck of tubes, and the tubes of the lower deck are exposed for their entire length.

Improvements in boiler and furnace design have increased the heat absorption by the tubes ahead of the

New Year's Messages from Engineers You Know—II

Good Maintenance an Element in Service

In order that electric railways may better meet the increasing competition of the gasoline bus, their equipment must be carefully maintained so as to increase the attractiveness of the cars. Clean, attractive cars, not overcrowded during the rush hours, together with carefully maintained schedules, will bring back the business. The electric railways should themselves go into the bus business to supply feeders for their lines.

—W. Schaake.

Steel Container a Promising Development

The most important thing railways have to face at present is an improvement in freight handling. The length of time required for handling l.c.l. freight is practically prohibitive, and the railways will lose all of that business where it is possible to obtain transportation by other means. The steel container appears to be one of the best things that has appeared in recent years to facilitate the handling of such freight. The congestion on the railroads is mostly at the terminals, and that is where the big improvement must be made. Electrification should play a large part in this work.

—N. W. Storer.

Why 1923 Should Be Progressive

I expect to see in 1923 at least a partial recovery of the electric railways from their unfortunate financial condition resulting from the increased operating costs of the war period. This, I believe, will be brought about by concentrated effort on the part of electric railways throughout the country, by the proper use of advertising matter and by co-operation with the public. Certainly the better the public understands the transportation business the better it can judge of the need for relief.

—L. F. Griffith.

Urge the Open Mind

More than any one thing in the electric railway industry we should urge the open mind. There are many places where competition with other transportation agencies should be replaced with co-operation. The field of our work is local and interurban transportation, and the attention of our entire personnel should be centered on transportation rather than street car problems. It is within the Province of an urban transportation company to handle not only street car and auto-bus transportation, but also package deliveries for department stores and others, general trucking and even taxicab service. I look to see the day when the existing plants of street railway companies will be used during off-peak and night hours for freight transportation. Moreover, I believe that this freight business can be worked up in conjunction with the steam railroads and can be made the basis of community good will, if only the idea of "service" is held to the front. *—J. P. Barnes.*

Engineering and Transportation Competition

One of the outstanding things that electric railways might do from an engineering standpoint is to make more complete studies of their schedules to determine what can be done to bring about operating economies and improve facilities better to meet the increasing competition from automobiles and other means of transportation. The human factor, also, ought to have careful consideration. *—Edwin D. Dreyfus.*

Six Things to Be Done

We should urge: (a) Improved service as regards condition of equipment and frequency of operation; (b) adoption of light-weight cars for city, suburban and interurban service and operation of these by one man wherever practicable; (c) use of automatic substations and purchase of power from large central stations; (d) continuous use of safety cars in city service; (e) extension of existing rail routes by means of trolley buses; (f) replacement of old types of rolling-stock and equipment with modern apparatus.

—H. L. Andrews.

Utilizing the Collective Effort of the Industry

If I were to suggest any principle to be urged upon our engineers, it would be that every one should endeavor to utilize more fully and contribute more to the collective effort of the industry. We should each try to know more about the work that has been done and made available for application to our own problems, and we should each give reasonable encouragement and assistance to those who are seeking to make available to the industry the results of their individual experience. *—Ralph W. Eaton.*

Service Is the Answer

Especially during this time of more or less inflated prices the service must be the best possible, and it must remain so as normal conditions return. Regular and frequent service is the chief attraction of this service. All engineering considerations controlling the industry must be studied, such as routing, types of track, designs of equipment and handling of schedules. Only thus can competition be met. *—S. Clay Baker.*

Possibilities of Freight Haulage

A phase of transportation work which is bound to come in for further development is that of urban and interurban freight haulage, making a better use of present city tracks. The movement now on foot to improve the use of streets will result in restriction of vehicular traffic, with consequent opportunity to speed up street car service. *—Karl A. Simmon.*

Good Track and Light Cars Essential

My only suggestions as to meeting the competition from other transportation agencies are, first, that tracks be constructed with a view to securing the longest possible life and, second, that the lightest cars which are adequate for the service be operated. These practices will tend to economy in annual track cost and in car upkeep also.—*H. M. Steward.*

A Good Word for Standardization

I look for an increasing adoption of the ideas of standardization, although I am not unmindful of the opposition to this on account of the fear that it will stifle initiative. Looking ahead, I think that electric railway managements should heed more and more the advice of engineers as to the economic points involved in meeting the competition from other transportation agencies and should more widely advertise them.—*John R. Mc Kay.*

Competition Must Be Met

To my mind one of the most important factors in our industry today is the growing competition from both public and privately operated automobiles. The most pressing need for engineering development is along the lines which will increase the safety, comfort and convenience of our passengers in order that service may be further improved and thus competition more fully met.

—J. H. Hanna.

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usual position of the superheater. At the same time there has been a demand for higher superheat and a greater quantity of steam per hour at higher pressure. This condition has brought about the design of the radiant heat superheater, which is placed in one or more walls of the combustion chamber. The Power Specialty Company, which builds the Foster superheaters, has developed also an economizer which is an integral part of the boiler unit.

New Features of Stokers, Turbines, Etc.

A good example of what is going on in stoker design was furnished by the Twin City Rapid Transit's new Westinghouse stokers, described in the issue of this paper for Aug. 12, 1922, page 221. Here a low-grade clinkering coal is successfully burned on an underfeed stoker.

The Combustion Engineering Corporation has also put out a new type, the Frederick stoker. This is a multiple-retort stoker of the super-station type; that is, the grate area is large. Moreover, it can be made of any length by simply adding tuyère units without change of design. The Sanford Riley Stoker Company has also brought out a radical departure in a super-stoker which is being tried out in the Delray station in Detroit. It has long retorts, with other dimensions suitably increased. There are thirteen retorts fed by eleven rams of 12-in. stroke. These retorts will feed coal as rapidly as twenty-six retorts in the double-end stoker. The tuyères or grate blocks are movable in a direction parallel to the path of the coal. The length of travel is adjustable and under the control of the operator. This stoker can be made to suit furnaces from 13 ft. to 20 ft. in depth. Another new Sanford Riley specialty is the Jones lateral retort stoker, which is a side-cleaning stoker and can be placed under boilers of from 150 to 500-hp. capacity without the necessity for raising the boiler or making extensive basement construction for ash removal.

The American Engineering Company, builders of the Taylor underfeed stoker, notes a tendency of the past year to obtain greater outputs per square foot of boiler heating surface or to use higher boilers. The tendency to obtain higher outputs from existing boilers is illustrated in the recent stoker replacements in the power plants of the Philadelphia Rapid Transit Company and the Capital Traction Company in Washington. The American Engineering Company has developed a stoker which can be built to burn up to 2,500 to 3,000 lb. of coal per retort per hour.

The Green Engineering Company has recently been developing its forced-draft chain or traveling grate, the engineering problems of interest during the past year having been along lines of low-pressure, liberal-air-space, forced-draft stokers. Special attention has been given to water cooling of furnace side walls along the fuel and clinker line. In the opinion of engineers of this company, furnace maintenance is an outstanding problem. Boiler heating surface absorption has not yet reached its limit, but maintenance of furnace side walls and prevention of clinker and slag formation along the fuel line must be met by water or air cooling and improved refractories.

The most important boiler auxiliary is the feed-water heater, which is being developed to keep pace with the boiler. In the opinion of engineers of the Harrison Safety Boiler Works—Cochrane Corporation, among the most promising opportunities for power-plant improvement are those connected with the handling of feed water and the selection and arrangement of auxiliary apparatus for carrying out the steam reheating cycle. The apparatus will include that for stage feed-water heating, de-aeration of feed water, and in many cases distillation of make-up water. Air heating has possibilities, for in their opinion, the steam cycle will be most efficient when the feed water is heated entirely by steam extracted during the expansion process. Then if at the same time boiler and furnace operation is improved by reclaiming waste heat from the flue gases to heat air used for combustion, the maximum plant efficiency will be realized for given initial and final temperatures.

Just a word regarding coal and ashes handling in the power plant, a subject of real interest at this time. R. H. Beaumont & Company see a tendency to a preference for the skip hoist for handling coal. They have therefore devised what they term the "super central coal and ashes handling system." It comprises one or two skip hoists to elevate the coal from the railroad cars to bunkers, with a separate skip hoist to elevate ashes to the ash bunker. Coal is distributed to the boilers with weighing larries, and ash larries transfer ashes to the ash skip hoist. Both coal and ash bunkers, skip hoists and all machinery are housed in a separate building at the end of the power house.

Some General Electric turbine developments were mentioned earlier. The Westinghouse company has developed its large single-flow turbine with a single exhaust, which has been sold in sizes of 20,000 and 30,000 kw. These are provided with multiple-stage feed-water heating connections.

The Allis-Chalmers company has introduced in its latest turbines a new method of baffling to prevent steam leakage over the tips of the blades. The clearance of one flange of the shroud which surrounds the blade tips has been changed from radial to axial by bringing the flange close to the adjoining foundation ring.

In the ventilation of electric generators there is increasing interest in the air washer and cooler, especially when used in the closed system wherein the ventilating air is confined in a closed circuit and used over and over. The Cooling Tower Company reports the success of its "Impact" washer for this purpose, and the Spray Engineering Company has developed its Type V (vertical) washer and cooler for the same purpose. The latter goes in the generator foundation. Hot air enters the top of the washer, passing vertically downward and dividing below into two streams, which are then directed upward into the generator inlets. An emergency damper is of course provided to close the circuit in case of fire.

Significant Things in Regard to Power Distribution

In the opinion of many, if not most, distribution engineers the outstanding feature of the work in this corner of the engineering field is the automatic substation. Even where it does not seem immediately available it is of interest because it is one of the few devices that are in the development stage. Closely following this in interest is the standardization of overhead construction and the development of higher strength trolley wire with greater resistance to wear.

During the past year real progress has been made

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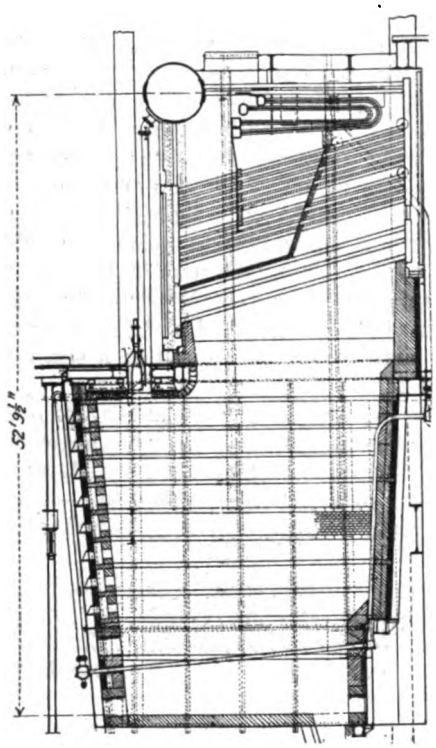
in inaugurating joint action by all parties interested in wire crossings, with a view to revision of the National Electrical Safety Code so that it will be generally acceptable. The American Engineering Standards Committee is functioning in this connection and furnishing a clearing house for co-operative effort. Ralph W. Eaton, public service engineer, Providence, R. I., states that he knows of no more significant or important occurrence in the electric railway engineering field than the real progress which was made in this connection. The manner in which rules for overhead construction are being adopted, he says, gives bright promise of ending the misunderstanding and lack of co-operation which have existed ever since the need for such rules was recognized. Of the same general nature was the joint work between the American Telephone & Telegraph Company and the National Electric Light Association on the subject of "inductive co-ordination." It looks as if the companies engaged in the transmission of intelligence and power respectively would actually get together sufficiently to agree on construction which will be mutually acceptable. Electric railways are vitally concerned in this matter to the extent that their lines are or may be alleged to interfere with telephone circuits.



Boiler Setting for Pulverized-Fuel Burning

The width of the boiler shown is 24 ft. 10 in., the furnace width directly under the arch 19 ft. 9 in. and the volume of the furnace 13,200 cu.ft.

As to electrolysis co-ordination, that appears to be farther along, thanks to the national joint committee. This committee has issued its second report and is doing a steady but non-sensational work.

As M. B. Rosevear, of the Public Service Railway and chairman of the Engineering Association committee on power distribution, puts this whole matter, the spirit of co-operation seems to be actuating all of the national organizations and interests. This, he thinks, is due largely to the American Engineering Standards Committee, which deserves the whole-hearted support of engineers and others concerned in its work.

Automatic Substation Is Forging Ahead

The past year was a good one for the automatically controlled substation, both in the technical advances made and in the volume of business. Remote supervisory control deserves special attention because it adds to the non-manual features the advantages of ultimate centralized manual control. This is now being installed for the Cleveland Railway, where standard telephone lines are used for the supervisory manipulation and at the same time they remain available for the usual communication. The Westinghouse company installed last year the first automatic substation for a trolley-bus line, on Staten Island, New York City.

John Liston, who was quoted earlier, points out that during the year work on some exceptionally large installations was begun not only in the United States but in foreign countries, the most notable example being that for the South African Railways. In other words, the new control has invaded the heavy traction field. In this country the Oregon Electric Railway will shortly put into service two 1,000-kw. and five 500-kw. stations on the 1 200-volt line operating out of Portland. This will leave but one manual substation on this road. Another group comprises five 750-kw. equipments for the Wilkes-Barre & Hazleton Railway, while what was probably the largest order was that placed by the United Railways of St. Louis for four 1,000-kw. and two 2,000-kw. control units. The Chicago, Aurora & Elgin Railroad will install two 1,000-kw. units as the results of trial service covering several years of a 500-kw. station at Warrensville. These stations will have the new supervisory control. The Northwestern Elevated Railroad in Chicago is installing a 2,000-kw. station, the first application of automatic control to metropolitan elevated service. Other interesting installations include three 1,000-kw. units for the Hydro-Electric Commission, Toronto, Ont.; one 1,000-kw. unit for the Pacific Electric Railway; one 1,500-kw. and one 500-kw. unit for the Public Service Corporation of New Jersey and four 300-kw. units for the Cincinnati, Georgetown & Portsmouth Street Railway.

Three Phases of Transmission Line Activity

The remarks made above regarding inductive co-ordination indicate one of the active items in transmission line development from the administrative standpoint. Physically speaking, interest centers in poles, insulators and wires and cables.

First as to poles, the National Tube Company notes an increasing tendency to employ steel for this purpose, although wood still leads as a pole material. According to the latest figures compiled by the American Association, of the 408,833 poles in service on a group of large properties, 55 per cent were wood and 38 per cent steel. Concrete poles are giving a good account of themselves. The Massey Concrete Products Corporation, maker of a reinforced hollow concrete pole, reports that after several years of service trials of its pole, which is made by the centrifugal process, the past year saw this type of pole out of the preliminary stage. The makers of the Bates expanded steel pole took a forward step last year in extending the range of sizes to include 7 in. and 8 in. They have also developed a plan for precasting concrete foundations at a central point, with bolts set to template, with the idea of saving material and facilitating erection.

The Electric Railway Equipment Company reports increasing appreciation of the combination trolley and lighting pole which was installed in a number of cities during the past year with a view to increasing the attractiveness of the overhead construction.

In the wire and cable field an urgent need for standardization is felt, and there is hope on the part of both manufacturers and users that something in this line will be accomplished through an A.E.S.C. committee which is now at work. Opinion seems to favor

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specifying the sizes of stranded conductor in terms of the number and sizes of strand. W. A. Del Mar, chief engineer Habirshaw Electric Cable Company, states that the application of scientific principles has resulted in a material improvement in the power factor of cables with impregnated paper insulation, with increase in the breakdown voltage of such cables. H. T. Dyett, president Rome Wire Company, expresses the hope that users of wire in the electric railway field will co-operate with the manufacturers in order that the best possible products may be available at a reasonable price.

Insulator development has gone along with that of poles and wires. The manufacturers of the Thomas insulator say that perhaps insulators have been considered too much from the electrical and not enough from the mechanical standpoint. The serious problems of the manufacturer are mechanical; that is, to make a structure of porcelain and metal that will withstand extremes of heat and cold and exposure to sun and rain without cracking. This requirement being met, the obtaining of adequate resistance to flashover and puncture are relatively easy. One manufacturer (Lapp) has adopted the plan of making the porcelain in a vacuum and uses drop forged caps.

Improvements in signals during the past year were principally in refinement of detail, the manufacturers being concerned principally in development of train control for steam roads. To illustrate, the General Railway Signal Company worked out a unit construction for signal light, each unit containing lenses and a lamp and removable as a whole or in parts.

Getting More Wear Out of the Trolley Wire

Last year the distribution engineers showed a real desire to learn why trolley wire wears out and how to make it wear out less rapidly. Researches were conducted and will be continued in this field. The manufacturers of phono-electric wire conducted experiments during the year, and will soon give the industry the benefit of the results.

Mr. Cope, of the Westinghouse company, mentions several improvements in overhead line material which have a bearing on the life of the trolley wire. For example, there is the Cleveland splicer with a solid body which eliminates shrinkage strains in the castings. A new 15-deg. rigid insulated crossing has been developed. This has micarta runners.

Excellent results have been secured by the Public Service Railway and others with a new trolley ear which is designed with a tapered approach from the tip of the ear to the point immediately under the boss, at which point the lips almost encircle the wire. This is a recent Ohio Brass product.

A novelty in porcelain was the car-stop sign and strain insulator introduced toward the end of the year by the American Porcelain Company.

The subject of switching is too large and technical for detailed discussion here. It will be of interest, however, to record the extension of the high-speed principle in circuit breakers to 600-volt service. This type was originally developed for the Chicago, Milwaukee & St. Paul electrification, but it is now being used for protection of 600-volt stations and individual machines, as well as for feeder protection. A valuable addition to the standard line of relays is found in the line sectionalizing relay known as the impedance or distance relay. During time of trouble it is acted upon by both the current and the voltage of the circuit, and from these values it automatically calculates the distance of the short-circuit from the relay and the time of operation is determined accordingly. Still another development was the application of motor operation to high-tension disconnect switches and air-break switches.

1922 Was a Good Year in the Field of Heavy Traction

There are encouraging signs in the field of steam railroad electrification, indicating a resumption of a healthy rate of growth. The Illinois Central terminal project in Chicago reached the point of selection of system, 1,500 volts, direct current, and this choice seems to have met with general approval for the local conditions. In accordance with the terms of the contract with the city this work must be carried out on a definite schedule. The postponement of the Lackawanna Scranton grade electrification was a disappointment to all persons interested in the logical spread of electric motive power applications, for conditions seemed exceptionally favorable in this case for a profitable investment. Difference of opinion as to the proper system for this section is reported to have been at least a partial cause of the postponement. This indicates that electrification is not considered by the railroad directors to have progressed as far as it is generally supposed to have done.

Electrification maintenance had a remarkable test during the past year on account of the shopmen's strike. Testimony is general to the effect that the electrical equipment withstood the impaired maintenance at least as well as the steam equipment, and certainly in a highly creditable manner.

The shops of both large American as well as those of the foreign manufacturers of heavy traction equipment clearly reflect the present status of electrification progress. The General Electric Company is building two 120-ton locomotives for the Baltimore & Ohio Belt Line in Baltimore, which was electrified about twenty-eight years ago.

Among foreign orders are substantial ones from Spain, France, Chile, Japan and Mexico. Ten 150-ton, 3,000-volt d.c. locomotives will be supplied to the Mexican Railway for changing the 30-mile Vera Cruz-Mexico City line from steam to electric operation. Energy for this will be purchased from the local power company, and only one substation will be required for the entire line.

Six 3,000-volt d.c. locomotives for the Spanish Northern Railway are nearly completed. They will be the first 3,000-volt machines in Europe. A 1,500-volt d.c. machine of the gearless type for the Paris-Orleans Railway is under construction, and two 1,500-volt, 66-ton d.c. locomotives were recently shipped to Japan for use on the Tokaido Railway.

The Westinghouse company has under construction twelve 180-ton a.c.-d.c. locomotives for the New Haven Railroad, four a.c. locomotives to weigh each nearly 400 tons for the Norfolk & Western Railway and three locomotives for the Pennsylvania Railroad, one 11,000-volts a.c. and the two others 600-volts d.c. For foreign customers there are on order or recently shipped thirty-nine 3 000-volt d.c. locomotives for the Chilean State Railways, six 3,000-volt d.c. control equipments for the Spanish Northern Railway, 120 control equipments for the Paris-Orleans Railway (1,500-volts d.c.), and two 60-ton, 600-1,200-volt locomotives for the Japanese Government Railways.

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Proven Improvements Available for

How MANY of these economy and betterment measures can you check off ☑ as done? How many can you check off ☒ as thoroughly considered and found not applicable to your conditions? How may blank squares remain to indicate backwardness or to show where your studies should be directed in 1923, if you are to keep pace with progress?

☐ Have you inaugurated a system for the periodic checking of traffic and the rescheduling of cars on all lines, so that service will follow changing traffic, avoiding wasteful car-miles but providing all the transportation that will be bought?

☐ Have your cars been rerouted to better serve traffic as material changes in course of travel have taken place?

☐ Have you discarded the ponderous obsolete cars and substituted the use of lightweight one-man cars in light interurban service?

☐ Are you making full use of one-man safety cars in city service?

☐ Have you entered upon a program of revision of the better existing cars for operation with one man on light interurban and suburban lines and the lighter city lines, utilizing safety devices to improve safeness of such operation and for psychological effect on the public?

☐ Have you substituted modern for ancient motors, saving weight and energy consumption, maintenance expense and road delays?

☐ Are you using a modern fare collection system with approved fare box and a modern system of fares, eliminating a lot of ticket printing costs and accounting expense?

☐ Have you gone after freight business, including through service with other lines?

☐ Have you looked into the possibilities of hauling livestock?

☐ Are you using modern turbine equipment in your power plants, or are you retaining obsolete prime movers, reciprocating engines, or early type turbines, dissipating profits in wasted heat units?

☐ Have you modernized your generating plant by the installation of economical auxiliary equipment, metering devices and automatic control and test equipment?

☐ Have you begun the installation of automatic substation control to reduce labor charges, save energy and free the system from possibility of shutdown on strike of a handful of men?

☐ Have you given your line materials the same careful attention that you have rolling stock, track and power system? Many improvements in line materials and construction have been made which increase the life of the overhead and decrease the work and number of trouble crews.

☐ Are you utilizing modern steel poles in the cities for economy, permanence and appearance?

☐ Have you substituted machines for hand work and saved labor costs to the great extent possible in the track department?

☐ Are you using the highest development in special trackwork to reduce the maintenance charges on both track and cars?

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Bettering Operation

☐ Are you utilizing substitute ties where they would decrease the first cost and possibly extend the life of new and rebuilt track in paved streets?

☐ Are you using electric welding in connection with trackwork maintenance, but not carrying the welding to the point that it is more expensive than replacements?

☐ Are you employing the latest developments in rail joints?

☐ Have you substituted modern machine tools for obsolete tools, and improved methods in the shop department.

☐ Are you conserving the time of shop labor, of track storage yard labor, and the storeroom help by use of proper material handling equipment?

☐ Are you using an energy-saving device to reduce power bills, maintenance bills, and improve the general handling of cars?

☐ Are you deriving the saving in energy possible from the use of thermostatic control of electric heat in the cars?

☐ Have you looked into the savings possible from inspection of cars on a kilowatt-hour basis, particularly as against a periodic inspection, but also in comparison with inspection on a mileage basis?

☐ Are you utilizing the practice of dipping and baking armatures and field coils to reduce the number of electrical failures?

☐ Have you adopted spray painting, together with a fixed schedule for keeping cars brightly painted for the sales value therein?

☐ Have you gone into the reclamation of oil and waste?

☐ Are you using electric, thermit and gas welding and cutting equipment in the shop to reclaim worn or broken parts?

☐ Are you using closed vestibules to reduce accident expenditures?

☐ Are you using automatic door engines to shorten the standing time?

☐ Have you installed automatic electric switches to facilitate the movement of cars and eliminate the delays that aggravate passengers?

☐ Are you employing train operation to handle rush-hour traffic or all-day traffic on extremely heavy lines, using motor and trailer or multiple-unit cars?

☐ Are you using automatic couplers to save time at the terminals, to reduce maintenance costs on inter-car connections and reduce hazard to trainmen?

☐ Are you using automatic slack adjusters to minimize inspection and brakeshoe wear?

☐ Are your cars cleaned periodically, other than merely swept out at night?

☐ Have you made use of improved metals for bearings in brake rigging and truck parts?

☐ Are you using anti-freeze devices to eliminate pull-ins and delays due to frozen air?

☐ Have you made operation at railroad crossings safer by the installation of trolley guards?

☐ Have you installed signals to protect operation at dangerous points where the view is obstructed; and also where their application would increase schedule speed and reduce car-hour costs?

☐ Have you taken reasonable precautions to avoid damage claims by protecting grade crossings with automatic crossing signals?

☐ Have you minimized your insurance costs and fully protected your property by co-operating with insurance representatives competent and equipped to advise?

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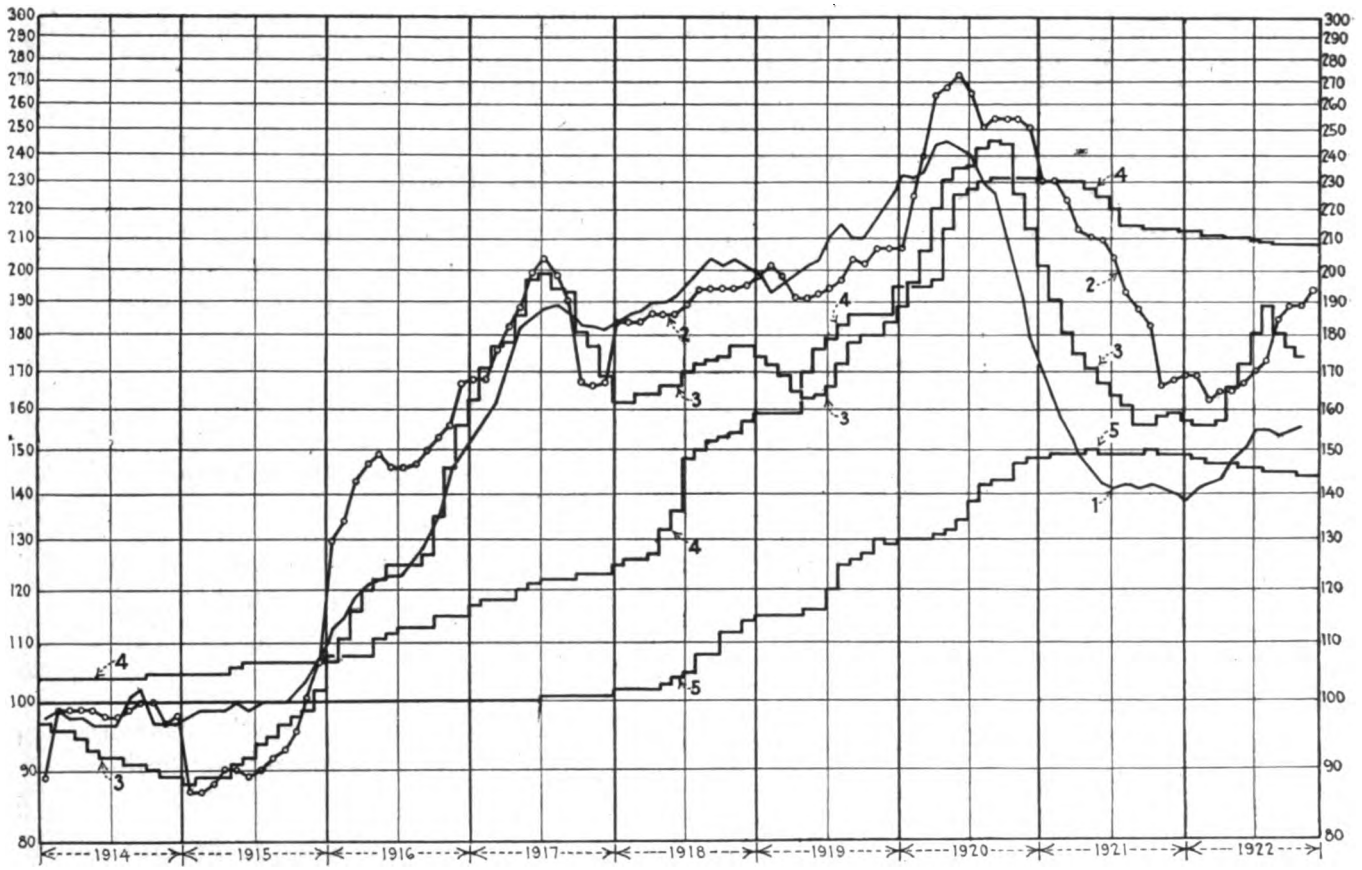
TABLE AND CHART SHOWING TREND OF PRICES, WAGES AND FARES, BASED ON FIGURES ASSEMBLED AND COMPILED BY ALBERT S. RICHEY



1914	Wholesale Prices, All Commodities (U. S. Bur.) Lab. Stat.)	Construction Costs (Eng. News-Rec.)	Street Ry. Operating Materials Costs (Richey)	Street Railway Wages (Richey)	Street Railway Fares (Richey)
January	98	89.2	97	104	100
February	99	99.2	96	104	100
March	98	99.2	96	104	100
April	98	99.2	95	104	100
May	97	99.1	93	104	100
June	97	97.6	92	104	100
July	97	98.1	92	104	100
August	101	99.4	91	104	100
September	102	100.4	91	104	100.1
October	97	99.8	90	105	100.1
November	97	97.3	89	105	100.1
December	97	97.5	89	105	100.1
1915					
January	98	87.1	88	105	100.1
February	99	87.4	89	105	100.1
March	99	87.7	89	105	100.1
April	99	90.2	89	105	100.1
May	100	90.2	91	106	100.1
June	99	89.0	92	107	100.1
July	100	90.5	94	107	100.1
August	100	91.8	95	107	100.1
September	100	93.0	97	107	100.1
October	102	96.2	98	107	100.1
November	104	101.1	99	107	100.1
December	108	107.1	102	107	100.1
1916					
January	113	130.5	107	108	100.1
February	115	134.5	111	108	100.1
March	119	143.0	116	108	100.1
April	121	147.3	120	108	100.1
May	122	148.9	122	111	100.1
June	123	146.5	125	112	100.1
July	123	145.8	125	113	100.1
August	126	146.6	125	113	100.1
September	130	149.6	127	113	100.1
October	136	152.9	135	115	100.1
November	146	155.7	146	115	100.1
December	149	167.2	156	115	100.1
1917					
January	153	167.8	163	117	100.1
February	157	167.8	171	118	100.1
March	162	175.7	177	118	100.1
April	173	183.4	178	118	100.2
May	183	187.6	186	120	100.2
June	185	199.3	197	121	100.2
July	188	204.1	199	122	100.6
August	189	198.4	194	122	100.6
September	187	190.3	193	122	100.6
October	183	167.1	181	123	101.1
November	183	166.5	175	123	101.1
December	182	167.1	169	123	101.2
1918					
January	184	184.5	162	125	101.7
February	186	184.5	162	126	101.7
March	187	184.5	164	126	101.9
April	190	186.0	164	127	102.2
May	190	186.0	166	132	102.8
June	191	186.3	166	136	104.5

1918	Wholesale Prices, All Commodities (U. S. Bur.) Lab. Stat.)	Construction Costs (Eng. News-Rec.)	Street Ry. Operating Materials Costs (Richey)	Street Railway Wages (Richey)	Street Railway Fares (Richey)
July	196	188.7	170	148	105.1
August	200	193.9	172	150	107.5
September	204	193.9	173	152	108.2
October	202	193.9	174	153	112.0
November	203	193.6	177	154	112.3
December	202	194.8	177	157	114.4
1919					
January	199	198.1	174	159	115.0
February	193	201.5	172	159	115.0
March	196	198.1	169	159	115.1
April	199	191.3	165	159	114.6
May	202	191.3	163	170	115.6
June	203	191.9	164	176	116.5
July	212	193.7	166	179	119.6
August	216	196.7	172	183	125.1
September	210	202.9	178	186	126.2
October	211	202.3	180	186	126.9
November	217	206.9	180	186	129.9
December	223	206.9	184	186	129.0
1920					
January	233	206.6	189	195	129.9
February	232	225.1	196	195	129.9
March	234	240.9	207	195	130.2
April	245	265.2	221	197	131.1
May	247	268.9	232	213	131.9
June	243	273.8	236	226	134.0
July	241	265.7	237	228	138.0
August	231	252.0	243	231	141.5
September	226	255.2	247	232	142.6
October	211	255.2	245	232	143.3
November	196	255.3	227	232	147.0
December	179	251.6	213	232	147.5
1921					
January	170	230.9	202	231	148.2
February	160	230.7	191	231	148.6
March	155	224.3	181	231	148.9
April	148	213.1	175	231	149.1
May	145	210.8	171	228	149.6
June	142	209.8	167	225	148.9
July	141	203.8	164	221	149.0
August	142	193.1	161	215	148.7
September	141	188.3	156	215	148.9
October	142	182.6	156	214	149.6
November	141	166.3	158	214	148.9
December	140	167.8	159	214	148.6
1922					
January	138	168.7	157	213	148.6
February	141	168.7	156	213	147.8
March	142	162.0	156	212	147.4
April	143	164.7	157	212	147.4
May	148	164.6	166	211	147.4
June	150	166.6	172	211	145.5
July	155	169.7	181	210	145.5
August	155	173.4	189	209	144.9
September	153	185.0	181	208	144.8
October	154	188.6	177	208	144.6
November	156	188.6	174	208	144.1
December	...	192.6	...	...	143.7

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Trend of Prices, Wages and Fares

These Charts Show on a Logarithmic Scale Variations During the Last Ten Years in Wholesale Prices, Construction Costs and Electric Railway Material Costs, Wages and Fares, as Quoted Monthly in This Paper by Albert S. Richey

DURING the past year the "Financial and Corporate" department of this paper has been showing a tabulation of twelve indexes of special interest to electric railway operators under the heading "Conspectus of Indexes," which is assembled (and in part compiled) each month by Albert S. Richey. In the issue of June 24, 1922 (page 995), a chart was presented showing the trends of five of these indexes from the beginning of 1914 down to that date. A similar chart is published herewith in which the various indexes have been extended to include the latest data available at this time. The chart is drawn with each of the indexes to the scale of its average value during 1913 equaling 100 as a base.

It will be noted that the chart as presented in this issue has been drawn to a logarithmic or ratio scale, thus giving a more accurate picture of the trends of the various indexes. While most of the readers of this periodical are undoubtedly familiar with the advantages of plotting such charts on logarithmic scale, the principal advantage of use of such ordinates might be mentioned, namely, that it brings out more clearly a constant ratio of change than does the ordinary arithmetical or uniform scale chart. As an illustration, it will be noted that the distance between the ordinates representing indexes of 100 and 120 (a 20 per cent increase) is exactly the same on the logarithmic scale as that between those representing 200 and 240 (also a 20 per cent increase). If the chart had been plotted to a uniform scale, the distance between 200 and 240 would be twice as great as that between 100 and 120, although the percent of increase is exactly the same.

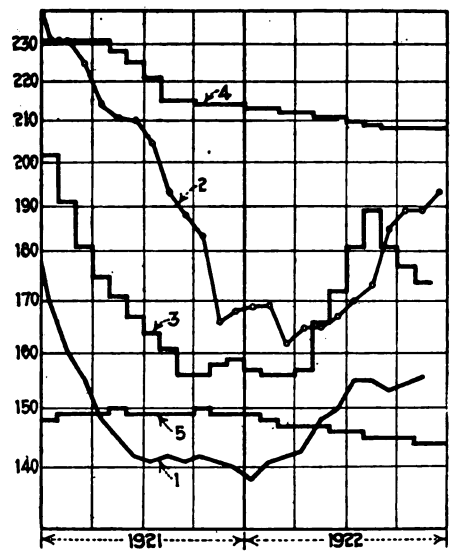
How the Railway Indexes Are Compiled

The three indexes compiled by Mr. Richey personally have to do particularly with electric railway operation, and are those of operating materials costs (No. 3), street railway wages (No. 4), and street railway fares (No. 5).

Mr. Richey's index of street railway operating materials costs is a combination of three of the price indexes of the U. S. Bureau of Labor Statistics, namely, metals, lumber and fuel. These three indexes are weighted in such a manner as quite fairly to represent the general country-wide price level of the materials entering into the normal operation and maintenance of the average street railway, including fuel for power. It will be noted that this index maintained its lowest level fairly constantly from August, 1921, through April, 1922, but increased about 20 per cent to a high point in August, 1922, since which time it has been slowly receding.

The index of street railway wages (No. 4 on the chart) is compiled by Mr. Richey by a calculation of the weighted average of the maximum hourly rates of conductors and motormen on 105 street and interurban railways in the United States, each operating more than 100 cars, the rates of the various companies being weighted according to the number of cars operated. This index reached its high point very soon after the peak of general commodity prices in 1920, and while it showed some decline during 1921, it has been receding more gradually than have any of the commodity price indexes.

The index of street railway fares (No. 5) is also compiled by Mr. Richey, and is the relative average of street railway fares in all United States cities having a population of 50,000 or more (except New York City) and weighted according to population. The chart shows very clearly the fact, of which readers of the ELECTRIC RAILWAY JOURNAL need no reminder, that street railway fares began to advance only after more than two years of the advance in all other commodities, and further that the advance was not nearly so great in fares as it was in any of the other commodities listed.



Trend of Conspectus Figures in the Years 1921 and 1922

The weighting of the three indexes above described was determined upon by Mr. Richey after very careful investigation and direct information from a large number of companies, and the indexes have been checked against the operating results of both large and small companies at various times since the first publication of the indexes over two years ago. It is believed that they very correctly show the general trends of the three items of operating materials, wages and fares.

The Basis of the Other Index Figures

The wholesale prices of all commodities (No. 1 on the chart) are shown as compiled by the U. S. Bureau of Labor Statistics, and are as revised by the Bureau during the summer of 1922. This revision consisted of, first, the regrouping of commodities and the addition of a considerable number of new articles, and second, the use of the 1919 census data for weighting purposes in place of the 1909 census data formerly employed. A comparison with the chart shown on page 995 of the issue of June 24, 1922, will show the extent to which this revision changed these index numbers as compared

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with those sent out by the bureau prior to June, 1922. The new series should of course be a more reliable indication of the trend of wholesale prices than the old.

The *Engineering News-Record* construction cost index (No. 2 on the chart) is based on the cost of structural steel, cement, lumber and the average price of common labor in about twenty cities, weighted as described on page 996 of our issue of June 24, 1922. It should be remembered that this index does not include the price of brick, sand, gravel, crushed stone and other materials locally produced, but intends only to show an index which portrays nationwide trends.

For the benefit of those who want to study the last two years only, a section of the larger chart, including only the years 1921 and 1922, but drawn to a larger scale, so that the various points may be read more closely, has also been prepared and is published.

A tabulation of the five indexes showing their numerical values by months from January, 1914, through to the latest dates available is also published.

Money Is Cheaper than It Was a Year Ago and the Prospects of Financing at Lower Rates Are Better, but the Investors Are Still Chary and Companies Seeking Loans Must Be Prepared to Prove Their Case

Prospects for Electric Railway Financing in 1923

By C. E. Morrow
Boston, Mass.

THERE has been a noticeable improvement in the feeling toward electric railway securities in general during the past year and this improvement will, in all likelihood, continue in 1923. It can be attributed principally to improved railway earnings, and also to the fact that there has been a much improved money market in which railway securities have shared, but not in the same degree as other public utility securities. In the absence of any significant change in the economic outlook, it may reasonably be expected that electric railway and electric light and railway companies may look forward hopefully toward doing their 1923 financing at current rates and perhaps better.

The improvement in earnings is the result of:

1. Changed economic conditions which have brought about an opportunity for reduced operating expenses.
2. More sympathetic consideration of railway problems on the part of the general public and a seeming disposition on the part of regulatory bodies to grant relief to traction properties that will enable them to work out of the difficulties with which they have been beset in recent years.

The evidence of better earnings is conclusively shown in the large numer of traction bonds that have been removed from the list of defaulted obligations, referred to again later.

In many instances long-deferred fare increases have finally brought about larger gross revenues. The Boston Elevated Railway has profited, too, by the introduction of special 5-cent fare routes without transfer, which have brought in considerable revenue that would have been lost under the regular 10-cent fare. But larger gross revenues would have availed little if operating expenses had not at the same time shown a general decrease. The improved net earnings, therefore, must be ascribed to those economies that have reduced the costs of doing business. Among these economies are the more general adoption of lightweight cars equipped for one-man operation; the use, as in Boston, of three-car trains with multiple control on heavy lines; reduction in costs of railway materials, supplies and equipment; reductions in wages to car operators and service employees; reduced costs of power, and the more general elimination by the roads of the second blue uniform man on passenger cars.

The public has come more and more to realize the unfairness of the wild jitney operation that has taken away not only the cream of railway revenues but in many cases also the milk. There can be no doubt that it is unfair to permit unlicensed and irresponsible jitneys to compete with the railway properties, which are obliged to establish themselves on a permanent basis and to operate under strict regulation of public authorities. In many cases the number of jitneys has been reduced, the territory restricted and operations limited to certain streets not used by the railways.

The ease in the money market is reflected in the downward trend of interest rates. Evidences of this are the advances in prices of Liberty bonds from the low 80s in 1920 and 1921 to around par at the present time. General market municipal bonds have advanced in price during the same period so that the income yield is approximately 1 per cent less than it was only a short time ago. Prime first mortgage 5 per cent bonds of long-established and stable electric light and power companies are now selling for long maturities at income yields varying from 5 to 5½ per cent, compared to yields of around 7 per cent and higher in 1920 and the early part of 1921. The market for public utility bonds showed such improvement in 1922 that a great many high rate bonds were called for redemption, frequently at high premiums, and replaced with lower rate long-term issues. There probably will be more of this refunding at lower rates in 1923.

The extent to which certain railway companies shared in the improved market conditions is instanced in the case of the Springfield (Mass.) Street Railway. This company found it difficult in 1920 to sell $330,000 of refunding and general mortgage bonds bearing 7 per cent interest and maturing in 1940. During this past

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fall, however, it sold $2,134,000 of 6 per cent bonds, also due in 1940 and secured under the same mortgage as the 7s. The price at which the bonds were offered was slightly under par to yield about 6.30 per cent. The bonds were not eligible for savings banks in any of the New England states and the important savings bank market was not available. Nevertheless the bonds were quickly sold throughout the New England states.

There is much encouragement to be found in the number of traction bonds, heretofore in default, on which interest payments have been resumed or on which defaults have been removed as the result of reorganizations. Among these are $2,241,000 Atlantic Avenue Railroad general 5s, $2,000,000 Brooklyn City & Newtown Railroad consolidated 5s, $1,987,000 Coney Island & Brooklyn Railroad consolidated 4s, $4,821,000 Des Moines City Railway general and refunding 5s, $6,118,000 New Orleans Railway & Light refunding and general 5s, $4,200,000 Ohio Electric Railway first and refunding 5s and $2,927,000 second and general 5s, $4,708,000 Rhode Island & Suburban first mortage 4s, $4,500,000 St. Louis & Surburban general 5s and $2,000,000 consolidated 5s, $3,685,000 Spokane & Island Empire Railroad first and refunding 5s and $9,000,000 United Traction & Electric first mortgage 5s.

There is a long list of traction bonds still in default. Figures corrected to November, 1922, indicate that there are some seventy-nine companies doing a public utility business (not including steam railroads) that have one or more bond issues in default, amounting in the aggregate to more than $364,000,000. Of these companies sixty-eight, or 87 per cent, are railway properties, in which are included a few small companies which also do an electric light and power business. The bonds of these latter companies which are in default aggregate some $348,000,000, or 95.5 per cent. It is hoped that 1923 earnings will show such improvement that some of the defaults can be removed. The Brooklyn Rapid Transit Company, with considerably more than $92,000,000 in default, is one of the companies on which high expectations are placed. The Kansas City Railways with more than $29,000,000 in default is another property that appears to be working out of its difficulties.

Sale of New Securities to Customers

Many electric light and power companies, and in some instances combined lighting and railway companies, have been successfully selling preferred stocks in small lots to a large number of their customers. It has not been infrequent to find that this wide distribution has been encouraged by selling stocks on the installment plan. The local stockholder is a strong credit asset. Sales of such securities direct to the public will undoubtedly enhance senior financing because they produce a situation that is wholly desirable. The benefits are more far reaching than the supply of new money which results. The gain from the intangible good will and friendly interest and support shown by such stockholders is considerable. It is hoped that electric railways will soon be in a position to interest their local customers in a similar way. There can be no doubt that public utility properties under efficient private management with reasonable public regulation and a large number of local citizens financially interested present a highly favorable investment possibility and would seem to approach an ideal combination for public service.

While the feeling toward electric railway securities in investment markets has improved, that does not mean that all traction properties that could not sell their bonds in 1922 will, somehow, in 1923 find new money flowing into their treasuries. It does mean that investors will be more inclined to be interested in railway securities of real merit than heretofore. In the last analysis, of course, each property coming into the market for new money will have to stand on its own feet. While bankers will want to know about the extent of physical property, its condition, present earnings and anticipations, they will also want to be satisfied on numerous other points, such as, "What is the state of the public mind in the territory served?" "What are the prevailing economic conditions?" "Are jitneys condoned or encouraged?" "Is the railway management harassed by petty governmental interferences or restrictions?" "Is there strong general desire for municipal operation or ownership?" etc.

The railways must not delude themselves about traction bonds. They are still generally shunned in investment circles. No other type of public utility is so open to general attack. It has continued to be popular sport by ambitious politicians to go after the "traction interests," and far too frequently the politicians have found sympathetic audiences. We are continually reading about rate controversies with judgments appealed from court to court, confiscation of property, wage disputes, jitneys, public operation or public ownership. All of these things are disquieting. Is it any wonder that the investor proceeds with caution when offered traction bonds?

It is not uncommon to find in circulars describing bond issues of electric light and power companies emphasis made of the point that the companies have been divorced from traction business. In circulars describing the bonds of combined electric light and street railway companies the high percentage of earnings from electric business is usually pointed out. The inference is that electric earnings are ample to meet the total charges on the property, even if railway earnings are small or should in the future show a deficit. The statements are intended to answer the questions which investors frequently ask, such as, "What is the extent of the traction interest in the business?" and "How largely are the company's earnings dependent upon railways?"

New traction bond issues that may be brought out during 1923 are almost certain, in the great majority of cases, to bear a minimum interest rate of 6 per cent. Most of the offerings will very likely bear higher rates and all will undoubtedly be offered at a discount, thus making the income yield larger than the interest rate. The day of the 5 per cent traction bond has not returned and its approach seems still in the distant future.

How many railway operators can say that they have exhausted all the possibilities of improved service, of increasing net earnings, of educating the public to know the intricacies and difficulties of railway operation, and of enlisting the public's co-operation and good will? It ought to be clear to all that a strong, healthy traction property is a distinct asset to a community. Conversely, a broken down and defunct property is frequently a disappointment, sometimes a disgrace, and always a matter of concern. In order to increase the respect for electric railway securities in investment centers and to secure the interest of investors in rehabilitation of broken down properties it is essential that the earnings position be strengthened and stabilized and the good will and hearty co-operation of the public be secured and held.

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Credit Conditions of Electric Railways Are Improving

Prospects Appear to Be Good for Borrowing by the Electric Railways at Moderate Rates Unless Some Economic Change Now Unforeseen Should Develop

ONE thing is certain. The credit situation of the electric railways is considerably improved over that of a year ago. President Todd of the American Electric Railway Association, in his speech at Chicago, made a point of this fact. John A. Prescott, chairman of the committee of public service securities of the Investment Bankers' Association of America, has said the same thing of the utilities as a whole. Mr. Prescott, looking at the matter from the standpoint of the banker who sells direct to the public, said at the meeting of the bankers at Los Angeles that during the past two years there had been a marked improvement in the demand for public utility securities, which, coupled with declining rates, has resulted in a broader market and higher prices.

Such recovery as has been made must be judged in the light of conditions of the past. There is no blinking the fact that so far as electric railways are concerned their credit was at one time well-nigh destroyed. The record of the utility defaults as reported by the *Wall Street Journal* in November totaled $349,648,000 for the electric railways alone, but of this amount $200,000,000 was represented by the railways of New York City, showing plainly the effect of insistence on the 5-cent fare. It is a sad record, this, but the reason for it is not far to seek. It is found very largely in the frightful increase during the war-time period of the cost of everything entering into the operation of the railways and the slowness of appreciation on the part of regulating bodies of the need for prompt action to secure greater revenue for the lines. Mr. Richey's index of street railway fares shows that the average in 1913 was 4.84. Only very slight increases show in this respect prior to May, 1918, when a fairly uniform rise started, reaching its high point of 7.24 in May, 1921. Since then there has been a decline to 6.96 at present. Even at the last-mentioned figure the rise over 1913 has been more than 40 per cent.

As a matter of fact so bad did the credit situation of the electric railways become that, as Mr. Morrow points out in his article elsewhere in this issue, it was not infrequent two or three years ago to see in investment advertising of utility issues the statement that the property of which securities were being offered did not include any electric railway lines. It has been a long while now, however, since the last of these ads appeared. In one instance at least recently has an investment banking house, though not at the time offering any specific railway issues, advertised its faith in strictly railway issues. This house was Bonbright & Company. It ascribed its faith in such issues to:

1. The reduced cost of materials.
2. Reduction of labor costs.
3. Increased fares.
4. Partial elimination of uncontrolled jitneys.
5. Marked economies in operation.
6. Improvements in public relations.

The analysis of the situation which this company prepared at that time was published substantially in full in the issue of the ELECTRIC RAILWAY JOURNAL for Aug. 5, 1922, page 197.

But this is not the only instance in which faith has been expressed in the traction securities by investment bankers. In the preparation of this article expressions of opinion were solicited from members of leading investment houses scattered over the United States, and they are unanimous in their sentiment that the credit situation and the financial outlook for the electric railways have improved during the last year. The change is pretty generally ascribed by the bankers to a combination of the general downward tendency of interest rates and to the improved condition of the industry. Agreement was not so general, however, over the question of whether it might reasonably be expected, in the absence of any significant change in the economic outlook, that the electric railways or combined electric railway and light companies could look forward to doing their 1923 financing at current rates or perhaps better. In some cases the opinion prevailed that the railways would be able to do their financing on a better basis in 1923 than during the past few years, but others felt that the railways must still prove their right to cheaper money. The bankers replying were not all of the same opinion on this point, even in the case of combined railway and light companies. Some seemed to think that these companies were already doing as well in the money market as might be expected, while others thought that the rates for such companies might go even lower. On one point, however, all were in agreement. That was to the effect that any company which widely distributes preferred stock among the public that it serves automatically presents a certificate testifying to efficiency and the ability to handle public relations problems satisfactorily.

A representative of one of the largest investment banking houses dealing in public utility securities was emphatic in the position that he took to the effect that the credit situation of the electric railways improved

COMPARATIVE STATEMENT OF PUBLIC UTILITY FINANCING

Eleven Months Ended Nov. 30	1922 New Capital	1922 Refunding	1922 Total	1921 New Capital	1921 Refunding	1921 Total
Long term bonds and notes	$414,476,539	$198,894,661	$613,371,200	$333,739,000	$93,986,000	$427,725,000
Short term bonds and notes	18,245,000	20,011,000	38,256,000	23,372,000	36,623,000	59,995,000
Stocks	232,293,070	26,556,625	258,849,695	111,204,590	8,557,280	119,761,870
Total	$665,014,609	$245,462,286	$910,476,895	$468,315,590	$139,166,280	$607,481,870

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during 1922. As proof of this he said that some railway financing had been done during the last six months of 1922 that could not have been done during the first six months. While the amounts were not large, they were indicative of an improved condition. The opinion of his house was that this was due to a combination of the general tendency downward of interest rates and to the improved conditions of the electric railway industry. According to this authority a combined electric railway and light company should have no difficulty in doing its financing this year, provided the electric railway was not a liability, but in the case of a compan doing only a railway business, the prospective buyer of the security would have to be tempted by the price as well as the security itself. His opinion was that customer ownership of stock has done more to strengthen the public utility situation and actually to save it than anything else that could have happened. In this connection the criticism was offered that the utilities blundered during the last twenty-five years by their willingness to pay for extensions and additions by the creation of various forms of indebtedness. The tendency has been to do too much borrowing. This is being corrected, however, by the growing realization that a partner is a much better associate than a creditor. In short, as this authority sees it, the traction situation has improved, many individual cases have been straightened out and the credit situation of the electric railways is better than it was, but a good many problems remain to be solved.

General Conditions Improved

Of course the factors that affect the operation of the electric railways are largely the same as those that govern the ordinary lines of business, but the freedom of action is not the same. True, the reduction in the cost of labor to the electric railways has been only 10 per cent from the peak, but a good deal of the hazard has been removed from electric railway work by the "decasualization" of labor so that the turnover has been reduced considerably, a factor which has made for economies in other directions.

The jitney situation is greatly improved, although the bus as a competitor has loomed large in other directions, but this will be self-corrective, as the laws of twenty-three states now provide for the regulation of motor vehicles, used as common carriers, and the prospects are that regulation of this kind will be extended in the future. In fact, such regulation will be a subject before many of the legislatures now in session. Public relations are certainly greatly improved over the old days. Perhaps the most important point in this connection is that the battle has been won for recognition of rights of the utilities to a living rate of return. New laws and court decisions have placed the railways on firmer grounds and established in many cases rates that insure a reasonable return on invested capital.

All these things have worked to restore confidence in electric railway securities. Of course, money rates have declined materially from the extreme peak of the war-time period, but that fact alone does not explain the ability of the utilities to do their refinancing during the past year on terms fairly favorable to them. The companies went into the market in competition with other bidders in all lines, and a survey of recent offerings shows the respect with which investors now regard the utility issues as compared with some of the industrials. Bankers report their shelves pretty well swept of such issues. As for stock issues, there have been many notable sales during the past year direct to utility customers, with more in prospect for the coming year. Such sales are in direct line with the advice given by the banker speakers at the 1921 meeting of the American Electric Railway Association. They introduce an element that has had a stabilizing effect on the other security issues.

Many Sales of Stock to Customers

In these sales of security issues direct to the general public the better credit situation of the electric railways was reflected. Two typical cases are those of the Milwaukee Electric Railway & Light Company and the Public Service Corporation of New Jersey. These are combined properties. In 1921 the Milwaukee company borrowed from home investors through an issue of 8 per cent preferred stock, while in 1922 it successfully disposed of a similar issue with a dividend rate of 7 per cent. The 8 per cent issue is now at a premium of 10 per cent above par. This quotation of 110 is the callable price. The experience of the Public Service Corporation has been similar. Extending over from 1921 to 1922 it sold to local investors in the territory which it serves an issue of 8 per cent preferred stock. The quotation for this issue is also well over par. So confident is President Thomas N. McCarter of the position of his company that he recommended that the stockholders give up the privilege of redeeming the issue at 110 per cent of its par value and also recommended to them that they change the dividend provision on the remaining authorized but unissued preferred stock to 7 per cent instead of 8 per cent. With the redeemable feature removed, he sees still higher levels for the 8 per cent preferred issue, while he is confident of his ability to dispose of a 7 per cent issue locally at or about par. The last quarterly dividend on the common stock of this company was at the rate of 8 per cent a year. Aside from the sale of this stock locally, the company has scored another stroke in bettering its public relations by announcing a cut in power rate.

These are among the most notable examples of the sales of preferred stock to employees and consumers, but there were many others. Among them were the Bangor Railway & Electric Company, Columbus, Delaware & Marion Electric Company, a reorganization of the Columbus, Delaware & Marion Railway; Interstate Public Service Company, Pacific Electric Railway, Portland Railway, Light & Power Company, and the West Penn Railways. One or two of these companies report that it is difficult to say what effect, if any, customer ownership has had on public relations, as there has been no occasion for a real test, but others are agreed that customer ownership has had an important influence in bettering public relations. As for the cost of such sales, it has varied from $2 per share to as much as $12 per share. The average cost of selling issues for which figures are available was $6 per share. In this connection, however, it must be borne in mind that in most of these cases the issue was disposed of locally at a better basic price than could have been secured in the open market for a bid of none or all. Moreover, it usually costs more to dispose of a smaller issue than one not too large. These data all relate to the companies mentioned, but these companies do not represent all the utilities, either railway or combined railway and light companies, that have sold stock direct to the public. There were the notable examples, pre-

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viously cited, in Milwaukee and New Jersey, and in addition there were offerings by the Gary Street Railway, the Northern Ohio Traction & Light Company, the Pennsylvania-Ohio Electric Company, the Tri-City Railway, the Iowa Railway & Light Company and others.

This tendency to cater to the small investor has not been confined to the sale of stock issues. The baby bond has come to be a real factor; in fact, much more of a factor than is perhaps generally realized. The war opened the eyes of the investment banker to this field of operation. In the case of utility and industrial bonds, it has been found that the small investor is very often the long holder. He has a great deal more investment sense than he ordinarily receives credit for having. In proof of the growing magnitude of issues put out in small denominations the *Wall Street Journal* has recently published several lists of $100 bonds. One of these contains about 204 utility issues, covering gas, telephone, electric light, electric railway and the issues of companies that combine two or more of these activities. Of this number thirty-three were of straight electric railway issues or combined light and power issues.

After all, however, the matter of credit reduces itself to the individual company. There is of course a mass trend to the money market. Money is relatively cheap or it is dear, but the borrower secures additional capital within the range of current prices at a relatively low or high figure compared with the spread of prices, in conformity with his credit standing. An example or two will suffice to point a moral. Money rates were low last year, as compared with the war-time period, but it took a combination of a good credit rating and seizing of opportunity to complete these transactions. Thus, as a result of putting out an issue of refunding and first 5 per cent bonds, one combined utility was able to call $4,950,000 of 7½ per cent bonds issued during the money stringency of 1921 and in addition to redeem approximately $3,000,000 of additional funded debt bearing a high rate of interest. In the absence of direct information and allowing for possible premium and discount on the old and the new issues, the saving in yearly interest charges, in this particular case is probably somewhere near $100,000. Earlier in the year the Columbus Railway, Power & Light Company arranged to call $3,00,000 of 8 per cent bonds outstanding, with a saving of $41,000.

These are of course isolated cases. There fell due in 1922 $160,015,860 of railway or combined railway and light issues. As money, in a sense, went begging in the early part of the year a number of companies anticipated their maturities. A good deal of the refunding carried out was of short-term issues carrying interest rates in many instances as high as 8 per cent. On the other hand, many long-term issues fell due that had been placed at coupon rates as low as 4½ per cent. It is impossible under the circumstances even to hazard a guess as to whether as a whole on the basis of last year's refinancing the fixed charges of the railways and the combined railway and light properties were materially reduced. In this connection the figures for the new year are significant. From the record of maturities as compiled by the *Wall Street Journal* the accompanying summary covering the railway and the combined railway and light properties has been prepared. It shows that there are only $94,851,800 of such maturities in 1923, or a little more than half the amount falling due in 1922. This in itself is a very helpful factor for the new year.

For the eleven months ended with November the total

STATEMENT OF PRINCIPAL ELECTRIC RAILWAY MATURITIES COMING DUE IN 1923

Corporation	Rate	Amount
January		
Ohio Traction notes	7	$1,878,000
Lake Shore El. Ry. cons.	5	1,630,000
Jackson & Battle Creek Tr. 1st	5	1,200,000
West End Street Railway 1st	4½	700,000
Charleston City Railway 1st	5	680,000
Milford & Uxbridge St. Ry. 1st	5	335,000
Eastern Massachusetts St. Ry.	6	300,000
Jamestown Street Railway 1st	6	300,000
Jersey City & Bergen R.R. 1st	4½	258,000
Interurban Railway deb.	6	250,000
Webster, Monessen, Belle Vernon & Fayette City Street Railway	6	250,000
Oskaloosa Traction & Light Co. 1st	5	216,000
January total		$7,997,000
February		
Brooklyn Rap. Tr. receivers' cert.	6	14,000,000
Cleveland, Southwestern & Col. Ry.	5	1,400,000
Ind., Col. & So. Tract. Co. 1st	5	932,000
Saginaw Valley Traction 1st	5	584,000
Canton-New Philadelphia Ry. 1st.	5	565,000
Montgomery Street Railway 1st.	6	350,000
February total		$17,831,000
March		
Ind. & Northwestern Tract. Co. 1st.	5	2,470,000
Danville, Urbana & Champaign Ry. 1st	5	2,000,000
Eastern Wisc. Elec. Co. notes	7	1,200,000
Ohio Central Traction cons.	5	305,000
Kentucky Utilities deb.	6	380,000
March total		$6,355,000
April		
Tri-City Ry. & Lt. Co. clt.	5	6,696,000
Detroit United Ry notes	7	4,500,000
St. Louis & Suburban Ry. gen.	5	4,500,000
Wilmington & Chester Tract. Co.	6	2,305,000
Springfield Street Railway 1st	4	1,700,000
Denver Tramway Power Imp.	5	836,000
Holyoke Street Railway deb.	5	265,000
Evansville & Princeton Tract. 1st.	5	260,000
Lancaster Traction 1st	5	225,000
Citizens Elec. Ry., Lt. & Pwr. cons.	5	200,000
Joliet Railroad general	5	400,000
April total		$21,887,000
May		
Commonwealth Pr., Ry. & Lt. notes.	7	250,000
Mobile Street Railroad 1st	6	250,000
May total		$500,000
June		
Quebec, Montmorenci & Charlevoix Ry. 1st	5	2,500,000
Lehigh Traction Co. 1st	5	500,000
Lowell, Lawrence & Haverhill St. Ry. 1st	5	479,000
Portsmouth, Dover & York Ry. & Light Co. 1st	4½	450,000
W. Penn. Trac. & Wat. Pr. Co. notes	7	299,000
June total		$4,228,000
July		
Monongahela Valley Trac. gen.	7	6,615,000
Comp. Hts., Un D. & M. term 1st	5	986,000
Lehigh Valley Trans. collateral trust	6	924,200
Bridgeport Traction 1st	5	706,000
Northern Illinois Light & Trac. 1st.	5	668,000
Niagara Falls & Susp. Br. Ry. 1st.	6	500,000
Oklahoma Pr. & Transport. notes.	6	329,000
Pittsfield Electric Street Ry. 1st.	4	300,000
Wisconsin Gas & Elec. Co. notes	6½	300,000
Winnipeg, Selkirk & Lake Winnipeg Ry. 1st	5	400,000
July total		$11,728,200
August		
Boston & Worcester Street Ry. 1st.	4½	2,460,000
Bloomfield Street Railway 1st.	5	250,000
August total		$2,710,000
September		
Scioto Valley Traction Co. 1st	5	1,426,000
Southwest Missouri Elec. Ry. ref.	5	1,150,000
Binghamton Railroad 1st	5	462,000
Webb City Northern 1st	5	200,000
Louisvile & So. Indiana Tr. Co. 1st.	5	1,000,000
September total		$4,238,000
October		
United Rys. of St. Louis rec. cert.	7	4,200,000
Cass Ave. & Fair Grds Ry. 1st	6	1,640,000
Eastern Wisconsin Ry. & Lt. 1st.	5	1,182,000
Clev., Painesvle & East. R.R. cons.	7	1,131,000
Clev., Painesvle. & East. R.R. 1st.	7	500,000
Dayton, Springfield & Xenia So. 1st.	5	426,000
Scranton & Pittston Traction 1st.	6	295,500
Blue Hill Street Railway 1st	5	250,000
Christopher & Tenth Street 1st.	4	210,000
October total		$9,834,500
November		
Milwaukee Elec. Ry. & Lt. notes.	7	3,600,000
Milvale, Etna & Sharpsh 1st.	5	741,000
November total		$4,341,000
December		
Washington Railway & Elec. gen.	6	1,000,000
Federal Light & Traction notes.	7	947,000
Federal Light & Traction notes.	6	715,000
Hagerst. & Frederick Ry. 1-yr. notes	7½	540,000
December total		$3,202,000
Railway notes and bonds maturing in:		
January		$7,997,100
February		17,831,000
March		6,355,000
April		21,887,000
May		500,000
June		4,228,000
July		11,728,200
August		2,710,000
September		4,238,000
October		9,834,500
November		4,341,000
December		3,202,000
Grand total		$94,851,800

As indicated in the accompanying text, this total of $94,851,800 of maturities for the year 1923 is in striking contrast to the total of $160,015,860 of maturities for the year 1922.

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of all utility financing as reported by the *Commercial and Financial Chronicle* was $910,476,895. This includes of course all utilities, among them gas compaines, telephone companies and water companies. For the entire year the *Electrical World* reports the financing for the electric light and power companies and combined electric light and railway companies at $589,960,990.

On this matter of statistics it is recognized that there is a need for comparable figures going into greater detail than those now ordinarily available through the usual financial channels. The newspapers and financial journals make a good job of the work which they attempt, but after all they are essentially newspapers and there are limits beyond which they cannot go. Recognizing this, the Investment Bankers' Association of America, through its committee on public service securities, is planning to keep a complete record of financing activities in the public utility field, according to a recent announcement. To this end, Henry R. Hayes, chairman of the public service securities committee of the association, has sent out a letter to all the members of the organization, urging their co-operation in this connection. The work of the committee includes, among other things, keeping in touch with the requirements of utilities, securities offered for sale, and legislation affecting the securities offered.

Reference has been made previously to the trend of the bond market last year. That is by no means a criterion by which to judge accurately probable movements for 1923, but in referring to the prospects for the coming year the National Bank of Commerce says that the two major causes which explain the movement of the bond market during 1922 are of great significance in relation to its probable course in 1923. During the last twelve months that market passed through three distinct phases: a rapid advance, a period of relative stability with a moderate upward tendency, and a period of moderate decline. The upward swing which began in midsummer of 1921 was unchecked, save for temporary and quite unimportant recessions, until June, 1922. This advance was more rapid and persistent than any recorded in recent financial history. All classes of bonds shared in the gains, and prime securities were brought back to what would have been an average yield before the war, if some allowance is made for the altered tax situation.

During the period of rapidly advancing prices new offerings were very heavy. The approximate total for the ten months ending with October was $4,700,000,000, which amount included refunding of old issues. Of the total $3,180,000,000 was offered from January to June. For a time, because of expectation of advancing prices, new issues were bid for eagerly, in some instances at prices to yield less than the investing public was anxious to accept.

From July until autumn the undertone of the market was firm and the various averages of bond prices continued to advance, although more slowly. The strength of good investment issues was especially marked. During this period interest in new issues flagged. The market had definitely lost the enthusiasm prevailing during the earlier months of the year. The downward movement began in September and it was unchecked until the first week of November. Since that time the market has moved irregularly and through a very narrow range.

As a result of general business unsettlement in 1920 and the earlier months of 1921 many excellent bonds had declined below what they were worth for permanent investment. This situation was certain to be corrected as soon as business stability was regained.

The second factor of change in the money market was the purchase of bonds with funds ordinarily employed in commercial and industrial enterprises. During the long period of liquidation many businesses accumulated funds which were not immediately required for their current operations. In the interim it was necessary to employ this money, and many turned to the bond market, at first because the yields on many issues were very attractive and later because of the expectation of profits on a rising market.

Bonds bought for temporary investment were certain to come back on the market sooner or later, and under these conditions the market was also peculiarly sensitive to money rates. Declines in prices during the autumn months have been due in considerable measure to this situation, but they have been moderate, and it seems probable that the further elimination of this speculative element from the market will be so gradual as to have in itself little further effect.

As the banking authority previously quoted sees it, in 1923 the general business situation will exert only its ordinary influence on the bond market. Stable business ought to be reflected in a corresponding stability in good securities. Political conditions will continue to be the dominant factor for some foreign bonds and money rates will exert their customary effect upon the course of security prices. It seems probable that for the first time since 1914 the American bond market will again become primarily an investors' market. It will be increasingly discriminating and will be affected to a lessening degree by temporary and speculative influences.

Tax Recommendation Renewed

In connection with the matter of future finance, it is of interest to note here that the President in his message to Congress renewed the suggestion that the nontaxable feature of bonds of political subdivisions be removed. This, of course, is in line with the best thinking of the day on the matter. Eventually the goal sought to be obtained by the president will undoubtedly be attained, but just at this time the recommendation is perhaps of greater interest as a manifestation of the growing realization of the evil of the tax-exempt bonds than for any prospect it holds out of the end sought being achieved in the near future.

But where does all this point? It points, unless all signs fail, to bright prospects for the future. Of course, industry has expanded in the last half of the year and commercial borrowers have again come into the market for goodly sums. This has had a tendency to stiffen money rates somewhat, so that they have advanced, particularly to industrial borrowers. All business is hazardous, as the electric railway managers found out, but there are few lines of activity which, taken over a span of years, offer the stability that does a well-managed utility. Having won their case before the courts of law, having in most cases bettered their public relations materially, and having in many cases strengthened their financial structures, the electric railways, it would appear, have every reason to look forward hopefully to financing capital expenditures during the coming year.

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Railways Will Spend $240,000,000 in New Plant and Equipment

1923 Purchases for Modernizing and Producing the Service at Lower Cost Will Be 60 per Cent Greater than in 1922—This Gives a Definite Measure of the Improving Financial Conditions

IN ADDITION to the very large normal expenditures that must always be made for materials and supplies to keep the wheels turning, city and interurban electric railways of the United States will spend the huge sum of $240,000,000 for new plant and equipment during 1923. This is an estimate of the budget of the industry for this year, as far as it relates to the purchase of new plant and equipment, paving, tools, economy devices, etc. These planned purchases for 1923 are practically 60 per cent greater than were the same expenditures for 1922, when the total amounted to some $151,000,000.

These expenditures will be divided among the three main accounts, as set up in the A.E.R.A. standard classification, as shown in the accompanying table. This gives a very tangible measure of the extent to which the credit and financial ability of the electric railways are coming back. Their returning prosperity has been plainly evident as 1922 wore on and as now shown indisputably in the statistical studies made by this paper and published elsewhere in this issue.

Increases in expenditures planned in the budgets of the electric railways for 1923 show unquestionably that, taken as a whole, the electric railways have turned the corner, their difficulties are rapidly mending, confidence in their future is more solid, and that the quagmire under their securities is certain to be dried out and become firm ground, thus enabling them in the comparatively near future to proceed with the needed expansion on a reasonable basis of financing.

How the Figure Was Obtained

In order to determine what the probable expenditures in new plant and equipment would be during 1923, the ELECTRIC RAILWAY JOURNAL requested information from the 107 Class A companies as to 1922 expenditures and what they planned to spend in 1923, both divided as among way and structures, equipment and power. Definite figures were supplied by forty-seven companies, practically all of the remaining companies responding, but either declining to give the figures or stating that they could not tell at this time, or indicating that a budget or the planning ahead of expenditures for the year was not a part of their routine. The figures for these forty-seven companies were summarized and the figures for the entire industry calculated from them, proportionately, based on track mileage and cars operated. Both track and cars were used because neither alone gives a proper measure of the buying power of the industry. The actual figures supplied by the forty-seven companies totaled as follows: 1922, $31,200,000; 1923, $51,800,000; the latter being an increase of 66 per cent over 1922.

A number of the companies which were unable to give any estimate stated that they were expecting to make large expenditures in rehabilitation work but this was contingent upon local political situations. It may be assumed, therefore, that many of these situations will be cleared up and expenditures will thus be made which will offset abnormal conditions that may arise with other companies tending to cut off expenditures. Furthermore, several of those that gave figures stated that a much larger amount would be expended than indicated if the money market for their securities showed improvement, or if some political difficulty or franchise matter was settled. Any improvement in such cases would then tend to improve the showing as applied to the entire industry. While some may say that the smaller companies will probably not make expenditures proportional to the larger companies in point of cars and miles of track, there are many small companies which are among the most prosperous. Furthermore, a number of the very largest Class A companies are missing in the figures used as the basis for the industry estimate, and this tends to decrease any over-influence of the large corporations. Also the JOURNAL editors have made allowance in this direction by scaling down to take into account a possible differing situation with respect to the smaller companies. The main reason for approaching only the larger companies was to simplify the work of compilation and because comparatively few of the smaller companies operate on a budget basis.

"ELECTRIC RAILWAY JOURNAL" ESTIMATE OF EXPENDITURES DURING 1922 AND 1923

	1922	1923	Per Cent Increase, 1923 Over 1922
Way and structures	$85,000,000	$105,000,000	23.5
Equipment	38,000,000	90,000,000	137.0
Power	28,000,000	45,000,000	60.6
Total	$151,000,000	$240,000,000	59.0

In looking into the detailed figures it is interesting to note that the largest increase in expenditures during 1923 compared with 1922 will be in the purchase of new equipment. The expenditures for way and structures will lead in 1923 as it did in 1922, but will be only 16 per cent greater than for equipment instead of more than 100 per cent greater, as was the case last year.

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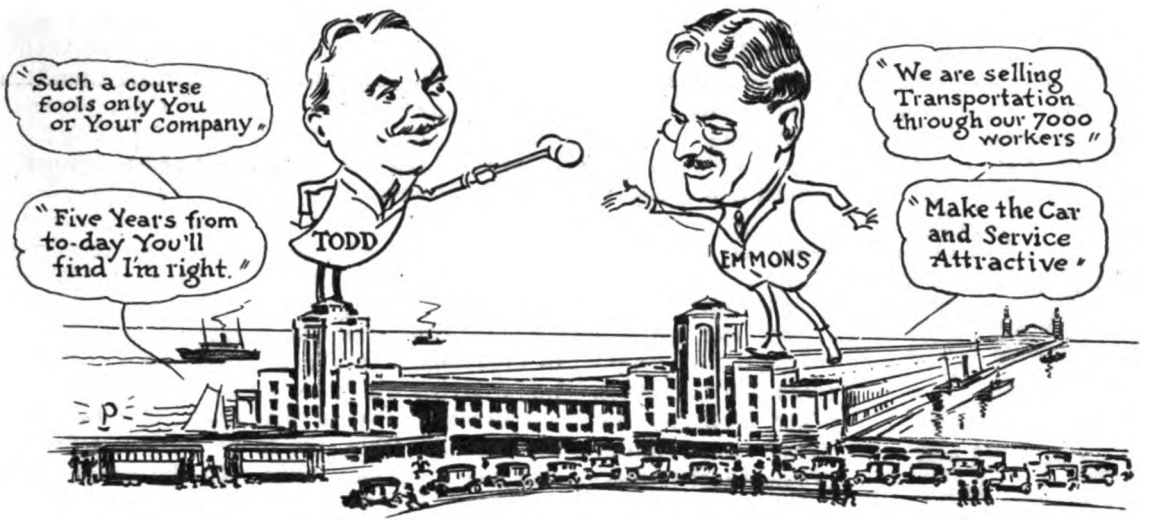

"The Attendants at the Convention Helped the Yellow Cab Company Pay an Extra Dividend"

Over the Road with Father Time

By G. J. MacMurray
News Editor ELECTRIC RAILWAY JOURNAL

Some Sense and Some Non-Sense Glimmed Out of the Year's News — The Bumps of 1922 Don't Appear So Bad Now That You Have Taken Them

NINA WILCOX PUTNAM is a clever woman. To this introduction every electric railway man is expected to respond promptly. He will if he happens not previously to know that the lady is already married. She has a husband of her own, and in the *American Magazine* she makes a few remarks about husbands in a most delightful way. In that respect she seems to score visibly over Ring Lardner, to whom was assigned the task of dissecting the ladies. One article was headed "Say It with Bricks"; the other "Say It with Oil." To Mrs. Putnam there is very little that is romantic about a man with shaving cream on his face and his suspenders draped over his hips. She loves her husband but she is not oblivious to his shortcomings. The relation of the writer to the electric railway industry is somewhat similar to that of Nina to her husband. He loves it but he sees it too often with its face covered with lather, and its suspenders over its hips, as it were, not to enjoy its moments of unconcern. Thus it was at Chicago.

Aside from the fact that the convention forsook the privately owned stock yards for the beautiful Municipal Pier as the place for holding the meeting, there were other seeming incongruities. For instance, there was a beautiful map of the city got out by the railway association which showed among other things the street car lines that could be used to reach the pier, but if anybody in attendance at the convention other than the writer used these lines, there was no evidence of it. The attendants at the convention, concerned with means of boosting the electric railways, helped the Yellow Cab Company to pay an extra dividend. It was a great convention as far as the cab company was concerned, the greatest of all except one, the cab drivers said, and that was the bakers'. The railway men have the "rubber urge," as Zenas W. Carter said, but apparently they don't know they are victims of it. All of this may seem trite, but there isn't much that remains to be said about the convention now that the JOURNAL editors have finished discussing the meeting. So much for that.

In the article similar to this which appeared in the JOURNAL for Jan. 6, last year, the writer referred to the statistics elsewhere in that issue being like hash, because most anything could be put into it. All that was achieved by that excursion was to incur the temporary displeasure of the men who worked on these figures, so that the three-hour-for-lunch club among the editors was minus a member for several days. Statisticians are

"The Three-Hour-for-Lunch Club Among the Editors Was Minus a Member for Several Days"

sensitive beings, it seems. Moreover, they appear to know all the different wheezes that have been got off in the past about them. They were patiently waiting this year for us to come to them and ask: "What do your figures for 1923 prove?" We felt the proud man's contumely once. That was enough.

As Will Rogers says, it is the opening that counts. Having placated both the railway men and the editors

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at the start, it ought now to be possible to proceed, whether that be in chronological order, in historical sequence from the most important subject to the less important, or without any attempt at law and order. After all, the important thing in life is salesmanship. Some railway men forgot for a time that this was so. In consequence a gang of newspaper men is at work for state committees throughout the country trying to get the public back on the right track and Labert St. Clair is busily engaged on a similar problem at the American Association headquarters. This is all good stuff, and it would be nice if as much could be said of all the house organs, but it can't. The contents of most of them are pretty good, but there is considerable room for improvement. In this connection Robert C. Benchley has made some pointed comments under the title "Effective House Organs" in his book "Love Conquers All." Of course Mr. Benchley exaggerates, but so do all other humorists and satirists. That's where their art comes in. They distort the truth without destroying it. It is easier to quote Mr. Benchley than to paraphrase what he says. As a typical example of house-organ inanity he quotes:

"Every One Is Wondering Who Put Chocolate Peppermints in Some of the Girls' Pockets"

"Every one is wondering who the person is who put chocolate peppermints in some of the girls' pockets while they were hanging in the girls' rest room Thursday afternoon, it being so hot that they melted and practically ruined some of their clothing. Some folks have a funny sense of humor."

Mr. Benchley suggests:

"Perhaps some one will start a house organ edited by the employees for circulation among the bosses, containing newsy notes about the owners' families, quotations from Karl Marx, and the results of the profit-sharing contests. This would complete the circle of understanding."

As this is the era of reform, it is to be hoped that the house organ will be next in line to be tackled by the Committee of One Hundred or some other strong organization. To appropriate an expression used by Heywood Broun, some of these house organs are about as effective in their way as it would be for a man to help swell the Niagara current by spitting into the Niagara River.

The sales idea as applied to transportation is sometimes misapplied, but on the whole the industry is reacting favorably in the matter. This has been evident at most of the convention meetings during the year. In this work the weekly pass has been a considerable factor. It furnishes concrete evidence of the willingness of the railway to do something extraordinary for the public. The spread of its use has been remarkable. Moreover, the realization has been growing steadily of the real value of the service performed by the electric railway in the community. Yes, it's true. In a particular case here and there doubt may still be felt about it, but on the whole it's true. Saginaw may still be without electric railway service, but as contrasted with Saginaw there are the settlements of the jitney question arrived at in Augusta, Toledo, Kansas City, Spokane, Providence and Des Moines to mention just a few. True, the citizens of Augusta were without electric railway service for several weeks, but they appear to have learned their lesson.

Strikes were among the other causes of service suspensions. One of the most bitterly contested of these has been the dispute in Buffalo. The brief Chicago strike discommoded the greatest number of people, but in Columbia, S. C., in the early part of the year there was a strike which so far as a small city is concerned was one of the worst that has occurred for some years. Steubenville, Ohio, not to be outdone by any big city, also had a serious strike. In the Buffalo case it certainly is a strange study in contrast that the man at the head of this property should in Philadelphia be considered as a benevolent chief, while in Buffalo he is regarded as a despot. In Philadelphia the socialization of industry has been pretty nearly made a fact by Mr. Mitten, but in Buffalo, strange as it may seem, the attempt being made to achieve the same footing for the workers is being contested by the so-called representatives of the men.

Everywhere the question has been how to better the service. In New York both the companies operating the rapid transit lines and those running the surface roads fell in with the ideas of the commission as to what should be done and a series of service standards was promulgated based on the growing ability of the companies to meet the demands which it was intended to make upon them. Instead of formal proceedings now, there is a monthly conference at which members of the commission and the officers of the surface lines go over the facts. In Chicago cars have been rerouted in the downtown section. Nashville, Memphis, Atlanta and Kansas City are among the other cities that have gone forward in the movement to better local conditions of service. In this connection the extension of service with one-man cars was extraordinary, as was also the application of light-weight cars to interurban service. At the same time there was a further extension of the idea of de luxe service to the operation of the interurban lines. Thus the Kansas City, Clay County & St. Joseph Railway adopted the chair car idea with excellent results and the Sacramento Northern Railroad has put into commission a luxuriously furnished dining and observation car, which is being operated over the company's lines from Chico to Sacramento and thence direct to

"The Spread of the Use of Weekly Pass Has Been Remarkable"

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San Francisco, via the Oakland ferry. Under this plan there is no change of cars during the entire 184-mile trip between Oakland Pier and Chico.

Another innovation was the appearance of the turnstile car. The ways in which this device has been worked out certainly speaks well for the ingenuity of the men engaged in street railway work. At a meeting of railway men a few years ago one of the speakers predicted the so-called push-button car for the future. It certainly looks as if that device were on its way. The subway trains in New York are fast approaching this goal, a great many being operated with only one guard on a train. Operation is becoming more automatic every day in every way. Perhaps M. Coué can suggest the way.

Movie of Mayor Cousens and Fickle Detroit

And now apparently this account comes to a direct pause. The subjects which the notes show should receive attention are so diverse that it seems well-nigh impossible to tie them together. It is like committing journalistic hara-kari to admit this, but some one has said that open confession is good for the soul. On its financial side the status of the industry has improved considerably. There is still much left to be desired, but the record of earnings of some of the roads is impressive. Richmond had a surplus of $990,099, Boston one of $1,117,621, Eastern Massachusetts an increase in net of $892,389, Philadelphia a net of $1,807,292, not to mention in exact figures the Brooklyn City showing, the Illinois Traction System figures, the Montreal surplus, the Cleveland showing, etc. Money is being plowed back into the properties, too. For instance, in the case of Columbus, Ohio, the sum so reinvested amounted to $5,043,471 in three years. Even under the receivership in St. Louis $8,513,000 has been spent in three years. It was more or less of a revelation locally that 17,782 items of supplies had been bought. Incidentally, the speech in which these facts were brought home to his audience was a mighty good piece of better

Money Has Been Plowed Back Into the Run-Down Properties

public relations work on the part of Colonel Perkins, manager for the receiver.

The home rule agitation was renewed in Indiana, New Jersey, California and New York and the Bacharach bill made its appearance in Congress. Except in New York it is extremely unlikely that the apostles of local control will achieve very much, and even in New York State the result of any reorganization may mean that it will be put right up to Mayor Hylan to put up or shut up. And while New York is talking subways instead of building them, Chicago is doing the same thing. Again it is politics. This did not prevent one of the JOURNAL editors, Harry L. Brown, from telling Chicago how it sought to be done. Speaking before the midwinter convocation of engineers Mr. Brown, like a true editor, differed with about everybody else who has spoken on the subject with respect to routes. Every one will agree with one of Mr. Brown's statements, however. It is to the effect that Chicago is in need of some subway facilities *now*, and he showed how the construction of a certain small amount of subway would greatly relieve the rapid transit congestion, if *tied in with* the present elevated system. New York has a $218,000,000 construction program announced by its state-created Transit Commission as opposed to a subway and bus scheme proposed by its Mayor. And while the representatives of the "peepul" in New York, Chicago, Philadelphia and other cities are quarreling among themselves over what shall be done to increase transportation facilities, over in Paris they have done a great big thing by tying together in one transportation unit the urban and suburban railways, the omnibus lines and even the steamer service. Those among us who are prone to say, "But conditions are different over there," should turn back to the JOURNAL for July 1, page 3. In line with these thoughts is the record of the opening of the Frankford Elevated Railroad in Philadelphia. For more than two years this structure stood in mute silence while the city and the Philadelphia Rapid Transit Company discussed operating terms. It mattered not that the Philadelphia Rapid Transit was right in insisting upon being guaranteed against loss in running this line, the people suffered in the meantime. Anyway, Mr. Mitten succeeded in putting his property back on a dividend-paying basis, after having elected his own slate to the directorate of the company at the annual meeting in February. It had been anticipated that the fight for control would be a great battle. It was, for Mr. Mitten. In a carhouse jammed with employee stockholders Mr. Mitten was entirely at home.

But Mr. Mitten's effort has been no more heroic than the efforts made elsewhere to put properties back on their feet or to keep others from slipping off their feet. The plan for the unification of the lines in New York may never materialize along the lines originally proposed, but the Interborough Rapid Transit reorganization has been accepted and that company apparently saved from receivership. Brooklyn has been building along substantial lines, and there is talk of taking the Brooklyn Rapid Transit Company out of the hands of Lindley M. Garrison as receiver early in 1923. So far as the operation of the divorced surface lines in Brook-

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lyn is concerned, they are doing so well under the guidance of Clinton E. Morgan that they have been put back on a dividend paying basis. Through the effective work of President A. W. Thompson, the Pittsburgh reorganization has been approved and only the details remain to be concluded there. In all, the Pittsburgh program calls for the expenditure of $5,000,000 of new money in improvements. The New Orleans situation has been cleared up and the company there is working under a new basis advantageous alike to both the city and the company. This was due in large part to the efforts of C. C. Chapelle, who represented the security holders' committee of the New Orleans Railway & Light Company, whose success lay in his ability to convince the New Orleans public and city authorities of the truth of four principles. When expressed, they seem axiomatic, but their general acceptance elsewhere would simplify reorganizations greatly. As applied to New Orleans they were as follows: (1) New Orleans needs efficient public utility service. (2) Such service cannot be supplied without money. (3) Money cannot be had from the present company. It hasn't got it; it can't get it. (4) No one can or will supply this money except the investor. After these principles were accepted the adoption of an "assured service" plan, fair alike to the company and the city, followed as a matter of almost due course. Speaking of new operating agreements and franchises, there are the new grants in both Louisville and Grand Rapids. There is also the Des Moines grant, referred to before, which the courts have recently sustained and thus settled doubt here. A small coterie attempted to upset all the good work that had been done at Des Moines, but failed ignominiously.

"Thus Times Do Shift; Each Thing Its Turn Does Hold"

On the other hand, during the year the cities of Detroit and Ashtabula took over the local electric railways. For the road in Detroit the city paid $19,850,000 in partial payments, so much down and so much every six months. It appears to have been a personal triumph for Mayor Jim Couzens rather than for the municipal ownership idea. It was May 15 that the deal was formally put through. In November the same public that had backed the Mayor refused to listen to the same Mayor's admonition for funds to carry out extensions and improvements which were part of the original plan approved by the same voters. Mr. Couzens wanted to see the thing through, but then came the resignation of Senator Newberry and the call of the Governor to the Mayor to go to Washington. Thus Mr. Couzens became a national figure in a day.

In Detroit the agitation over the local railway problem has helped materially in making a national figure of the sponsor of the municipal ownership idea, while in Seattle, with the lapse of time, both Mayor Hanson and his successor, Mr. Caldwell, have been returned to private life by a "grateful" public. It will be interesting to follow the acts of Mr. Brown, the present incumbent at Seattle, and see how he succeeds. In deference to public clamor he has arranged to reduce fares from 10 cents cash, or 8⅓ cents at the ticket rate, to 5 cents cash with a 2-cent transfer. Riding will have to increase 46 per cent to pay at the 5-cent fare, so the railway experts say. And yet Seattle isn't afraid. It wouldn't be Seattle if it were. Mr. Erickson, who has had a large hand in the Seattle municipal ownership pie since the pie was first baked, perhaps half-baked, wanted a 3-cent fare. Nobody seems to have stopped to figure out how many passengers would have to ride at 3 cents to make the road profitable, but if the estimate for the 5-cent fare is right, then the population of New York transported to Seattle might help considerably.

Another important work of the year was the campaign for safety. An entire issue of the ELECTRIC RAILWAY JOURNAL was devoted to that subject. Aside from the interview by Harry Brown with Cecil G. Rice, the articles were all written by railway men themselves. Mr. Rice was then president of the Claims Association. Again in the issue of Sept. 9 there was a full page of "Safety Epigrams" by Mr. Rice himself.

So far as meetings of electric railway men are concerned the most important in the order of their occurrence were the annual Central Electric Railway Association meeting on Jan. 26 and 27, the midyear meeting in Chicago on Feb. 28, the annual meeting of the Canadian men in Quebec June 1 to 3, the Central Electric Railway Association boat trip the early part of July and the Chicago convention in October. The annual meeting of the C. E. R. A. was the one at which Labert St. Clair trotted out his renowned cookie jar. Some other very good cookies were also trotted out. It is seldom at a sectional meeting that so many good papers are presented on mechanical subjects. And most fitting of all, the Central men elected Sam Greenland to head them. At the midyear meeting Mr. Todd explained "What is a Hoosier?" That meeting was attended by more than 700 persons. Mr. Todd said Hoosier was derived from "Who's here?" Well, nearly everybody in the industry was there. It was at this meeting that the novelty was introduced of having a woman address a railway convention. The men who spoke did very well, but on this occasion even the inimitable Mr. Wickwire appears to have been outshone by Antoinette Funk of Washington. On the occasion of the Canadian meeting in June a goodly number of Americans were in attendance. Helical versus spur gearing was one of the topics of conversation, but that wasn't all, indeed it wasn't. The Central Electric Railway boat trip was a stormy meeting in the sense of being a rough trip. The boat, so the writer of the account in the JOURNAL says, got on a sand bar. It was at this meeting with the boat on the bar that certain railway men had the temerity to look into the future as far ahead as 1952. As for the Chicago meeting, reference has already been made to that.

And here the notes are exhausted, and the author, too, but not the subject. If the reader is not by this time exhausted it is only because he sees himself here reflected as a participator in some of the events of which a line or two has been jotted down.

"Thus times do shift; each thing its turn does hold;
New things succeed, as former things grow old."

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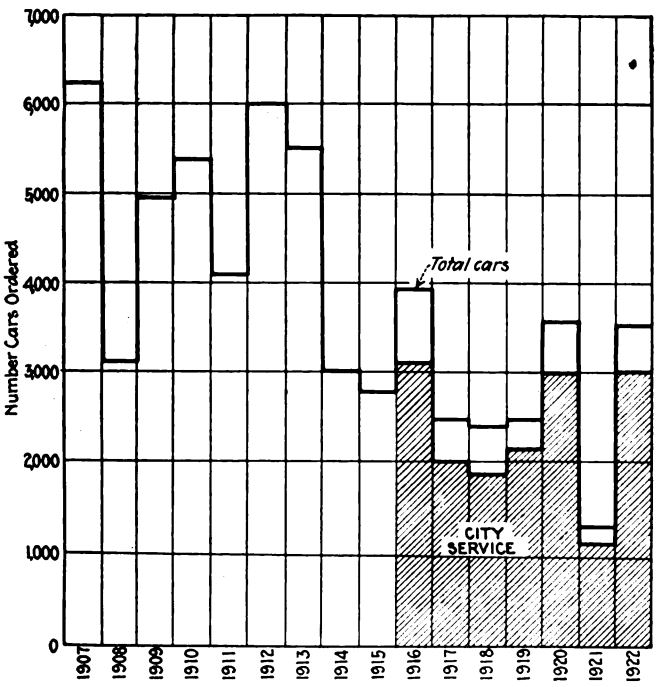
Nearly 200 per Cent Increase in Rolling Stock Ordered During 1922

Pre-War Level Again Reached in New Car Purchases—Passenger Cars Arranged for One-Man Operation Constitute More than 50 per Cent of the Total of New Passenger Cars for City Service

THE year's record of new cars and electric locomotives ordered during 1922 is shown in the accompanying tables. The volume of new rolling stock ordered has again mounted to the levels of 1916 and 1920 and has exceeded other previous records since 1913. The total of 3,538 new cars and locomotives ordered during 1922 is nearly three times that of 1921 and exceeds the yearly average for the previous ten years, which is 3,344. The statistics for new passenger cars ordered during the first half of 1922 as published in the July 1 issue of this paper showed that an excellent start had been made. It is now seen that the number of cars ordered during the last half of the year



New Cars and Locomotives Ordered, by Years. The Division Into City and Interurban Cars Is Not Made Prior to 1916

is more than twice those ordered previous to July 1. This argues well for 1923.

The one-man, single-truck cars with 28-ft. body which are quite universally known as safety cars are still being bought extensively. There were 772 of these purchased during 1922 as compared with 565 for 1921. There were also 269 one-man cars bought with bodies longer than 28 ft. Of these latter 196 had double trucks and seventy-three were single-truck cars. Of the one-man double-truck cars forty were purchased for interurban service. In addition to these types one-man, two-man cars make their first appearance in our tabulation of statistics this year. There were 471 one-man, two-man cars purchased for city service and 9 for interurban service. This type of car gives promise of becoming a very popular one for city service.

An attempt has been made this year to obtain data as to the total number of cars in service that are operated by one man. While the information received is not entirely complete, it appears that there are approximately 7,500. Of these approximately 5,500 are the 28-ft. safety car type. The accompanying table of cars remodeled during 1922 shows a total of 763 cars that were remodeled for one-man operation during the past year.

There were seventeen electric railway systems that placed orders for 50 or more cars. Of these the Chicago Surface Lines ordered 169 double-truck 59-ft. cars and forty-five double-truck one-man cars; the city of Detroit ordered 200 double-truck two-man cars; the Boston Elevated railway ordered 160 one-man, two-man cars and forty motor cars for subway train operation, and the United Electric Railways of Providence, R. I., ordered 150 one-man, two-man cars and twenty-

TABLE I—NEW ROLLING STOCK ORDERED SINCE 1907

Year	Passenger Cars—City	Passenger Cars—Interurban	Freight and Miscellaneous Cars	Electric Locomotives	Total
1907	3,483	1,327	1,406	(a)	6,216
1908	2,208	727	176	(a)	3,111
1909	2,537	1,245	1,175	(a)	4,957
1910	3,571	990	820	(a)	5,381
1911	2,884	626	505	(a)	4,015
1912	4,531	783	687	(a)	6,001
1913	3,820	547	1,147	(a)	5,514
1914	2,147	384	479	(a)	3,010
1915	2,072	336	374	(a)	2,782
1916	3,046	374	491	31	3,942
1917	1,998	185	223	49	2,455
1918	1,842	255	278	44	2,419
1919	2,129	128	172	18	2,447
1920	2,889	227	465	17	3,598
1921	1,059	129	81	7	1,276
1922	2,912	187	405	34	3,538

(a) Included in "Freight and Miscellaneous Cars."

TABLE II—SPECIAL COMPARISON OF NEW ROLLING STOCK ORDERS BY YEARS

	1922	1921	1920	1919	1918	1917	1916
Number of railways reporting new cars	145	94	172	160	140	182	250
City Service							
Number of one-man cars (28 ft. body S.T.)	772	565	1699	1383	644	280	187
Number of one-man cars other than 28 ft. body	227	....	....	....	....	....	....
Number of one-man.two-man cars	471	....	....	....	....	....	....
Number of two-man passenger motor cars*	1290	383	847	635	1068	1316	2731
Number of passenger trailers	150	111	343	111	130	402	128
Service cars	103	47	104	31	(a)	(a)	(a)
Total cars city service	3,015	1,106	2,993	2,160	1,842	1,998	3,046
Interurban Service							
Number of one-man cars	40	....	....	....	....	....	....
Number of one-man, two-man cars	9	....	....	....	....	....	....
Number of two-man motor cars*	122	103	195	96	200	158	303
Number of passenger trailers	16	26	32	32	55	27	71
Number of freight, express and miscellaneous cars	302	34	361	141	(a)	(a)	(a)
Total cars interurban service	489	163	588	269	255	185	374
Total number of cars	3,538	1,269	3,581	2,429	2,375	2,406	3,911
Number of electric locomotives	34	7	17	18	44	49	31

* Includes motor and trail cars for subway, elevated and train service.
(a) Not available.

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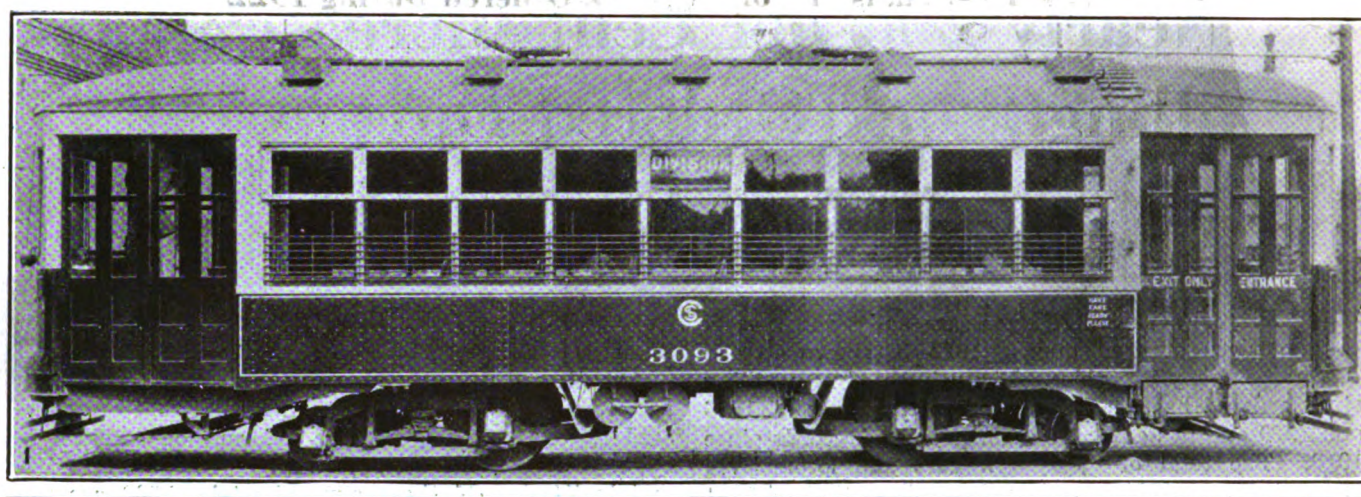
Four Types of Cars Developed During 1922



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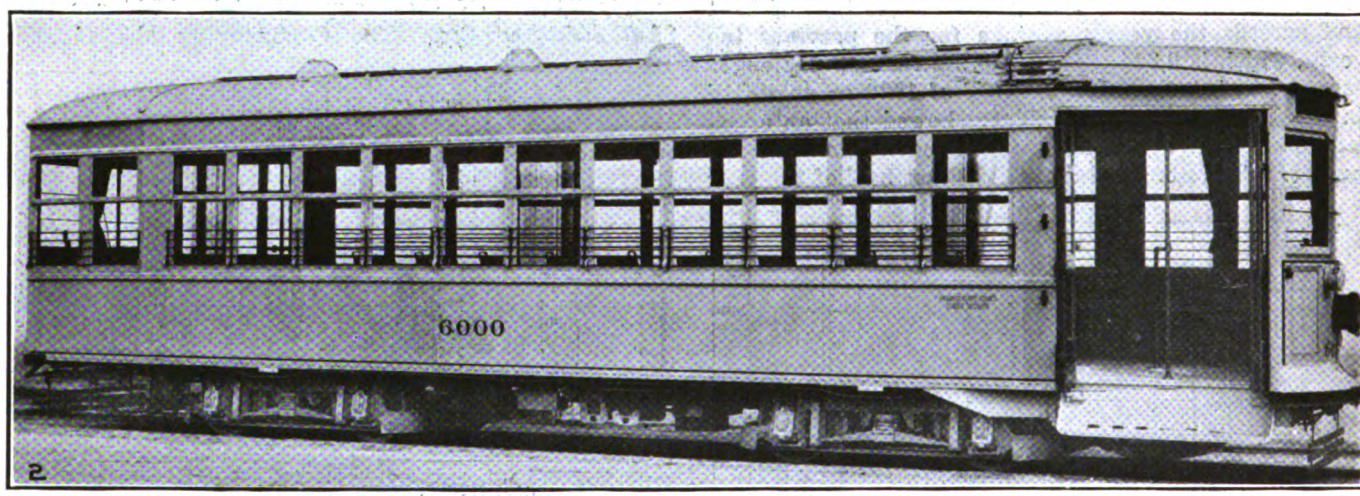

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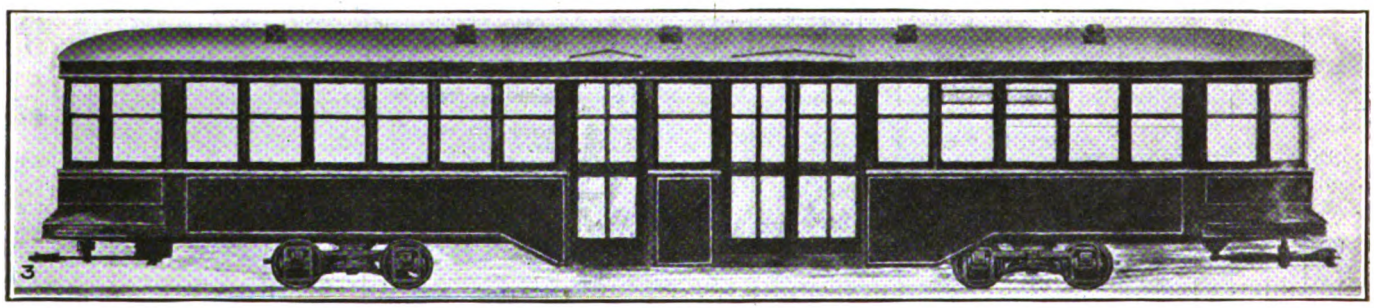

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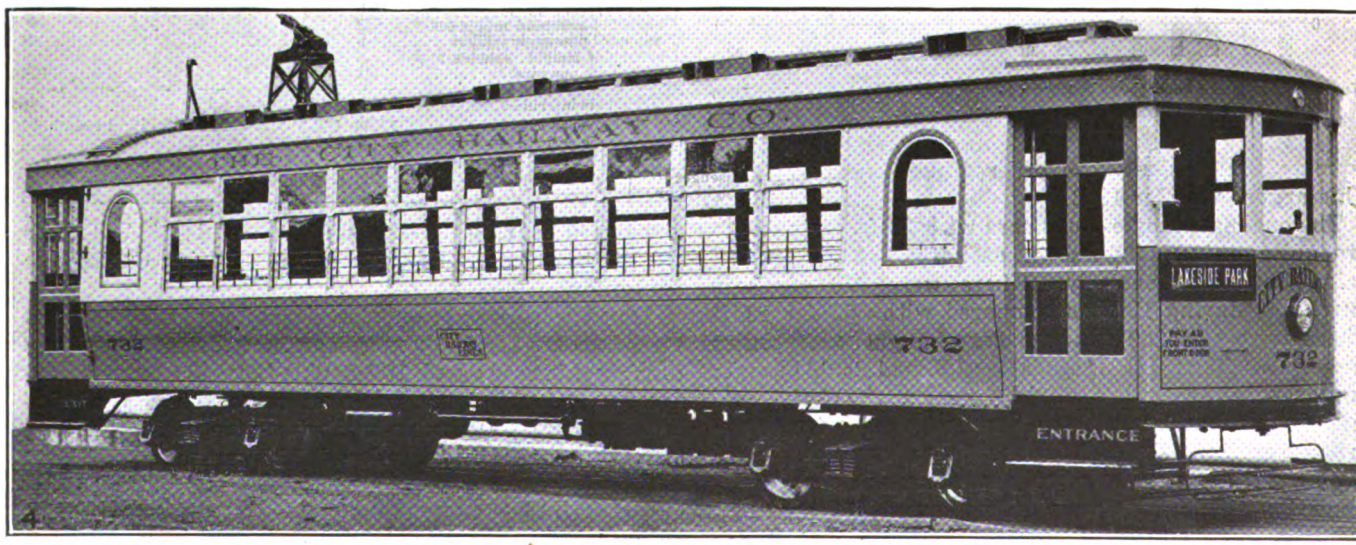

4

No. 1—Double-truck, one-man car for Chicago Surface Lines.
No. 2—Light-weight, one-man car for Eastern Massachusetts Street Railway.
No. 3—Light trailer for Toronto Transportation Commission.
No. 4—Light-weight, one-man car for the City Railway of Dayton, Ohio.

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Table III—Details of Rolling Stock Ordered During 1922

New England District

Name of Company	No.	Class	City or Interurban	Motor or Trailer	Single or Double Truck	One or Two Man	Length Overall	Seating Capacity	Total Wt. Light (Tons)	Equipped With Safety Devices	Cars Junked During Yr.
CONNECTICUT											
The Connecticut Co.	35	Passenger	C	M	ST	1	28′ ½″	32	8.25	Yes	66P
	3	Passenger	I	M	DT	1	40′ 3″	54	13.85	Yes	218
MAINE											
The Androscoggin & Kennebec Ry. Co.	1	Passenger	I	M	DT	1	40′ 3″	52	14	Yes	.....
	3	Passenger	C	M	ST	1	28′ 5″	32	7.5	Yes	.....
Bangor Ry. & Elec. Co.	1	Passenger	I	M	DT	1	40′ 3″	52	15	Yes	.....
	2	Passenger	C	M	ST	1	28′ ½″	32	8	Yes	.....
Central Maine Power Co.	3	Passenger	C	M	ST	1	28′	32	8	Yes	4 IM
	3	Passenger	I	M	DT	1	40′ 3″	54	14.5	Yes	.....
	1	Passenger	I	M	DT	2	40′	54	17.5	No	.....
Cumberland County Power & Light Co.	1	Sweeper	C	M	ST	.....	.....	...	...	...	37 CM
MASSACHUSETTS											
Boston Elevated Ry. Co	160	Passenger	C	M	DT	1-2	45′ 0″	48	15.5	Yes	.....
	40	Passenger	(Subway)	M	DT	Train	47′ 3″	44	22.00	No	.....
	2	Sweepers	C	...	...	...	...	...	26.00	...	.....
Brockton & Plymouth St. Ry.	1	Passenger	I	M	DT	1	40′ 3″	50	14.00	Yes	3 IM
	1	Passenger	C	M	ST	1	28′ ½″	32	8.00	Yes	.....
Eastern Massachusetts St. Ry. Co.	25	Passenger	C	M	DT	1	41′ 3½″	45	15.75	Yes	147 CM
Massachusetts Northeastern St. Ry. Co.	1	Passenger	C	M	ST	1	28′	33	8	Yes	.....
Nahant & Lynn St. Ry. Co.	1	Snow Plow	C	...	.....	..	.....	...	...	....	.....
NEW HAMPSHIRE											
Exeter, Hampton & Amesbury St. Ry.	1	Passenger	C	M	ST	1	28′	32	8.0	Yes	.....
Keene Elec. Ry. Co.	3	Passenger	C	M	ST	1	30′	32	...	Yes	2 CM
RHODE ISLAND											
United Elec. Rys. Co.	150	Passenger	C	M	DT	1-2	41′	38	15.30	Yes	24 C M (Service)
	1	Sweeper	C	M	DT	..	39′	...	27.49	.....	8 CM (Pass.)
	4	Snow plow	C	M	DT	..	42′ 4″	...	21.43	.....	.....
	2	Dump	C	M	DT	..	40′ 6″	...	23	.....	.....
	25	Passenger	C	M	ST	1	27′ 10″	32	8.34	Yes	.....
Total for New England District	470	.....	.....	...	....	....	.....	...	...	...	.....

North of the Ohio and East of the Mississippi River

DISTRICT OF COLUMBIA											
The Capital Traction Co.	2	Sweeper	C	M	ST	..	28′ 3″	...	...	...	.....
Washington Ry. & Elec. Co.	40	Passenger	C	M	DT	1	42′ 3″	46	17.5	Yes	23 CM
	...	.....	.....	...	....	....	.....	...	....	...	19 CT
ILLINOIS											
Bloomington & Normal Ry. & Lt. Co.	10	Passenger	C	M	ST	1	28′ ½″	32	8	Yes	.....
Chicago, Aurora & Elgin R.R.	20	Passenger	I	M	DT	2	55′ 0″	56	...	...	.....
Chicago No. Shore Ry.	15	Freight	I	M	DT	..	50′ 0″	...	36.5	...	.....
	1	Line	I	M	DT	..	50′ 0″	...	32.3	...	.....
	7	Passenger	I	M	DT	2	55′ 3½″	54	49.55	No	.....
	2	Passenger	I	M	DT	1	47′ 6″	58	20	Yes	.....
	1	Dining	I	M	DT	2	55′ 3½″	...	51.6	....	.....
	2	Parlor	I	T	DT	2	55′ 3½″	28	37.5	....	.....
	12	Passenger	C	M	ST	1	28′ ½″	32	9.85	Yes	.....
Chicago Surface Lines	169	Passenger	C	M	DT	2	48′ 11″	48	22.50	....	.....
Chicago Surface Lines	45	Passenger	C	M	DT	1	39′ 7½″	50	15.55	Yes	.....
	3	Sweepers	C	M	ST	..	28′ 3″	...	14.25	....	.....
	2	Snow plow	C	M	DT	..	47′ 0″	...	...	....	.....
Chicago & West Towns Ry. Co.	4	Passenger	C	T	DT	..	42′ 6″	48	...	....	.....
Danville St. Ry. & Lt. Co.	16	Passenger	C	M	ST	1	28′ ½″	32	8	Yes	.....
Decatur Ry. & Lt. Co.	5	Passenger	C	M	ST	1	28′ ½″	32	8	Yes	.....
Illinois Power Co.	1	Work	I	M	DT	...	40′ 0″	...	...	....	.....
East St. Louis & Suburban Ry.	1	Passenger	I	M	DT	2	53′ 8″	58	29.00	Yes	.....
	1	Work	I	M	DT	.....	40′ 6″	...	25.00	....	.....
Metropolitan West Side Elevated Ry. Co.	100	Passenger	Elevated	M	DT	Train	48′ 0″	50	35.25	....	.....
Peoria Ry. Co.	50	Passenger	C	M	ST	1	28′ ½″	32	8	Yes	.....
Urbana & Champaign Ry., Gas & Elec. Co.	9	Passenger	C	M	ST	1	28′ ½″	32	8	Yes	.....
INDIANA											
Chicago, South Bend & Northern Indiana Ry. Co.	2	Freight, flat	I	T	DT	..	38′ 2″	...	9	...	1 IM (Work)
	1	Service	C	M	DT	..	34′ 0″	...	15	...	1 CM (Service)
	1	Work	I	M	DT	..	36′ 0″	...	25	...	.....
Indianapolis Street Railway Co.	3	Work	C	T	DT	..	34′ 0″	...	...	...	.....
Indiana Service Corp.	15	Passenger	C	M	ST	1	30′ 5″	34	...	No	.....
Interstate Public Service Co.	15	Freight, box	I	T	DT	..	40′ 3″	48	12.73	No	.....
	5	Passenger	C	M	DT	1	40′ 2″	48	12.73	No	.....
Lafayette St. Ry., Inc.	18	Passenger	C	M	ST	1	28′ ½″	33	8	Yes	.....
	3	Passenger	C	M	DT	1	38′	48	25	No	.....
	1	Work	C	...	.....	..	.....	...	...	....	.....
Terre Haute Traction & Lt. Co.	2	Stock	I	M	DT	..	34′	...	15	....	.....
	7	Stock	I	T	DT	..	34′	...	10	....	.....
Union Trac. Co. of Indiana	27	Passenger	C	M	ST	1	28′ 4″	34	8	Yes	3 CT
	5	Stock	I	T	.....	.....	.....	...	...	...	.....
MICHIGAN											
City of Detroit,—Dept. of St. Rys.	200	Passenger	C	M	DT	2	48′ 5½″	52	18.66	Yes	.....
Detroit United Ry.	...	.....	.....	...	....	....	.....	...	....	....	128
Grand Rapids Ry. Co.	8	Passenger	C	M	ST	1	28′ ½″	32	8.0	Yes	8 CM
Menominee & Marinette Lt. & Traction Co.	.....	.....	.....	...	.....	.....	.....	...	...	....	7 IT
NEW JERSEY											
Atlantic & Suburban Ry.	6	Passenger	C	M	ST	1	28′ ½″	33	8	Yes	.....
Cumberland Traction Co.	2	Passenger	I	M	DT	1	40′ 3″	50	...	....	.....
Trenton & Mercer County Trac. Corpn.	2	Sweeper	C	M	ST	..	29′	...	17.5	....	.....
	2	Plows	C & I	M	DT	..	43′	...	25.00	....	.....
	1	Crane	C & I	M	DT	..	45′	...	30	....	2 IM (Service)
	1	Comb.	C & I	M	DT	..	43′	...	26	....	2 IM (Sweepers)

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Table III—Details of Rolling Stock Ordered During 1922—(Continued)

North of the Ohio and East of the Mississippi River—Continued

Name of Company	No.	Class	City or Interurban	Motor or Trailer	Single or Double Truck	One or Two Man	Length Overall	Seating Capacity	Total Wt. Light (Tons)	Equipped With Safety Devices	Cars Junked During Yr.
NEW YORK											
Binghamton Ry.	7	Passenger	C	M	DT	1	37′	42	16	Yes	
Elmira Water, Light & R. R. Co.	4	Passenger	C	M	ST	1	27′ 10″	32	8.28	Yes	4
Hudson & Manhattan R.R. Co.	25	Passenger	Tube	M	DT	Train	51′ 3½″	44	37	Yes	
Interborough Rapid Transit Co.	100	Passenger	C	T	DT	Train	51′ ½″	44	27.5		
The Long Island Railroad Co.	40	Passenger	I	M	DT	Train	63′ 4½″	78	58.6	Yes	
New York Central Railroad	30	Passenger	I	M	DT	Train	69′ 5″	82	64.5	Yes	
Niagara Junction Ry.	1	Line	C	M							
New York & Queens Co. Ry.	12	Passenger	C	M	ST	1	28 ½″	3	28.5	Yes	
Ogdensburg St. Ry. Co.											3
Poughkeepsie & Wappinger Falls Ry. Co.	10	Passenger	C	M	ST	1	27′ 10″	32	8.85	Yes	
	1	Sweeper	C	M	ST						
OHIO											
Ashtabula Rapid Transit System	10	Passenger	C	M	ST	1	28′ ½″	32	8.25	Yes	9
Cincinnati & Dayton Traction Co.	16	Passenger	C	M	ST	1	28′ ½″	32	8.5	Yes	
Cincinnati, Georgetown & Portsmouth R.R. Co.	4	Passenger	I	M	DT	1	39′ 8″	48	13	Yes	
	1	Express & Mail	I	M	DT		40′		14.25	Yes	
The Cincinnati Traction Co.	75	Passenger	C	M	DT	1-2	43′	46	14	Yes	
The City Ry. Co.	15	Passenger	C	M	DT	1	41′ 11″	52	12.65	Yes	46 CM
The Cleveland Ry.	50	Passenger	C	M	DT	2	52′ 5½″	56	22.15		
	8	Dump	C	M	DT		40′ 6″		23		
	4	Dump	C	T	DT		35′ 6″		15		
	50	Passenger	C	T	DT		49′ 2″	60	12.65		
The Community Traction Co.	1	Dump	C	M	DT		40′ 6″		25		
Dayton, Springfield & Xena So. Ry.	2	Passenger	C	M	DT	1	41′ 11″	52	13	Yes	
	4	Passenger	I	M	DT	1	44′ 5″	46	13.75	Yes	
	2	Dump	C	T	DT		40′ 6″		16		
The Dayton St. Ry. Co.	15	Passenger	C	M	ST	1	28′ ½″	34	8	Yes	
Dayton & Western Traction Co.	4	Dump Cars	I								1 FM
The Fostoria & Tremont Ry. Co.	2	Passenger	I	M	DT	2	45′	48	16.22	Yes	
Lima City St. Ry.	20	Passenger	C	M	ST	1	28′ ½″	33	8	Yes	
Maumee Valley Ry.	7	Passenger	I	M	DT	1	39′ 8″	49	13	Yes	
Northern Ohio Traction & Light Co.	4	Express	I	T	DT		56′		30		
The Pennsylvania-Ohio Electric Co.	5	Passenger	C	M	ST	1	28′ ½″	32	7.5	Yes	
Portsmouth St. Ry. & Lt. Co.	6	Passenger	C	M	DT	2	42′ 11″	52	13	Yes	
The Steubenville, East Liverpool & Beaver Valley Trac. Co.	25	Passenger	C	M	ST	1	30′ 1″	32	8	Yes	
The Toledo & Western R.R. Co.	3	Passenger	I & C	M	DT	2	41′ 2″	45	13.35	Yes	
The Western Ohio Ry. Co.	8	Passenger	I	M	DT	2	45′	48	16.22	Yes	
The Youngstown & Suburban Ry. Co.	2	Passenger	I	M	DT	1	41′ 6″	44	14.5	Yes	
PENNSYLVANIA											
Buffalo & Lake Erie Trac. Co.	25	Passenger	C	M	ST	1	28′ ½″	32	8.18	Yes	14 CM
Conestoga Trac. Co.	10	Passenger	C	M	ST	1	30′ 1″	32	9	Yes	3 CM
Eastern Pennsylvania Rys.	2	Passenger	I	M	DT	2	50′	52			
Frankford Elevated Ry.	50	Passenger	El.	M	DT	Train	55′ 0″	53			
Harrisburg Rys. Co.											7
Northampton Transit Co.	6	Passenger	I	M	DT	1	44′ 8″	48	13.5	Yes	
Philadelphia Rapid Transit Co.	5	Passenger	C	M	ST	1	28′ ½″	33	8	Yes	
Philadelphia Rys. Co.											24
Philadelphia & West Chester Trac. Co.	1	Snow Plow	I	M	DT		50′				
Pittsburgh Rys. Co.	2	Dump	C	M	DT		40′ 6″		23		
	40	Passenger	C	M	DT	2	45′	56	17		
Reading Transit & Lt. Co.	5	Passenger	C & I	M	DT	1-2	45′	52	15	No	30 M (Open)
	1	Dump	I	M	DT		40′ 6″		25		
York Railways Co.	7	Passenger	C	M	ST	2	34′ 11″	38	11.5	No	
WISCONSIN											
East Wisconsin El. Co.	1	Passenger	C	M	ST	1	28′ ½″	32	8.5	Yes	
Milwaukee Elec. Ry. & Lt. Co.	1	Flat, spec.	C	T	DT		30′				25 T (Work)
	1	Work crane	C	M	DT		40′ 3″				
	10	Dump, side	C	T	DT		35′ 6″		16		
	2	Dump, center	C	T	DT		35′ 6″				
	4	Work	I								
Wisconsin-Minnesota Lt. & Power Co.	4	Passenger	C	M	ST	1	28′ ½″	32	8.2	Yes	
Wisconsin Public Service Co.	2	Passenger	C	M	ST	1	28′	34	7.5	Yes	4 CM
	6	Passenger	I	M	DT	1	43′ 9″	46	13.5	Yes	
Wisconsin Ry., Lt. & Power Co.	3	Passenger	C	M	ST	1	28′ ½″	32	8.5	Yes	
Total North of the Ohio and East of the Mississippi River.	1606										

South of the Ohio and East of the Mississippi River

FLORIDA											
Jacksonville Traction Co.	47	Passenger	C	M	ST	1	28′ ½″	32	7.5	Yes	12 CM
Miami Beach El. Co.	4	Passenger	C	M	ST	1	28′ ½″	33	8.00	Yes	
Municipal Railway of St. Petersburg	1	Passenger	C	M	ST	1	28′	32	8.00	Yes	
Pensacola Elec. Co.	8	Passenger	C	M	ST	1	28′ ½″	32	8.00	Yes	
Tampa Elec. Co.	20	Passenger	C	M	ST	1	28′ ½″	34	8.00	Yes	
Tampa Electric Co.	4	Passenger	C	M	DT	1	45′ 8″	52	16	Yes	
GEORGIA											
Augusta-Aiken Ry. & El. Corp. of So. Carolina	1	Express	I	M	DT		45′		26		31 CM
	15	Passenger	C	M	ST	1	28′ ½″	32	8.5	Yes	
Brunswick & Interurban Ry. Co.											4 CM
Columbus Elec. & Power Co.	3	Passenger	C	M	ST	1	28′ ½″	32	8.00	Yes	
Georgia Ry. & Power Co.	20	Passenger	C	M	DT	2	44′ 6″	48	17.43		
	6	Passenger	C	M	DT	2					
Savannah Elec. & Power Co.	30	Passenger	C	M	ST	1	28′ ½″	32	8	Yes	
KENTUCKY											
Kentucky Traction & Terminal Co.	2	Express	I	M	DT		40′		15		5 CM (Open)
	10	Passenger	C	M	DT	2					
Louisville Ry. Co.	55	Passenger	C	M	ST	1	28′ 3″	33	9	Yes	
	1	Line	C & I	M	DT		33′ 4″		18.4		
	1	Dump	C & I	M	DT		40′ 6″		24		
	2	Dump	C & I	T	DT		40′ 6″		16		
MISSISSIPPI											
Delta Light & Traction Co.	1	Passenger	C	M	ST	1	28′ ½″	32	8.0	Yes	
Jackson Public Service Co.	6	Passenger	C	M	ST	1	28′	32	8.5	Yes	

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Table III—Details of Rolling Stock Ordered During 1922 (Continued)

South of the Ohio and East of the Mississippi River (Continued)

Name of Company	No.	Class	City or Interurban	Motor or Trailer	Single or Double Truck	One or Two Man	Length Overall	Seating Capacity	Total Wt. Light (Tons)	Equipped With Safety Devices	Cars Junked During Yr.
VIRGINIA											
Newport News & Hampton Ry., Gas & Elec. Co.	...	...	...	...	...	...	...	...	...	10	CT
Virginia Ry. & Power Co.	75	Passenger	C	M	ST	1	82′ ½″	32	7.5	Yes	6 CM
	2	Passenger	C	M	ST	1	31′ 0″	33	8	Yes	...
WEST VIRGINIA											
Monongahela Power & Ry. Co.	4	Freight, (Box)	I	..	DT	..	36′	..	14.8	...	...
Tygart's Valley Traction Co.	4	Passenger	C	M	ST	1	28′ ½″	33	8	Yes	...
Wheeling Traction Co.	3	Dump	C-I	M	DT	..	40′ 6″	...	24	...	...
	1	Dump	C-I	T	DT	..	40′ 6″	...	16	...	...
Total south of the Ohio and East of the Mississippi River	326										

West of the Mississippi River

CALIFORNIA											
Los Angeles Ry. Corp.	75	Passenger	C	M	DT	2	48′ 0″	52	19.45	...	...
Municipal Ry. of San Francisco	21	Passenger	C	M	ST	2	29′ 10″	28	13	Yes	...
	20	Passenger	C	M	DT	2	50′	50	24	Yes	...
Pacific Electric Ry.	200	Freight	I	T	DT	..	41′ 5″	...	19	...	1 CM
	50	Passenger	C	M	DT	2	52′ 2″	65	27 9	Yes	35 FM
	1	Crane	C	..	DT	..	22′ ½″	...	...	...	...
Petaluma & Santa Rosa R.R. Co.	2	Freight flat	I	..	DT	..	37′ 3″	...	...	...	...
San Diego & Arizona Ry. Co.	4	Stock	I	..	...	..	...	...	...	...	14
	20	Freight	I	..	...	..	...	...	...	...	...
San Diego Elec. Ry. Co.	10	Passenger	C	M	ST	1	28′ ½″	33	8.05	Yes	...
	1	Work	C	M	DT	..	...	...	...	...	...
San Francisco-Oakland Terminal Rys.	1	Passenger	C	M	DT	2	48′ 6″	52	19	No	9 CM
	15	Passenger	C	M	DT	2	57′ 7½″	68	30	Yes	...
San Francisco-Oakland Terminal Rys.	55	Passenger	C	M	DT	1-2	44′ 10″	48	17.5	Yes	...
Union Traction Co.	4	Passenger	C	M	ST	1	28′ ½″	33	8	Yes	
COLORADO											
The Western Lt. & Power Co.	1	Passenger	C	M	ST	1	30′ 1″	32	9	Yes	1 CM
IDAHO											
Caldwell Traction Co.	...	...	...	...	...	...	...	...	...	...	2 IM
IOWA											
Des Moines City Ry.	20	Passenger	C	M	DT	2					...
Sioux City Service Co.	5	Passenger	C	M	DT	1-2	36′ 2″	46	14	Yes	...
Tri-City Ry. Co. of Iowa	6	Passenger	C	M	DT	1-2	38′ 6″	44	13.5	Yes	...
KANSAS											
Atchison Ry. Lt. & Power Co.	2	Passenger	C	M	ST	1	25′ 5″	30	6	Yes	...
The Kansas El. Power Co.	5	Passenger	C	M	ST	1	28′ ½″	32	8.5	Yes	...
The Southwestern Interurban Ry. Co.	1	Passenger	C	M	ST	1	28′ ½″	34	8	Yes	...
The Topeka Ry. Co.	10	Passenger	C	M	ST	1	28′ ½″	32	8	Yes	...
Wichita R.R. & Lt. Co.	15	Passenger	C	M	ST	1	28′ ½″	32	8	Yes	...
LOUISIANA											
Baton Rouge Electric Co.	5	Passenger	C	M	ST	1	28′ ½″	32	8.00	Yes	2 CM
Monroe St. Ry.	5	Passenger	C	M	ST	1	28′ ½″	32	8	Yes	...
New Orleans Public Service, Inc.	2	Dump	C	M	DT	..	40′ 6″	...	24	...	...
	2	Dump	C	T	DT	..	40′ 6″	...	16	...	...
	100	Passenger	C	M	DT	2	47′ 8″	52	20.57	Yes	22 CM
Shreveport Rys. Co.	5	Passenger	C	M	ST	1	28′ ½″	32	7.75	Yes	...
MINNESOTA											
Wisconsin Ry., Lt. & Power Co.	3	Passenger	C	M	ST	1	28′	30	8	Yes	...
MISSOURI											
The Kansas City Rys. Co.	1	Dump	C-I	M	DT	..	40′ 6″	...	26	...	...
	20	Passenger	C	M	DT	1-2	44′ 10″	58	21-29	Yes	2
	2	Dump	C-I	T	DT	..	40′ 6″	...	16	...	...
Springfield Traction Co.	...	...	...	...	...	...	...	...	...	...	6
United Rys. Co. of St. Louis	50	Passenger	C	M	DT	2	50′ 6″	60	19.79	Yes	5 CM
NEBRASKA											
The Lincoln Traction Co.	...	...	...	...	...	..	...	...	...	...	1 CM
OKLAHOMA											
Chickasha St. Ry. Co.	...	...	...	...	...	...	...	...	...	...	2
Muskogee El. Tr. Co.	6	Passenger	C	M	ST	1	28′ ½″	32	8.5	Yes	...
Oklahoma Ry. Co.	20	Passenger	C	M	ST	1	28′ ½″	32	8.5	Yes	...
TEXAS											
Dallas Ry. Co.	5	Passenger	I	M	DT	2	45′	48	15	No	...
	2	Express	I	M	DT	..	45′ 8″	..	15	...	...
	2	Dump	C & I	M	DT	..	40′ 6″	..	22	...	...
Eastern Texas Elec. Co.	...	...	...	...	...	..	...	...	...	...	1 C
El Paso Electric Ry. Co.	...	...	...	...	...	..	...	...	...	...	4 CM
	...	...	...	...	...	..	...	...	...	...	6 CT
Houston Electric Co.	10	Passenger	C	M	DT	1	39′ 7″	48	13.9	Yes	...
	25	Passenger	C	M	ST	1	28′ ½″	33	8.0	Yes	...
	1	Freight, flat	C	T	DT	..	33′ 0″	...	8.5	...	...
San Antonio Public Service Co.	15	Passenger	C	M	ST	1	28′ ½″	34	8.4	Yes	...
Southwestern Traction Co.	...	...	...	...	...	..	...	...	...	...	1
UTAH											
Salt Lake, Garfield & Western Ry. Co.	1	Passenger (cl.)	I	T	DT	..	69′	96	26	...	...
	13	Passenger (op)	I	T	DT	..	55′ 8″	100	20	...	3 IT
WASHINGTON											
Lewiston-Clarkston Transit Co.	1	Passenger	C	M	ST	1	28′ ½″	32	8	Yes	...
	1	Work	C	M	ST	..	...	...	...	...	...
Puget Sound Elec. Ry.	...	...	...	...	...	..	...	...	...	...	4 Pass. I
	...	...	...	...	...	..	...	...	...	...	1 IT
	...	...	...	...	...	..	...	...	...	...	1 FI
	...	...	...	...	...	..	...	...	...	...	4 IM
Puget Sound International Ry. & Power Co.	...	...	...	...	...	..	...	...	...	...	1 CM
WYOMING											
Cheyenne Elec. Ry. Co.	2	Passenger	C	M	ST	1	28′ ½″	33	8	Yes	...
Total West of the Mississippi River	843										

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Table III—Details of Rolling Stock Ordered During 1922 (Concluded)

Canada

Name of Company	No.	Class	City or Interurban	Motor or Trailer	Single or Double Truck	One or Two Man	Length Overall	Seating Capacity	Total Wt. Light (Tons)	Equipped With Safety Devices	Cars Junked During Yr.
BRITISH COLUMBIA											
Itish Columbia Elec. Ry. Co., Ltd	...	...	...	...	...	..	...	...	...	...	1 CM
	...	...	...	...	...	..	...	...	...	...	1 F Box
	...	...	...	...	...	..	...	...	...	...	1 Service
MANITOBA											
Winnipeg Electric Ry. Co	1	Service	C	M	DT	..	34′ 0″	20	....	....	.....
NEW BRUNSWICK											
Moncton Tramways Elec. & Gas Co., Ltd	2	Passenger	C	M	ST	1	28′ ½″	30	7.75	Yes	.....
	1	Snow plow	C	M	ST	..	.....	...	....	....	.....
ONTARIO											
Hydro-Electric Pwr. Comm	4	Passenger	I	M	DT	1-2	43′ 9″	46	.....	Yes	.....
Oshawa Ry	2	Passenger	C	M	DT	2	.....	....	.....	.....	.....
The International Transit Co	5	Passenger	C	M	ST	1	28′	34	....	Yes	.....
The London St. Ry. Co	5	Passenger	C	M	ST	1	28″ 9″	32	9	Yes	.....
Toronto Transportation Commission	100	Passenger	C	M	DT	2	47′	52	18.5	Yes	82 M
	100	Passenger	C	T	DT	..	49′ 2″	60	12.5	Yes	63 CT
	5	Service, flat	C	M	DT	..	40′	...	21.5	.....	.....
	8	Diff. Dump	C	M	DT	..	40′ 6″	....	24.0	.....	.....
	2	Diff. Dump	C	T	DT	..	40′ 6″	....	16.5	.....	.....
Kitchener & Waterloo St. Ry	5	Passenger	C	M	DT	2	50′ 0″	62	13.0	Yes	.....
QUEBEC											
The Hull Electric Co	2	Passenger	C	M	ST	1	31′	41	11	Yes	.....
Levis County Ry	8	Passenger	C	M	ST	1	28′	32	8.5	Yes	.....
	3	Snow Plow	C	M	ST	..	26′	....	14	.....	.....
	2	Snow Plow	C	M	DT	..	40′	....	30	.....	.....
Montreal & Southern Counties Ry	2	Passenger	I	M	DT	2	55′	60	30.5	Yes	.....
	2	Passenger	I	T	DT	2	55′	60	21.5	No	.....
Quebec Ry., Lt., Heat & Power Co	...	.....	.....	...	.....	..	.....	...	.....	.....	21 CM
Total for Canada	259										

five safety cars. Aside from these, four other companies ordered 100 cars each, four more purchased seventy-five to 100 cars and five others fifty to seventy-five cars each.

This year's statistics include six rapid transit orders. The Interborough Rapid Transit Company, New York, and the Metropolitan West Side Elevated, Chicago, each purchased 100 cars; the Boston Elevated and the Long Island Railroad, New York, each purchased forty cars; the New York Central Railroad purchased thirty electric cars and the Hudson & Manhattan Railroad twenty-five cars.

The number of companies that reported new rolling stock ordered during 1922 is 145 as compared with ninety-four for 1921. These railways are approximately 18 per cent of all those in the United States

TABLE V—RECAPITULATION BY DISTRICTS OF CARS ORDERED DURING 1922

	New England District	North of the Ohio and East of the Mississippi River	South of the Ohio and East of the Mississippi River	West of the Mississippi River	Total for United States	Total for Canada	Grand Total
Number of companies reporting	12	72	17	33	134	11	145
City Service							
One-man cars, 28 ft. body	71	278	269	134	752	20	772
One-man cars other than 28 ft. { Single truck	3	65	2	1	71	2	73
{ Double truck	25	117	4	10	156	....	156
One-man, two-man cars	310	75	....	86	471	....	471
Two-man cars (surface)	....	476	36	352	864	111	975
Motor cars for rapid transit trains	40	275	....	....	315	....	315
Trailers	....	50	....	....	50	100	150
Service and miscellaneous cars	11	51	8	11	81	22	103
Total cars city service	460	1,387	319	594	2,760	255	3,015
Interurban service							
One-man double-truck cars	9	31	....	....	40	....	40
One-man, two-man cars	....	5	....	....	5	4	9
Two-man cars	1	46	....	5	52	....	52
Trailers	....	2	....	14	16	....	16
Motor cars for train service	....	70	....	....	70	....	70
Express and freight cars	....	52	7	228	287	....	287
Miscellaneous cars	....	13	....	2	15	....	15
Total cars interurban service	10	219	7	249	485	4	489
Electric locomotives	14	8	4	7	33	1	34
Total cars and electric locomotives ordered	484	1,614	330	850	3,278	260	3,538

TABLE VI—RECAPITULATION BY DISTRICTS OF CARS REMODELED DURING 1923

	New England District	North of the Ohio and East of the Mississippi River	South of the Ohio and East of the Mississippi River	West of the Mississippi River	Total for United States	Total for Canada	Grand Total
Number of companies reporting	12	38	5	21	76	6	82
City Service							
Number remodeled for one-man operation	62	490	42	110	704	45	749
Number remodeled for one-man, two-man operation	....	99	....	9	108	....	108
Number remodeled for two-man operation	3	100	3	183	289	321	610
Number of service and miscellaneous cars remodeled	30	3	....	1	34	15	49
Total remodeled cars city service	95	692	45	303	1,135	381	1,516
Interurban Service							
Number remodeled for one-man operation	7	....	5	2	14	....	14
Number remodeled for two-man operation	....	25	4	3	32	....	32
Express, freight and miscellaneous cars remodeled	....	14	....	3	17	....	17
Total remodeled cars for interurban service	7	39	9	8	63	....	63
Total city and interurban cars remodeled	102	731	54	311	1,198	381	1,579

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and Canada. In order to show at a glance the comparative amounts of new rolling stock ordered since 1907 a chart and table have been prepared. The table divides the passenger cars into city and interurban types and gives separate tabulations for freight and miscellaneous cars and electric locomotives. The chart for the years since 1916 divides the number of cars purchased into those for interurban and city service.

A special comparison of cars ordered during the last seven years is given in Table II. Separate tabulations are given for cars in city service and those for interurban service. Referring to this table it is interesting to note how the number of safety cars purchased increased each year from 1916 up to and including 1920 and during the same period how the number of large two-man cars showed a gradual decrease. A comparison by percentage that the number of safety cars purchased is of the total number of motor-passenger cars purchased for city service shows that the highest percentage for safety cars was reached in 1919 and since that time there has been a gradual return to the use of larger cars. These percentages are 6.4 per cent for 1916; 18.1 per cent for 1917; 37.6 per cent for 1918; 69 per cent for 1919; 64.4 per cent for 1920; 59.6 per cent for 1921, and 27 per cent for 1922. The big drop in percentage this year is due to the more extended purchase of larger cars operated by one man.

Details of the rolling stock ordered by individual companies are shown in Table III. The railways in each state are alphabetically arranged and the various states are grouped into four districts in a similar manner to that followed in previous years. Canadian

TABLE IV—ELECTRIC LOCOMOTIVES ORDERED DURING 1922

	No.	Weight Tons	Length Over All Ft.	Length Over All In.
New England District				
Aroostook Valley R.R.	1*	..	..	..
Boston Elevated Ry.	1	37	30	7½
New York, New Haven and Hartford R.R.	12	180	69	0
North of the Ohio and East of the Mississippi Rivers				
Baltimore and Ohio R.R.	2	120	41	6
Chicago, Aurora & Elgin R.R.	1	50	37	4
Pennsylvania R.R.	3	200	..	..
Washington & Old Dominion Ry.	1	50	..	..
Youngstown & Ohio River R.R.	1	50	..	..
South of the Ohio and East of the Mississippi Rivers				
Norfolk and Western Ry.	4	200	97	2
West of the Mississippi River				
Denver & Intermountain R.R.	2	28	37	1
Lincoln Traction Co.	1*	..	..	..
Northeast Oklahoma R.R.	1	50	..	..
Sacramento Northern R.R.	2	60	37	4
Yakima Valley Transportation Co.	1	50	37	4
Canada				
The Oshawa Railway Co.	1	43	..	..
Total	34			

* Built in company's shops.

Table VII—Cars Rebuilt During 1922

New England District

Name	Number	Class	City or Interurban	Motor or Trailer	Single or Double Truck	One or Two Man	Length Over All	Seating Capacity	Total Weight Light (tons)	Equipped with Safety Devices
CONNECTICUT										
The Connecticut Co.	6	Wreckers	C	...	DT	...	.....	....	.....	.....
	2	Work	C	...	DT	...	.....	....	.....	.....
	2	Line	C	...	DT	...	.....	....	.....	.....
	10	Sand	C	...	DT	...	.....	....	.....	.....
	1	Snow Sweeper	C	...	DT	...	.....	....	.....	.....
The Shore Line Elec. Ry. Co.	10	Passenger	C	...	DT	1	.....	....	.....	.....
MAINE										
The Androscoggin & Kennebec Ry. Co.	3	Passenger	C	M	DT	1	36′	32	16	Yes
Bangor Ry. & Electric Co.	1	Passenger.	I	M	DT	1	39′	40	23	Yes
Central Maine Power Co.	1	Passenger	C	M	.....	1	.....	....	.....	.....
Cumberland County Pwr. & Lt. Co.	14	Passenger	C	M	DT	1	.....	....	.....	Yes
	4	Passenger	C	M	ST	1	.....	....	.....	Yes
MASSACHUSETTS										
Boston Elevated Rys. Co.	1	Tower Car	C	M	.....	...	25′ 0″	....	.....	.....
Eastern Mass. St. Ry. Co.	8	Sweepers	C	M	DT	2	45′ 4″	....	20.5	.....
Massachusetts Northeastern Ry. Co.	6	Passenger	I	M	DT	1	36′	32	18.6	Yes
Springfield St. Ry. Co.	4	Sweeper	C	M	DT	...	41′	...	21	Yes
	12	Passenger	C	M	DT	1	35′ 10″	32	17.75	Yes
Union St. Ry. Co.	3	Passenger	C	M	DT	2	.....	....	.....	.....
RHODE ISLAND										
United Elec. Rys. Co.	14	Passenger	C	M	DT	1	35′ 8″	34	19.20	Yes
Total for New England District	102									

North of the Ohio and East of the Mississippi River

DISTRICT OF COLUMBIA										
Washington Ry. & Elec. Co.	30	Passenger	C	M	DT	1	42′ 4½″	43	18.78	Yes
	15	Passenger	C	M	DT	2	42′ 4½″	40	18.78	No
INDIANA										
Evansville & Ohio Valley Ry. Co.	8	.....	I	...	.....	...	.....	....	.....	.....
Chicago, South Bend & Northern Indiana Ry. Co.	14	Passenger	C	M	ST	1	28′	24	9	No
	21	Passenger	C	M	DT	1	43′	44	18	No
Interstate Public Service Co.	4	Flat	I	T	.....	...	.....	....	.....	.....
Southern Indiana Gas & Elec. Co.	7	.....	I	...	.....	...	.....	....	.....	.....
Union Trac. Co. of Indiana	5	Freight	I	T	.....	...	.....	....	.....	.....
MARYLAND										
Potomac Public Service Co.	2	Freight Gondola	I	...	.....	...	.....	....	.....	.....
MICHIGAN										
Detroit United Ry.	25	Passenger	C	...	.....	...	.....	....	.....	.....
Grand Rapids Ry. Co.	17	Passenger	C	M	DT	1–2	.....	....	.....	.....
NEW JERSEY										
Five Mile Beach Elec. Ry. Co.	3	.....	I	...	.....	...	.....	....	.....	.....
Trenton & Mercer County Trac. Corpn.	1	Service	C	M	ST	...	29′	....	14	.....
	2	Service	C&I	M	DT	...	31′ 9″	....	17	.....
NEW YORK										
The Brooklyn City R.R. Co.	75	Passenger	C	M	DT	1–2	40′ 3½″	35	18.2	Yes
Empire State R.R. Corpn.	3	Passenger	C	M	DT	1	40	40	17.25	Yes
Fonda, Johnstown & Golversville R.R. Co.	1	Passenger	C	M	DT	1	42′	52	26	Yes
International Ry. Co.	11	Passenger	C	M	DT	1	45′ 2″	51	18.00	Yes
	17	Passenger	C	M	DT	1	39′ 5″	34	17.45	Yes
N. Y. State Rys. (Syracuse lines)	77	Passenger	C	M	DT	1	.....	....	.....	.....
	4	Passenger	C	M	DT	1	.....	32	.....	.....
Olean, Bradford & Salamanca Ry. Co.	4	Passenger	C	M	DT	1	.....	32	.....	.....
Plattsburg Traction Co.	4	Passenger	C	M	ST	1	30′	26	8.5	No
Second Ave. R.R.	41	Passenger	C	M	DT	1	38′	32	13.0	Yes
Southern N. Y. Power & Ry. Corpn.	1	Milk	I	M	.....	...	.....	....	.....	.....
Syracuse & Suburban R.R. Co.	1	Passenger	C	M	DT	1	44′ 3″	48	.....	No
Third Ave. Ry. System	53	Passenger	C	M	ST	1	27′ 1″	26	22.5	.....
United Traction Co.	115	Passenger	C	M	ST	1	.....	....	.....	Yes
	25	Passenger	C	M	DT	1	.....	....	.....	Yes
OHIO										
Cincinnati, Georgetown & Portsmouth R.R. Co.	1	Passenger	I	M	DT	2	42′	32	32	No
City Railway Co.	39	Passenger	C	M	DT	1	.....	....	.....	Yes
Cleveland, Alliance & Mahoning Valley R.R. Co.	1	Freight	I	M	DT	2	60′	....	.....	.....
Dayton & Troy Elec. Ry. Co.	6	Passenger	C	M	.....	1	.....	32	.....	.....
The Pennsylvania Ohio Elec. Co.	5	Passenger	C	M	DT	1	.....	....	.....	.....
The Portsmouth St. R. R. & Lt. Co.	4	Passenger	C	M	DT	2	45′ 10″	52	22	No
	1	Passenger	C	M	DT	2	43′ 6″	36	22	No
PENNSYLVANIA										
Altoona & Logan Valley R. R. Co.	8	Passenger	C	M	.....	1	31′	29	11	.....
	2	Passenger	C	M	DT	1–2	41′ 6″	44	19	Partial
Buffalo & Lake Erie Trac. Co.	9	Passenger	C	M	DT	1	38′ 6″	38	17.65	.....
	.....	.....	.....	.....	.....	...	47′ 7″	56	15.88	Yes
Conestoga Traction Co.	3	Passenger	I	M	DT	2	44′	44	22	No
Phila. & Westchester Trac. Co.	1	Line	I	M	DT	...	.....	....	.....	.....
Reading Transit & Light Co.	5	Passenger	C	M	DT	1–2	.....	....	.....	.....
Southern Cambria Ry. Co.	3	Passenger	I	M	DT	2	50′	52	32	No
Tarentum Brackenridge & Butler St. Ry. Co.	2	Passenger	C	M	ST	1	33′	32	.....	.....
Westchester St. Ry. Co.	5	.....	C	...	.....	...	.....	....	.....	.....
WISCONSIN										
Milwaukee Elec. Ry. & Lt. Co.	50	Passenger	C	M	3T	2	89′ 1″	93	37.5	.....
Total North of the Ohio and East of the Mississippi River	731									

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Table VII (Continued)—Cars Rebuilt During 1922

South of the Ohio and East of the Mississippi River

Name	Number	Class	City or Interurban	Motor or Trailer	Single or Double Truck	One or Two Man	Length Over All	Seating Capacity	Total Weight Light (tons)	Equipped with Safety Devices
ALABAMA										
Mobile Light & R. R. Co.	3	Passenger	C	M	ST	1	30	32	13	Yes
GEORGIA										
Augusta-Aiken Ry. & Elec. Corp. of South Carolina	3	Passenger	C	M	2 ST	2	.....	..	.....	.....
	4	Passenger	I	M	5 DT	2	.....	..	.....	.....
Brunswick & Interurban Ry. Co.	2	Passenger	C	M	ST	1	32'	32	11	Yes
KENTUCKY										
Louisville Ry. Co.	5	Passenger	I	M	DT	1	43' 4'	44	24.40	Yes
	33	Passenger	C	M	ST	1	31'	34	11.50	Yes
VIRGINIA										
Charleston Interurban R.R. Co.	1	Passenger	C	M	DT	1	.....	13.5	.....	Yes
	3	Passenger	C	M	DT	1	.....	13.5	.....	No
Total South of the Ohio and East of the Mississippi River	54									

West of the Mississippi River

CALIFORNIA										
Los Angeles Ry. Corpn.	106	Passenger	C	M	DT	2	44' 7"	44	18.75	.....
	1	Passenger	C	M	DT	2	48' 0"	56	19.25	.....
	1	Passenger	C	M	DT	2	44' 7"	52	18.76	.....
Pacific Electric Ry. Co.	2	Passenger	C	M	DT	2	39' 6"	44	23.32	No
Pacific Gas & Elec. Co.	7	Passenger	C	M	DT	1-2	41'	44	13.5	Yes
San Diego Elec. Ry. Co.	10	Passenger	C	M	DT	1	.....	...	.....	.....
San Francisco-Oakland Terminal Rys.	60	Passenger	C	M	DT	2	48'	48	46.9	No
San Francisco-Sacramento R.R. Co.	3	Caboosa Flat to Refrigerator	I	.....	.....	...	.....	.....	.....	.....
IOWA										
Iowa Southern Utilities	2	Passenger	I	M	DT	1	38' 0"	36	14	No
Mississippi Valley Electric Co.	3	Passenger	C	M	ST	1	.....	...	.....	Yes
LOUISIANA										
Shreveport Rys. Co.	1	Passenger	C	M	DT	2	.....	65	.....	No
(Two single truck cars converted into one double truck sided entrance car)										
MISSOURI										
The Kansas City Rys. Co.	2	Passenger	C	M	DT	1-2	44'10"	58	19.40	Yes
Springfield Traction Co.	6	Passenger	C	M	ST	...	.....	...	.....	.....
	6	Passenger	C	M	DT	...	.....	...	.....	.....
United Rys. Co. of St. Louis	1	Passenger	C	M	DT	1	37' 9"	42	20 68	.....
NEBRASKA										
The Lincoln Traction Co.	5	Passenger	C	M	DT	1	.....	...	.....	.....
TEXAS										
Eastern Texas Elec. Co.	1	Wrecker	C	M	.....	...	.....	...	.....	.....
El Paso Elec. Ry. Co.	11	Passenger	C	M	DT	1	42'	44	20	Yes
Houston Electric Co.	11	Passenger	C	M	ST	1	30' 10"	32	11.0	Yes
San Antonio Public Service Co.	30	Passenger	C	M	ST	1	32' 3"	36	11.2	Yes
UTAH										
Salt Lake, Garfield & Western Ry.	3	Passenger	I	M	DT	...	56' 8"	66	38	.....
WASHINGTON										
Puget Sd. Internatl. Ry. & Pwr. Co.	4	Passenger	C	M	ST	1	22' 10"	33	6.5	Yes
Seattle Municipal St. Ry.	29	Passenger	C	M	DT	1	43' 9"	44	24.36	Yes
Seattle & Rainier Valley Ry. Co.	6	Passenger	C	M	DT	1	42'	44	22	Yes
Total West of the Mississippi River	311									

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QUEBEC										
Quebec Ry., Lt., Ht. & Pwr. Co., Ltd.	10	Passenger	C	M	DT	...	.....	...	.....	.....
Hull Elec. Co.	4	Passenger	C	M	ST	1	31'	35	11	Yes
NEW BRUNSWICK										
New Brunswick Pwr. Co.	40	Passenger		(All cars had operation.)		changed from left to right				
	7	Service	.....	...	.....	...	.....	...	.....	.....
BRITISH COLUMBIA										
British Columbia Elec. Ry. Co.	26	Passenger	C	M	DT	1	44' 3"	42	23.5	Yes
	177	Single End Paye	Changed from left to right hand operation.							
	31	Double End Paye								
	13	Single End Paye								
	41	Double End Paye	Changed for one-man operation.							
	9	Double End Closed								
	6	Sweepers	Changed from left to right hand operation.							
	2	Plows								
ONTARIO										
Brantford Municipal Ry.	11	Passenger	C	M	ST	1	.....	...	.....	.....
Port Arthur Civic Ry.	4	Passenger	C	M	.....	1	.....	..	.....	.....
Total for Canada	381									

companies are listed separately. The only details of construction given are type, over-all length, and weight. The service for which the cars were purchased is also given. The district north of the Ohio and east of the Mississippi purchased 1,614 cars and locomotives, which is 45 per cent of the total rolling stock ordered. The percentage increase over last year for cars ordered by the various districts is 582 per cent for the New England district, 161 per cent for the district north of the Ohio and east of the Mississippi, 392 per cent for the district south of the Ohio and east of the Mississippi, 295 per cent for the states west of the Mississippi and a decrease of 14 per cent for the Canadian railways. A recapitulation of the totals for cars and electric locomotives ordered during 1922 is given in Table V.

The companies which purchased or built electric locomotives during 1922 are given in Table V. The total number of new electric locomotives is 34, which is the largest for any year since 1918.

Some information regarding cars reconstructed during the year 1922 is given in Tables VI and VII. This is the first year we have included this information in our tabulation. Eighty-two railways reported the reconstruction of 1,579 cars. There were 749 cars reconstructed for one man operation in city service and 14 for interurban service. A total of 108 cars were reconstructed for operation by either one or two men. Seventy-five of these are being reconstructed for the Brooklyn City Railroad. The change from left to right hand operation by the British Columbia Electric Railway and the New Brunswick Power Company made it necessary to reconstruct all their rolling stock.

The information given in the various tables of rolling stock was obtained from replies received to questionnaires sent to all the electric railways in the United States and Canada. It is quite impossible to receive replies from all railways when a definite date of publication must be met, but this year replies were received from approximately 750 railways. The information thus obtained has been added to by items previously published and by very complete lists furnished by the car builders. Through the courtesy and co-operation of the various car builders we have been able to check these figures very carefully and in some cases where replies were not received from railways the information furnished by the car manufacturers has been used.

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New Automotive Equipment Ordered

Many Electric Railway Companies Acquiring Motor Buses and Service Trucks

IN connection with the statistics of rolling stock purchased by electric railways this year there is included a new departure which consists of obtaining the number of motor-driven vehicles ordered by electric railways during 1922. This information has been classified to give the number purchased, the class of service for which they are intended, as far as possible, and such information regarding the type of the chassis and body as will enable one to form a good idea of the construction. The number of gas-driven buses was 240, and in addition to these there were six trolley buses and two gas-driven rail cars. The remainder of the equipment purchased consists of 112 service trucks, including tower wagons, dump cars and trucks for carrying freight and express. No attempt has been made to include the large number of ordinary passenger touring cars and run-abouts purchased for official and departmental use in the operation of electric railways. In the table of statistics given in the Jan. 7, 1922, issue, figures were given showing the total automotive equipment owned by the electric railways in the United States. The additional information now furnished should permit a satisfactory estimate as to total automotive equipment now being operated. In tabulating these statistics it has been somewhat difficult to assign every vehicle to the particular service for which it is to be used, owing to the fact that trucks are frequently used for several different departments. They are therefore called service trucks in such cases. The mobility and speed of the gasoline-driven motors truck ha made it valuable as emergency equipment.

Automotive Equipment Ordered During 1922

Company	No. of Vehicles	Class of Service	Type Chassis	Body Builder	Capacity Seats	Capacity Tons
Intercity Terminal Ry. Co., No. Little Rock, Ark	5	Motor Bus	.....	Paterson	14	.....
Los Angeles (Cal.) Ry. Corpn.	3	Motor Bus	Reo	Pac. Motor Body Co.	18	.....
Pacific Elec. Ry. Co., Los Angeles, Cal.	5	Motor Bus	Moreland	.....	19	.....
	5	Motor Bus	White	.....	25	.....
	5	Dump Cars	.....	.....	.....	.....
Pacific Gas & Elec. Co., Sacramento, Cal.	1	Motor Bus	White-50	Co. Shops	25	.....
San Diego (Cal.) Elec. Ry. Co.	2	Motor Bus	Fageol	.....	27	.....
	1	Motor Bus	Republic	.....	24	.....
	1	Motor Bus	Reo	.....	20	.....
	1	Motor Bus	Fageol	.....	31	.....
	1	Serv. Trk.	Ford	.....	.....	1
	1	Line Dept. Trk.	Fageol	.....	.....	2½–3
	1	Maint. Trk.	Fageol	.....	.....	5
San Joaquin Lt. & Pwr. Co.	2	Motor Bus	White-15	White Auto Co.	30	.....
Washington (D.C.) Ry. & Elec. Co.	6	Motor Bus	White-15	Hoover	.....	.....
	3	Motor Bus	White-50	Hoover	.....	.....
Indianapolis (Ind.) St. Ry. Co.	2	Tower Wagons	Ford	.....	.....	1
	1	Tower Wagons	G.M.	.....	.....	1
La Fayette (Ind.) St. Ry.	1	Frt. Exp. Trks.	Service	.....	.....	2
	1	Frt. Exp. Trks.	Republic	.....	.....	2
Dubuque (Ia.) Elec. Co.	1	Serv. Trk.	Republic	.....	.....	1½
Louisville (Ky.) Ry. Co.	1	Serv. Trk.	.....	.....	.....	5
New Orleans (La.) Public Serv. Co.	1	Serv. Trk.	White	.....	.....	2
United Rys. & Elec. Co., Baltimore, Md.	3	Trolley Bus	Lansden	Brill	22	.....
	27	Motor Bus	Republic	Hoover	24	.....
	4	Motor Bus	5th Ave. Coach	5th Ave. Coach	51	.....
Boston (Mass.) Elevated Ry. Co.	1	Motor Bus	Republic	Hoover	25	.....
	1	Motor Bus	Mack	Boston Body Co.	25	.....
	1	Motor Bus	White-50	Brown Body Co.	25	.....
	8	Serv. Trks.	White-15	Keen Bros.	.....	¾
	1	Serv. Trks.	White-20	Abbott & Downey	.....	2
	3	Serv. Trks.	Ford	Springfield Exp.	.....	1
Worcester (Mass.) Consolidated St. Ry. Co.	1	Serv. Trks.	Federal	.....	.....	2
	1	Serv. Trks.	Federal	.....	.....	3½
Twin City Rapid Tr. Co., Minneapolis, Minn.	1	Trolley Bus	Lansden	Brill	30	.....
	3	Serv. Trks.	Ford	.....	.....	1
	1	Serv. Trks.	G.M.C.	.....	.....	1
Springfield (Mo.) Traction Co.	3	Motor Bus	Reo	.....	22	.....
	1	Serv. Trk.	Chevrolet	.....	.....	1½
United Rys. Co. of St. Louis, St. Louis, Mo.	2	Tower Wagons	.....	.....	.....	2
Lincoln (Neb.) Traction Co.	1	Serv. Trk.	Ford	Co.'s Shops	.....	1
Manchester (N. H.) Trac. Lt. & Pwr. Co.	1	Serv. Trk.	Republic	.....	.....	1½
Fonda, Johnstown & Gloversville (N. Y.) R. R. Co.	2	Gas Motor Cars	.....	Brill	.....	46–14
Jamestown (N. Y.) St. Ry.	3	Motor Bus	Pierce-Arrow	Kuhlman	.....	25
Second Ave. R.R. Co., New York, N. Y.	3	Serv. Trks.	.....	.....	.....	.....
Columbus (O.) Ry. Pwr. & Lt. Co.	2	Serv. Trks.	Federal	.....	.....	3½
	3	Serv. Trks.	Federal	.....	.....	1½
Community Trac. Co., Toledo, O.	1	Serv. Trk.	.....	.....	.....	1
	2	Serv. Trk.	.....	.....	.....	1½
	3	Serv. Trk.	.....	.....	.....	2
	2	Serv. Trk.	.....	.....	.....	3½
Northern Ohio Trac. & Lt. Co.	16	Motor Bus	White	.....	25	.....
Pennsylvania-Ohio Elec. Co., Youngstown, O.	12	Motor Bus	White	Bender	18	.....
	7	Motor Bus	Republic	Bender	25	.....
	1	Serv. Trk.	Dort	.....	.....	¾
Tulsa (Okla.) St. Ry.	9	Motor Bus	Garford	Garford	25	.....
	6	Motor Bus	Garford	Garford	16	.....
	1	Motor Bus	White	Kuhlman	25	.....
	7	Motor Bus	Reo	.....	15	.....
Jefferson Trac. Co., Punxsutawney, Pa.	2	Motor Bus	Reo	Grove City Body	20	.....
Johnstown (Pa.) Trac. Co.	3	Motor Bus	.....	.....	22	.....
Schuylkill Ry. Co., Girardville, Pa.	6	Motor Bus	.....	.....	29	.....
United Elec. Rys. Co., Providence, R. I.	4	Motor Bus	White	Brown Body	24	.....
	2	Motor Bus	Mack	Mack	24	.....
	6	Motor Bus	Republic	Hoover	24	.....
	4	Tower Trks	White	McCardell	.....	2
	1	Dump Car	White	.....	.....	5
	1	Dump Car	Mack	.....	.....	5
Olympia (Wash.) Lt. & Pwr. Co.	2	Frt. Exp.	Ford	.....	.....	½
	1	Serv. Trk.	G.M.C.	.....	.....	2
Pacific Northwest Trac. Co., Seattle, Wash.	2	Motor Bus	White-45	Ideal Body Co.	18	.....
Puget Sd. Int. Ry. & Pwr. Co.	8	Motor Bus	.....	.....	29	.....
Seattle (Wash.) Municipal St. Ry.	2	Motor Bus	Kleiber	.....	25	.....
	1	Tower Trk.	White-20	.....	.....	2
	1	Serv. Trk.	Ford	.....	.....	1½

A Table continued on page DD.Q

Electrification Work to Proceed

SIR MONTAGUE BARLOW, Minister of Labor, speaking in the House of Commons on Nov. 30 on the subject of the relief of unemployment and detailing kinds of work that would to relieve the situation, stated that the Chairman-elect of the Southern group of English railways had to press on with the electrification of the South Eastern & Chatham railway suburban lines, and extend the electrification of the London, Brighton & South Coast and the London & South Western Railways. The Government is renewing for another year the Trade Facilities Act and has increased from £25,000,000 to £50,000,000 the capital sum for which Government guarantee of principal and interest for works of public utility will be available.

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Automotive Equipment Ordered During 1922 (Continued)

Company	No. of Vehicles	Class of Service	Type Chassis	Body Builder	Capacity Seats	Capacity Tons
Seattle (Wash.) Rainier Valley Ry. Co.	2	Motor Bus	White	.....	17	.....
Spokane (Wash.) United Rys.	2	Serv. Trks.	Ford	.....	.....	1
Milwaukee (Wis.) Elec. Ry. & Lt. Co.	66	Motor Bus	(a)	.....	14-25	.....
	41	Serv. Trks.	(b)	.....	.....	.....
Wisconsin Public Serv. Co., Green Bay, Wis.	1	Serv. Trk.	Ford	Appleton	.....	5
Toronto (Canada) Transp. Comm.	2	Motor Bus	5th Ave. Coach	5th Ave. Coach	29	.....
	1	Motor Bus	Pierce-Arrow	Smith Bros.	25	.....
Winnipeg (Canada) Elec. Ry. Co.	1	Motor Bus	G.M.C.	Sterling Body	24	.....
	1	Serv. Trk.	Dodge	.....	.....	1½
Manila (P. I.) Elec. Co.	2	Trolley Bus	Atlas	Atlas	30	.....

(a) Whites, Fageols, Fifth Ave. Coach and others. (b) Fords, Nash, Sterling, Reos and others.

Heavy Traction Service Records

The Author Quotes Data to Show Some of the Results Achieved by Several American Railroads with Electric Locomotives and Motor Cars

By Homer K. Smith

Railway Engineer Westinghouse Electric & Manufacturing Co.

THE Long Island Railroad was the first in the United States to substitute electric for steam power on a large scale, the change having been made on this road in 1905. Multiple-unit cars with two 600-volt direct-current motors and the third-rail contact system were adopted. Since electrification, this road's passenger traffic has increased nearly 400 per cent, and the freight traffic nearly 200 per cent, while the earnings have increased approximately 200 per cent. The annual passenger traffic is more than 600,000,000 passenger-miles, and at times the schedules require that more than 95 per cent of the equipment be on the road.

The New Haven Railroad has approximately 550 miles of track electrified on the single-phase system, both locomotives and multiple-unit cars being used. In 1921, the electric passenger locomotives averaged 33,000 miles per locomotive failure and the average detention per failure was eighteen minutes. The mileage per locomotive was nearly 69,000. The freight locomotive mileage per locomotive failure was approximately 22,500. These locomotives frequently make two round trips between Harlem River and New Haven in twenty-four hours, a mileage of 272. Under steam operation in this section the daily locomotive mileage was from 100 to 120.

The New Haven has in operation sixteen electric switching locomotives which, from 1915 to 1921, were in actual service more than 70 per cent of the total time. In 1916 they were in actual service over 77 per cent of the time. These locomotives operate twenty-four hours per day and consistently make 140 miles per day (based on 6 m.p.h.). They have produced a coal saving of 65 per cent over that required for steam operation on this service and have replaced steam locomotives at a ratio of 2 to 1.

On the occasion of the Yale-Harvard football game, Nov. 20, 1920, between 8 a.m. and 11 a.m. forty-four special trains were dispatched from New York to New Haven in addition to the regular trains. On the same day forty-five extras were operated in the opposite direction. The eighty-nine extra trains carried approximately 70,000 passengers, and all departed and arrived practically on schedule.

In 1910 the Pennsylvania Railroad placed in service on its electrified extension into the New York Terminal thirty-one 600-volt third-rail locomotives. From November, 1910, to November, 1918, they made a total mileage of 9,508,765, with a total of 121 engine failures, or an average of 78,600 miles per detention on account of locomotive trouble. During one year there was a total train delay, due to failure of motive power, of only fifty-five minutes. These locomotives are now averaging about 4,500 miles per month.

The Norfolk & Western was the first to substitute electric locomotives for Mallet locomotives for mountain grade service. This road electrified a 30-mile route from Bluefield to Vivian in 1914, the electrification zone having since been extended approximately 8 miles to Farm. With steam operation, trains of approximately 3,250 tons were hauled up the Elkhorn grade by three powerful Mallets at 7 m.p.h. Two 300-ton electric locomotives hauled the same trains on this grade at 14 m.p.h. Twelve electric locomotives were purchased to replace twenty-four Mallets.

In a service where the average main-line haul is short, and where there is considerable coal mine setting out and gathering service as well as pusher service, these locomotives consistently do more than 100 miles per day. During 1920 they made an average mileage of 37,820. The steam locomotives formerly used in this service averaged about 60 miles per day.

The New York, Westchester & Boston Railway operates heavy motor cars on the single-phase system, in local and express service, from Harlem River Station of the New Haven Railroad. Local trains make a schedule of 22 m.p.h. with a stop every mile. The express train schedule is 37 m.p.h. with an average distance of 2½ miles between stops. In 1919 the average mileage per car was more than 42,000, and the average car mileage per minute of delay over 2,700.

In 1915 the Broad Street Terminal of the Pennsylvania Railroad in Philadelphia had reached the limit of its capacity of 160 trains per day on sixteen tracks with steam operation. The terminal was electrified on the single-phase system with the result that the time required to bring a motor car train into the station and get it out again is approximately one-third of the time required with steam operation. The track movements per train turn-around have been reduced from six to two. Approximately 600 trains per day are now operated through the six-track "bottle neck" at the interlocking tower. Between 5 and 6 p.m. fifty trains pass this tower, and during one seventeen-minute period of this hour there is a train movement every minute.

On the Chicago, Milwaukee & St. Paul electrification the passenger service from Harlowton to Avery is furnished by 3,000-volt direct-current locomotives with a one-hour rating of 4,200 hp. and a continuous rating of 3,400 hp. Soon after these locomotives were placed in service, it was decided to run them through the entire 440 miles without turning in at Deer Lodge shops for general inspection, as had been previously done. The locomotives are given a light inspection at the end of the 440-mile run and are sent to Deer Lodge for a general inspection on a mileage basis of from 3,000 to 5,000.

Individual locomotives in this service have made as much as 12,000 miles in one month. They have made the through run of 440 miles per day for twelve consecutive days during the most severe winter months.

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Receiverships Lowest in Eight Years

Only Fourteen Companies Fail During 1922—Several Emerge from Receivership as Trying Period of Financial Stringency Passes—Total Number of Railways in Hands of Courts Decreases

THE total number of electric railways still in receivership Dec. 31, 1922, is slightly less than that for the previous year. The whole situation as regards the credit condition of the electric railways still reflects largely the effect of the war time period of depression on electric railways. During the past year, only fourteen companies, with a total mileage of 695.43, went into receivership. Two of these, the Michigan United Railways and the Cleveland, Southwestern & Columbus Railroad, alone, included 466.46 miles of the total shown. A comparison of these figures with the statistics of electric railway receiverships for the previous years shows that the tendency toward an improvement in the street railway industry is continuing. The rising tide in the number of receiverships and foreclosures, and the mileage and amount of securities therein involved, reached the maximum point in the year 1919. In 1920, however, there was a material reduction in the number of companies which went into receivership and again the year 1921 showed a slight decrease in mileage and securities in receivership.

In order to permit comparisons with previous years the statistics have been presented herewith in the usual fashion. Tables I and II give a record of electric railway receiverships and foreclosures by years since this work was first begun in 1909. The figures given in these first two tables are not cumulative but show the new companies involved in each individual year. The figures have been corrected in line with information received since they were published a year ago, consequently in comparing them with last year's issue, attention should be given to the footnotes.

The cumulative totals of all companies in receivership as of Dec. 31, 1921, and Dec. 31, 1922, are shown at the foot of Table V. This tabulation includes all the individual companies shown in last year's Table V with the exception of those which were sold at foreclosure, completely abandoned, or otherwise relieved of receivership during 1921. These were removed from the list. To the list have been added fourteen new receiverships which occurred during 1922, also three companies mentioned in the note under Table I which should have been included in 1921 but were omitted because the information was not then available. In accordance with more recent information certain minor changes and corrections also have been made in the various figures in order to bring them up to date. The companies emerging from receivership in 1922 have been deducted from the total of roads in receivership as of Dec. 31, 1922 (Table V).

A somewhat smaller number of companies have passed into the hands of the receivers during 1922. A résumé of their status—total mileage, outstanding securities, etc.—shows a steady improvement. These

TABLE I—RECORD OF ELECTRIC RAILWAY RECEIVERSHIPS

Year	Number of Companies	Miles of Single Track Involved	Outstanding Securities Stock	Bonds
1909	22	558.00	$29,962,200	$22,325,000
1910	11	696.61	12,629,400	75,490,735
1911	19	518.90	29,533,450	38,973,293
1912	26	373.58	20,410,700	11,133,800
1913	18	342.84	31,006,900	47,272,200
1914	10	362.39	35,562,550	19,050,460
1915	27	1,152.10	40,298,050	39,372,375
1916	15	359.26	14,476,600	10,849,200
1917	21	1,177.32	33,918,725	33,778,400
1918	29	2,017.61	92,130,388	163,257,102
1919	48	3,781.12	221,259,354	312,915,104
1920	19	1,065.31	28,758,455	72,283,575
1921	19(a)	986.42	32,909,525	36,177,800
1922	14	695.43	18,140,150	20,304,400

TABLE II—RECORD OF ELECTRIC RAILWAY FORECLOSURE SALES

Year	Number of Companies	Miles of Track Involved	Outstanding Securities Stock	Bonds	Receiver's Certificates.
1909	21	488.00	$22,265,700	$21,174,000	(a)
1910	22	724.36	19,106,613	26,374,075	(a)
1911	25	660.72	91,354,800	115,092,750	(a)
1912	18	267.18	14,197,300	10,685,250	(a)
1913	17	302.28	15,243,700	19,094,500	(a)
1914	11	181.26	26,239,700	44,094,241	(a)
1915	19	308.31	30,508,817	16,759,997	(a)
1916	19	430.14	13,895,400	22,702,300	(a)
1917	26	745.19	27,281,900	27,313,045	(a)
1918	23	524.22	37,740,325	20,149,384	(a)
1919	29	2,675.48	89,893,400	79,836,738	$42,300
1920	13	259.90	7,782,400	11,227,328	52,000
1921	13	777.97	33,642,255	30,863,526	5,000
1922	13	322.88	7,491,500	12,640,600	114,683

(a) Corrected by adding to figures, shown last year, data for three companies: West Helena Consolidated Co., La Fayette Service Co., Pottstown & Phoenixville Ry. Co., which went into receivership in 1921, but were omitted through failure to receive information in time.

Table II does not include companies which were sold or reorganized without foreclosure proceedings.

TABLE III—ELECTRIC RAILWAY RECEIVERSHIPS—1922

	Miles of Single Track Involved	Outstanding Securities Stocks	Bonds	Receiver's Certificates
Chicago & Interurban Traction Co. (Chicago, Ill.)	50.00	$1,000,000	$1,350,000	None
Joliet & Eastern Traction Co. (Ill.)	25.00	300,000	None	None
Manhattan City & Interurban Ry. (Manhattan, Kans.)	16.00	612,150	90,000	None
Michigan United Rys. (Mich.)	257.46	7,000,000	12,355,800	None
Ogdensburg St. Ry. Co. (Ogdensburg, N. Y.)	7.93	150,000	150,000	None
Steinway Ry. Co. (Long Island City, N. Y.)	26.00	None	1,500,000	None
Asheville & East Tennessee R.R. Co. (Asheville, N. C.)	6.34	70,000	35,000	None
Cleveland, Southwestern & Columbus Ry. Co. (Cleveland, O.)	209.00	6,648,000	3,510,000	None
Dayton, Covington & Piqua Traction Co. (West Milton, O.)	38.00	1,150,000	550,000	None
Gallipolis & Northern Traction Co. (Gallipolis, O.)	5.00	$20,000	$48,000	None
Bangor & Portland Traction Co. (Bangor, Pa.)	8.70	130,000	130,000	3,000
Pottstown & Phoenixville Ry. Co.. (Pottstown, Pa.)	15.00	500,000	114,600	None
Slate Belt Transit Co. (Pen Argyl, Pa.)	18.00	360,000	400,000	21,000
St. Albans & Swanton Traction Co. (St. Albans, Vt.)	13.00	200,000	71,000	None
Total for 1922 (14 companies)	695.43	18,140,150	20,304,400	24,000

TABLE IV—ABANDONMENTS—ENTIRE—1922

(Includes only companies whose entire traction property has been dismantled or permanently abandoned and not likely to resume operation)

	Miles	Stock	Bonds
St. Albans & Scranton Traction Co. (St. Albans, Vt.)	13.00	$200,000	$71,000
Joliet & Eastern Traction Co. (Joliet, Ill.)	25.00	300,000	None
Cleveland & Erie Ry. Co. (Girard, Pa.)	30.00	300,000	1,000,000
Interurban Ry. & Term. Co. (Cincinnati, O.)	47.55	3,500,000	1,650,000
Springfield Ter. Ry. & Pwr. Co. (Springfield, O.)	30.00	350,000	250,000
N. Y. & North Shore Trac. Co. (Roslyn, N. Y.)	38.12	979,350	770,000
Aberdeen R.R. Co. (Aberdeen, S. D.)	5.85	(a)	(a)
Coatesville Trolley Co. (Coatesville, Pa.)	5.00	(a)	(a)
Monmouth County Elec. Co. (Red Bank, N. J.)	18.50	350,000	500,000
Total for 1922 (9 companies)	213.02	5,979,350	4,241,000

(a) Data not available.

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Table V—Electric Railway Receiverships and Foreclosures as of Dec. 31, 1922

New England District

Name of Company	Year of Receivership	Miles of Single Track Involved	Outstanding Securities: Capital Stock	Funded Debt	Receivers' Certificates
CONNECTICUT					
Danbury & Bethel St. Ry. Co. (Danbury)	1917	13.00	$320,000	$588,500	$100,000
Hartford & Springfield St. Ry. Co. (Warehouse Pt.)	1918	48.00	785,000	961,000	None
Shore Line Electric Ry. (New London) (28)	1919	67.20	1,000,000	2,725,000	None
MAINE					
Atlantic Shore Ry. (Kennebunk)	1915	49.93	1,000,000	1,746,250	None
MASSACHUSETTS					
Brockton & Plymouth St. Ry. Co. (Plymouth) (1)	1919	22.00	250,000	260,000	None
Concord, Maynard & Hudson St. Ry. Co. (Greenfield)	1921	18.15	235,000	230,000	None
Connecticut Valley St. Ry. Co. (Greenfield)	1921	47.05	620,000	580,000	None
Northern Massachusetts St. Ry. (Greenfield)	1921	44.09	500,000	500,000	None
NEW HAMPSHIRE					
Portsmouth, Dover & York St. Ry. (Portsmouth)	1917	41.46	(2)	707,000	30,000
VERMONT					
Barre & Montpelier Trac. & Pwr. Co. (Montpelier)	1920	9.75	120,000	100,000	None
St. Albans & Swanton Trac. Co. (St. Albans) (3)	1922	13.00	200,000	71,000	None
Springfield Elec. Ry. Co. (Springfield)	1918	9.00	100,800	100,000	None
Summary					
Total 1/1/22	11 cos.	370.50	4,810,800	12,713,521	110,000
Net changes and corrections	....	*0.87*	120,000	*4,215,771*	20,000
Receiverships added during 1922	1 co.	13.00	200,000	71,000	None
Less properties sold or reorganized	1 co.	*22.00*	*250,000*	*260,000*	*None*
Net receiverships 12/31/22	11 cos.	360.63	4,880,800	8,308,750	130,000

North of the Ohio and East of the Mississippi

Name of Company	Year of Receivership	Miles of Single Track Involved	Outstanding Securities: Capital Stock	Funded Debt	Receivers' Certificates
ILLINOIS					
Alton Granite & St. Louis Trac. Co. (Alton)	1920	62.00	3,189,000	3,000,000	None
Aurora, Elgin & Chicago R.R. (Aurora) (33)	1919	66.00	6,200,000	3,636,000	None
Third Rail Division (4)	1919	102.00	.....	4,735,000	None
Chicago & Interurban Trac. Co. (Chicago)	1922	50.00	1,000,000	1,350,000	None
Chicago & Oak Park Elev. R.R. (Chicago)	1911	22.66	10,000,000	5,992,500	2,210,000
Chicago, Aurora & DeKalb R.R. (Aurora) (32)	1916	30.20	950,000	427,500	None
Joliet & Eastern Trac. Co. (Joliet) (5)	1922	25.00	300,000	None	None
INDIANA					
Beech Grove Trac. Co. (Beech Grove)	1917	3.90	150,000	100,000	None
La Fayette Service Co. (La Fayette) (6)	1921	25.00	1,250,000	1,250,000	None
Winona Interurban Ry. Co. (Warsaw)	1916	70.00	750,000	2,343,700	None
MICHIGAN					
Houghton County Trac. Co. (Houghton)	1921	32.15	957,200	677,000	None
Marquette City & Presque Isle Ry. (Marquette) (24)	1912	6.00	200,000	100,000	None
Michigan United Rys. (Jackson)	1922	257.46	7,000,000	12,355,800	None
Saginaw-Bay City Ry. (Saginaw) (7)	1921	64.22	2,600,000	2,063,000	None
NEW JERSEY					
Monmouth County Elec. Co. (Red Bank) (1)	1916	18.50	350,000	500,000	17,500
No. Jersey Rapid Transit Co. (Hohokus)	1912	18.00	800,000	800,000	None
NEW YORK					
Binghamton Ry. Co. (Binghamton)	1918	50.25	978,995	(9) 2,422,160	30,000
Brooklyn Rapid Transit Co. (New York)	1918	Holding Co.	74,422,959	68,114,700	12,000,000
Brooklyn Heights R.R. Co.	1919	5.12	1,300	250,000	None
Brooklyn, Queens County & Suburban R. R.	1919	65.58	900	4,531,000	None
Coney Island & Brooklyn Ry.	1919	46.15	297,400	5,474,000	None
Nassau Electric Ry.	1919	136.10	105,925	13,571,928	70,000
New York Consolidated Ry.	1918	252.88	683,184	22,936,000	None
New York Municipal Ry. Corp.	1918	85.73	.....	2,207,000	None
Buffalo & Depew Ry. (Buffalo) (1)	1918	13.59	305,000	350,000	60,000
Buffalo & Lackawanna Trac. Co. (Buffalo) (32)	1918	8.80	55,000	1,000,000	None
Hornell Trac. Co. (Hornell)	1917	10.90	117,900	150,000	15,000
Interborough Consolidated Corp. (N. Y.)	1919	Holding Co.	(23) 50,403,634	(23) 63,808,000	None
Manhattan & Queens Traction Corp. (Long Island City) (32)	1917	21.20	20,000	(10) 2,090,000	None
New York & North Shore Trac. Co. (Roslyn) (1)	1921	38.12	979,350	770,000	11,000
New York Rys. Co. (New York) (19)	1919	(12) 92.66	$17,495,060	58,773,027	None
Ogdensburg St. Ry. Co. (Ogdensburg)	1922	7.93	150,000	150,000	None
Penn Yan & Lake Shore Ry. (Penn Yan)	1918	8.50	94,000	100,000	None
Richmond Lt. & R. R. Co. (Staten Island)	1920	32.05	(13) 1,932,000	(13) 1,482,000	None
Rochester, Corning & Elmira Trac. Co. (Rochester)	1912	(14)	271,000	1,000,000	None
Second Ave. R. R. Co. (New York)	1908	30.02	1,862,000	5,720,000	3,140,000
Shore Line Elec. R. R. Co. (White Plains) (15)	1920	1.46	50,000	None	None
Staten Island Midland Ry. Co. (N. Y.)	1920	28.68	1,000,000	1,000,000	3,000
Steinway Ry. Co. (Long Island City) (16)	1922	26.00	None	1,500,000	None
Westchester St. R. R. Co. (White Plains)	1920	21.60	700,000	168,000	47,400

companies, with the exception of two, previously mentioned, are practically all quite small companies, forced into bankruptcy through decreased earnings. The total amount of track mileage and securities in default represents, therefore, a promising decrease when compared with a corresponding table for 1921. It is true that the Brooklyn Rapid Transit Company, the United Railways of St. Louis and the Pittsburgh Railways are still in the hands of the receivers, but notable efforts have been made toward straightening out the affairs of these three large companies. In the case of the Brooklyn Rapid Transit Company, a reorganization is hoped for early in 1923 and the receiverships are

NOTES

1—Sold at foreclosure during 1922.
2—Included in that of Atlantic Shore Railway.
3—To be sold for junk.
4—Sold and reorganized as Chicago, Aurora & Elgin R.R. Co. in 1922.
5—Road has been dismantled.
6—Receiver discharged during 1922.
7—Service discontinued August, 1921.
8—Removed from last year's list because of reported foreclosure sale, set aside by the court. Final foreclosure 1922.
9—$68,160 in car trust certificates.
10—No bonds issued. Cost of construction carried by temporary notes.
11—Reported sold prior to 1922.
12—These figures exclude track and securities of formerly controlled companies which have been returned to their owners.
13—Figures cover only proportion of securities represented by railway property. Estimated at 67.4 per cent of total.
14—This company is reported as having had right-of-way, but no track built.
15—Receivership lifted during 1922. Not operating now.
16—Part of New York & Queens County Ry., which is not otherwise involved.
17—Road has discontinued operations and is now being dismantled.
18—Reported sold, but sale not yet confirmed.
19—Broadway and Seventh Avenue Railroad and Sixth Avenue Railroad, operated by the New York Railways, are also in receivership.
20—Sold during 1922.
21—Notes, bank loans and $85,050 in car trust certificates included in funded debt.
22—Figures cover total combined property. $38,553 in car trust certificates included in funded debt.
23—At the close of 1922 a reorganization plan eliminating the Interborough-Consolidated Corporation securities was practically but not completely consummated.
24—Receivership lifted during 1921.
25—Receivership, which was limited to Chattanooga lines only, was lifted during 1922. Now owned by Tennessee Electric Power Company.
26—Figures cover total combined property. Railway value cannot be separated.
27—Underlying railway bonds only.
28—Property is being disintegrated and reorganized.
29—Sold and now being operated by the Union Traction System.
30—Sold and reorganized, but receiver not yet discharged.
31—Stock has no par value. Nominal value given.
32—As included in last year's report. No new information received.
33—Balance remaining after separation of Third Rail Division.

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likely to be terminated in the two other cases before the end of this year. There are, to be sure, many legal and financial problems to be settled, but the increase in the net earnings, attributed to better economic conditions and improved operating methods, has made the terminating of the receiverships a practical question. Moreover, a growing appreciation has been shown on the part of security holders of the fallacy of too stringent insistence upon mortgage rights where such insistence may mean the disintegration of a system and destruction of earning power that inheres in the operation of a single system.

It is in New York City itself where a large part of the securities and mileage are in receivership. Nevertheless, the situation during the past year has improved considerably due to the reduced cost of labor, increased traffic, and in the case of the surface lines, a virtual increase in the fare, brought about by the break-up of some of the systems. Moreover, the situation will be materially relieved by the extinguishing of all of the $63,808,000 of 4½ per cent Interborough-Consolidated bonds, all of the $45,740,500 of preferred stock of that company and all the common stock, which at $5 nominal rating a share would be valued at $4,663,134. This reorganization plan was practically completed on Dec. 31, 1922. The reflection of this improved condition of financial affairs in New York City is also to be seen in the higher quotations for all traction securities. In the case of the Interborough Rapid Transit Company, the threatened receivership has been avoided and the condition of the company materially improved as a result of the rearrangement of the terms of lease under which it operates the Manhattan Elevated Lines.

Of the interurban properties in the hands of the receivers, both the Aurora, Elgin & Chicago Railroad Company and the Cleveland, Southwestern & Columbus Railroad Company are being reorganized in a rather drastic manner. In the former case, the Third Rail Division was sold and reorganized as the Chicago, Aurora & Elgin Railroad and is now being so

Table V (Continued)—Electric Railway Receiverships and Foreclosures as of Dec. 31, 1922

Name of Company	Year of Receivership	Miles of Single Track Involved	Outstanding Securities: Capital Stock	Funded Debt	Receivers' Certificates
OHIO					
Ashtabula Rapid Transit Co. (Ashtabula) (1)	1920	5.50	500,000	382,000	7,500
Cincinnati Lawrenceburg & Aurora Elec. St. Ry. (Cincinnati)	1913	31.89	808,900	750,000	None
Cleveland, Alliance & Mahoning Valley R. R. Co. (Ravenna)	1920	46.00	1,100,000	1,100,000	8,000
Cleveland, Southwestern & Columbus Ry. (Cleveland)	1922	209.00	6,648,000	3,510,000	None
Dayton, Covington & Piqua Trac. Co. (West Milton)	1922	38.00	1,150,000	550,000	None
Gallipolis & Northern Traction Co. (Gallipolis)	1922	5.00	20,000	48,000	None
Interurban Ry. & Terminal Co. (Cincinnati (17)	1914	47.55	3,500,000	1,650,000	None
Ohio Electric Ry. (Springfield) (28)	1921	82.90	11,000,000	7,254,200	None
Columbus, Newark & Zanesville Elec. Ry. (Springfield) (6)	1921	95.85	2,025,000	4,704,000	None
Fort Wayne, Van Wert & Lima Trac. Co. (Lima)	1921	61.63	1,000,000	1,470,000	None
Indiana, Columbus & Eastern Trac. Co. (Springfield)	1921	257.20	4,025,000	7,900,000	200,000
Ohio River Electric Ry. & Pwr. Co. (Pomeroy)	1919	12.70	300,000	315,000	None
Maumee Valley Ry. & Lt. Co. (Toledo)	1921	23.21	1,000,000	800,000	None
Springfield Terminal Ry. & Pwr. Co. (Springfield) (1) (8)	1919	30.00	350,000	250,000	18,683
Toledo & Western R. R. Co. (Sylvania)	1921	89.00	2,000,000	2,000,000	None
PENNSYLVANIA					
Bangor & Portland Trac. Co. (Bangor)	1922	8.70	130,000	130,000	3,000
Buffalo & Lake Erie Trac. Co. (Erie)	1915	168.00	7,500,000	7,066,000	920,000
Cleveland & Erie Ry. (Girard) (5)	1920	30.00	300,000	1,000,000	None
Ephrata & Lebanon St. Ry. Co. (Lebanon)	1921	24.00	189,000	250,000	None
North Branch Transit Co. (Bloomsburg)	1915	30.00	500,000	532,500	None
Northampton, Easton & Wash. Trac. Co. (Easton) (18)	1919	17.80	1,250,000	739,000	15,000
Philadelphia Rys. Co. (Philadelphia) (6)	1919	16.00	400,000	400,000	None
Pittsburgh Rys. (Pittsburgh)	1918	598.76	21,726,750	52,185,133	None
Pottstown & Phoenixville Ry. (Pottstown) (1)	1922	15.00	500,000	114,600	None
Slate Belt Transit Co. (Pen Argyl)	1922	18.00	360,000	400,000	21,000
Sunbury & Susquehanna Ry. (Sunbury) (32)	1913	9.20	600,000	640,000	None
Summary					
Total 1/1/22	51 cos.	3,025.70	226,585,599	371,135,013	24,410,526
Net changes and corrections	5 cos.	116.01	12,660,858	1,795,335	*5,637,443*
Receiverships added during 1922	11 cos.	660.09	17,258,000	20,108,400	24,000
Less properties sold or reorganized	*14 cos.*	*434.07*	*10,709,350*	*15,206,600*	*117,683*
Net receiverships 12/31/22	53 cos.	3,367.73	245,795,107	377,833,148	18,679,400
South of the Ohio and East of the Mississippi					
ALABAMA					
Birmingham Ry., Lt. & Pwr. Co. (Birmingham)	1919	153.55	4,232,800	(15) 8,767,044	(15) 414,021
Birmingham Tidewater Ry. Co. (Birmingham)	1919	32.63	325,000	1,500,000	18,000
Montgomery Light & Traction Co. (Montgomery)	1919	38.00	(26) 2,000,000	(26) 1,430,000	(26) 250,000
North Alabama Trac. Co. (Albany) (1)	1919	7.63	75,000	225,000	None
FLORIDA					
Jacksonville Trac. Co. (Jacksonville)	1919	64.00	1,500,000	(21) 4,122,050	62,500
Pensacola Elec. Co. (Pensacola)	1920	24.49	(22) 1,100,000	(22) 1,780,453	(22) 25,000
NORTH CAROLINA					
Asheville & East Tennessee R. R. (Asheville) (1)	1922	6.34	70,000	35,000	None
SOUTH CAROLINA					
South Carolina Lt., Pwr. & Rys. Co. (Spartanburg) (1)	1921	21.00	3,200,000	4,629,000	None
TENNESSEE					
Chattanooga Ry. & Lt. Co. (Chattanooga) (25)	1919	69.00	(26) 5,000,000	(27) 2,790,000	None
Memphis St. Ry. (Memphis)	1919	132.76	5,000,000	8,025,000	None
WEST VIRGINIA					
Morgantown & Wheeling Ry. Co.	1916	27.00	345,000	500,000	214,000
Summary					
Total 1/1/22	10 cos.	565.70	22,775,000	33,015,400	1,060,060
Net changes and corrections	....	4.36	2,800	753,147	*76,539*
Receiverships added during 1922	1 cos.	6.34	70,000	35,000	None
Less properties sold or reorganized	*4 cos.*	*103.97*	*8,345,000*	*7,679,000*	.....
Net receiverships 12/31/22	7 cos.	472.43	14,502,800	26,124,547	983,521
West of the Mississippi					
ARIZONA					
Tucson Rapid Transit Co. (Tucson) (6)	1919	4.35	500,000	114,800	None
ARKANSAS					
West Helena Consolidated Co. (Helena)	1921	5.50	469,975	None	None
COLORADO					
Denver Tramway Co. (Denver)	1920	226.42	6,156,300	17,555,585	None
IOWA					
Des Moines City Ry. Co. (Des Moines) (6)	1918	94.00	1,305,000	5,981,000	10,000

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operated. The Cleveland, Southwestern & Columbus Railroad Company, which did not go into receivership until this year, has submitted to a plan whereby the securities are to be scaled down within the limits of the company's earning power. A segregation of the various lines which made up the system of the Ohio Electric Railroad Company is being made. The Columbus, Newark & Zanesville Electric Railroad Company, formerly operated by the Ohio Electric Railroad Company, reports the discharge of the receiver. Certain bonds of the Michigan United Railways have been in default for some time and the appointment of a receiver for that company was not, therefore, wholly unexpected. Already a reorganization plan has been worked out whereby the outstanding securities are to be scaled down within the limits of the company's earning power. As the earnings of the first ten months of this year are reported to be sufficient to pay the new bond interest 1.55 times, it is hoped that the receiver will be discharged early in 1923.

Table V (Concluded)—Electric Railway Receiverships and Foreclosures as of Dec. 31, 1922

Name of Company	Year of Receivership	Miles of Single Track Involved	Outstanding Securities: Capital Stock	Outstanding Securities: Funded Debt	Outstanding Securities: Receivers' Certificates
KANSAS					
Manhattan City & Interurban Ry. (Manhattan) (29)	1922	16.00	612,150	90,000	None
Southwestern Interurban Ry. (Winfield)	1919	25.00	150,000	None	None
LOUISIANA					
New Orleans Ry. & Lt. Co. (New Orleans) (30)	1919	222.12	(26) 30,198,850	(26) 38,361,200	1,180,000
MINNESOTA					
St. Paul So. Elec. Ry. Co. (Hastings)	1918	17.54	658,225	425,400	None
MISSOURI					
Kansas City, Lawrence & Topeka R. R. Co. (Kansas City)	1919	12.00	250,000	400,000	None
Kansas City, Outer Belt Elec. R. R. Co. (Kansas City) (32)	1912	(14)	None	1,298,000	100,000
Kansas City, Ozark & So. Ry. (Ava.) (32)	1913	15.00	300,000	None	None
Kansas City Railways (Kansas City)	1920	314.88	(31) 100,000	30,032,336	None
Missouri Elec. R. R. Co. (St. Louis)	1919	18.83	1,000,000	700,000	None
United Rys. Co. of St. Louis	1919	460.78	41,296,000	50,690,000	4,200,000
OREGON					
Southern Oregon Trac. Co. (Medford) (11)	1918	8.19	150,000	150,000	None
TEXAS					
Austin St. Ry. Co. (Austin)	1921	22.67	810,000	786,000	None
Bryan & Central Texas Interurban (Bryan) (1)	1920	27.20	300,000	300,000	None
Bryan & College Interurban Ry. (Bryan)	1920	7.75	40,000	100,000	None
Corpus Christi Ry. & Lt. Co. (Corpus Christi) (24)	1919	9.75	None	(26) 1,694,507	14,539
Standard Trac. Co. (Dallas)	1921	1.50	10,000	None	None
Summary					
Total 1/1/22	18 cos.	1,486.94	82,884,375	148,536,620	5,544,539
Net changes and corrections	1 co.	6.54	809,975	52,208	*40,000*
Receiverships added during 1922	1 co.	16.00	612,150	90,000	None
Less properties sold or reorganized	*6 cos.*	*159.49*	*2,867,150*	*8,330,307*	*24,539*
Net receiverships 12/31/22	14 cos.	1,349.99	81,439,350	140,348,521	5,480,000
Recapitulation					
Total 1/1/22	90 cos.	5,448.84	337,055,774	565,400,554	31,125,125
Net changes and corrections	6 cos.	126.04	13,593,633	*1,615,081*	*5,733,982*
Receiverships added during 1922	14 cos.	695.43	18,140,150	20,304,400	24,000
Less properties sold or reorganized	*25 cos.*	*719.53*	*22,171,500*	*31,474,907*	*142,222*
Net receiverships 12/31/22	85 cos.	5,550.78	346,618,057	552,614,966	25,272,921

During the past year thirteen companies have been sold or reorganized. One now undergoing reorganization is the Cleveland, Southwestern & Columbus Railroad Company, previously mentioned. It was the second large Ohio company to go into receivership during the past two years. In an official statement issued by the counsel concerning the receivership, it was stated that the company was unable to pay the bond interest because of extreme loss in gross operating revenues, resulting from unfavorable economic and industrial conditions. Another reorganization now in process is the New Orleans Railway, Light & Power Company, which has successfully carried through a plan whereby the interests of the city and the company are both well protected for the future. The city, moreover, will gain very largely through the money put back into the property for improvements. Of those companies which have been sold and reorganized, the Ashtabula Rapid Transit Company, Ashtabula, Ohio, is also of interest as it represents an experiment in municipal ownership, having been purchased by the city in April, 1922, for $150,000. The La Fayette Service Company, forced to sell through jitney bus competition, has been purchased by the La Fayette Street Railway Company. Although these companies have been forced to sell at foreclosure, it augurs well for the future of the industry that new capital has been found to take them over and service will not be suspended.

Eight companies have been sold for junk during 1922. In many cases the suspension of service and subsequent total abandonments were due to the increased number of private automobiles, which rendered electric railway service by those companies impracticable. A notable instance of the results of such competition is the Joliet & Eastern Traction Company, Joliet, Ill., which was abandoned and sold for junk. The Gallipolis & Northern Traction Company reports a suspension of operations and the intention to dismantle entirely. It is hoped that in the case of the Asheville & East Tennessee Railroad Company, service may be resumed by the taking over of the properties by a new company. Of these companies, four have gone into receivership during the past year. It is especially interesting to note that during 1922 increased earnings have enabled six companies to terminate the receivership. Of these, the Chattanooga Railway & Light Company has been reorganized as the Tennessee Electric Power Company. The Shore Line Electric Railroad Company of White Plains, N. Y. (1.5 miles), which went into the hands of a receiver in 1920, reports that it is no longer in receivership but is awaiting a court order pending dissolution.

The list of abandonments of parts of lines, to be found in Table VI, has been tabulated this year to show both city and interurban mileage. Statistics for 1921 showed a total mileage of 149.61 of track abandoned by the 71 companies listed. The past year, however, shows a total of 110.53 miles of city track and 105.09 miles of interurban track, making a total of 215.62 miles abandoned by 97 companies. In many instances, however, the abandonment is due to a change in route or elimination of unused sidings, turnouts and other short pieces.

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Table VI—Abandonments—Partial—1922

(Includes all pieces of track, sidings, yards, etc., permanently abandoned—Companies arranged alphabetically by states)

	Miles City	Miles Interurban
Bakersfield & Kern Elec. Ry. Co. (Bakersfield, Cal.)	0.48	.....
Pacific Electric Ry. Co. (Los Angeles, Cal.)	0.23	.....
Peninsular Ry. Co. (San Jose, Cal.)	0.93	.....
Petaluma & Santa Rosa R.R. Co. (Petaluma, Cal.)	.....	0.05
San Francisco-Oakland Terminal Rys. (Oakland, Cal.)	0.09	0.11
Southern Pacific Co. (San Francisco, Cal.)	.....	0.90
Denver & Interurban R.R. Co. (Denver, Colo.)	.....	2.75
The Connecticut Co. (New Haven, Conn.)	0.19	.....
Danbury & Bethel St. Ry. Co. (Danbury, Conn.)	2.50	.....
The Shore Line Electric R.R. Co. (Norwich, Conn.	.....	28.22
Grand River Valley Ry. Co. (Grand Junction, Colo.)	.....	0.06
Southern Colorado Power Co. (Pueblo, Colo.)	0.34	.....
Trinidad Electric Transmission Ry. & Gas Co. (Trinidad, Colo.)	3.00	.....
Western Light & Power Co. (Boulder, Colo.)	0.43	.....
Augusta-Aiken Ry. & Elec. Corpn. of S. Carolina (Augusta, Ga.)	0.61	.....
Georgia Ry. & Power Co. (Atlanta, Ga.)	0.20	1.68
Macon Ry. & Lt. Co. (Macon, Ga.)	.....	2.63
Boise St. Car Co. (Boise, Idaho)	0.75	.....
Alton, Granite & St. Louis Traction Co. (Alton, Ill.)	0.09	.....
Chicago & Joliet Elec. Ry. Co. (Joliet, Ill.)	1.72	.....
Chicago Surface Lines (Chicago, Ill.)	0.26	.....
La Fayette St. Ry. Co. (La Fayette, Ind.)	0.60	.....
Albia Lt. & Ry. Co. (Albia, Ia.)	6.00	.....
Des Moines City Ry. Co. (Des Moines, Ia.)	0.10	.....
Tri-City Ry. Co. of Iowa (Davenport, Ia.)	0.64	.....
Kentucky Traction & Terminal Co. (Lexington, Ky.)	0.30	.....
Louisville Ry. Co. (Louisville, Ky.)	1.18	.....
New Orleans Public Service Co. (New Orleans, La.)	1.55	.....
Cumberland County Power & Light Co. (Portland, Me.)	0.26	.....
United Rys. & Electric Co. (Baltimore, Md.)	0.70	.....
Berkshire St. Ry. Co. (Pittsfield, Mass.)	.....	0.83
Boston Elevated Ry. Co. (Boston, Mass.)	1.40	.....
Connecticut Valley St. Ry. Co. (Greenfield, Mass.)	.....	8.96
Eastern Massachusetts St. Ry. Co. (Boston, Mass.)	1.16	10.81
Massachusetts Northeastern St. Ry. Co. (Haverhill, Mass.)	0.01	1.89
Middlesex & Boston St. Ry. Co. (Newtonville, Mass.)	.....	6.44
Benton Harbor-St. Joe Ry. & Lt. Co. (Benton Harbor, Mich.)	0.25	.....
City of Detroit—Dept. of St. Rys. (Detroit, Mich.)	0.42	.....
Detroit United Ry. (Detroit, Mich.)	1.18	.....
Grand Rapids Ry. Co. (Grand Rapids, Mich.)	0.24	.....
Twin City Rapid Transit Co. (Minneapolis, Minn.)	0.01	0.03
Wisconsin Ry., Lt. & Pwr. Co. (Winona, Minn.)	0.26	.....
Meridian Lt. & Ry. Co. (Meridian, Miss.)	1.50	.....
St. Joseph Lt. Ht. & Pwr. Co. (St. Joseph, Mo.)	1.13	.....
Springfield Traction Co. (Springfield, Mo.)	0.75	.....
United Rys. Co. of St. Louis (St. Louis, Mo.)	0.08	.....
Lincoln Traction Co. (Lincoln, Neb.)	2.16	.....
Bridgeton & Millville Traction Co. (Bridgeton, N. J.)	.....	10.00
Trenton & Mercer County Traction Corp. (Trenton, N. J.)	0.04	.....
Interborough Rapid Transit Co. (New York, N. Y.)	0.03	.....
International Ry. Co. (Buffalo, N. Y.)	0.91	6.31
New York State Rys.:		
Rochester lines	1.64	.....
Syracuse lines	0.05	.....
Utica lines	0.30	.....
Rochester & Syracuse R.R. Co. (Syracuse, N. Y.)	.....	0.73
Syracuse & Suburban R.R. Co. (Syracuse, N. Y.)	.....	0.47
Third Ave. Ry. System (New York, N. Y.)	17.49	.....
Cincinnati Traction Co. (Cincinnati, O.)	0.84	.....
City Ry. Co. (Dayton, O.)	0.58	.....
Columbus, Delaware & Marion Elec. Ry. Co. (Columbus, O.)	.....	6.21
Community Traction Co. (Toledo, O.)	2.82	.....
Northern Ohio Traction & Lt. Co. (Akron, O.)	1.21	.....
The Ohio Service Co. (Coshocton, O.)	2.00	.....
Allegheny Valley St. Ry. Co. (New Kensington, Pa.)	2.07	.....
Altoona & Logan Valley Elec. Ry. (Altoona, Pa.)	0.21	.....
Buffalo & Lake Erie Traction Co. (Erie, Pa.)	2.24	0.26
Chambersburg & Gettysburg Elec. Ry. Co. (Chambersburg, Pa.)	0.45	.....
Citizens' Traction Co. (Oil City, Pa.)	0.26	.....
Coatesville Trolley Co. (Coatesville, Pa.)	.....	5.00
Harrisburg Rys. Co. (Harrisburg, Pa.)	0.73	.....
Jefferson Traction Co. (Punxsutawney, Pa.)	.....	7.00
Johnstown Traction Co. (Johnstown, Pa.)	0.04	.....
Lehigh Traction Co. (Hazleton, Pa.)	.....	0.24
Northwestern Pennsylvania Ry. Co.	.....	1.12
Philadelphia Rapid Transit Co. (Philadelphia, Pa.)	2.48	.....
Pittsburgh Rys. Co. (Pittsburgh, Pa.)	3.25	.....
Vallamont Traction Co. (Williamsport, Pa.)	0.17	.....
West Penn. Rys. Co. (Pittsburgh, Pa.)	0.10	0.28
Charleston Consolidated Ry. & Ltg. Co. (Charleston, S. C.)	0.47	.....
Columbia Ry., Gas & Elec. Co. (Columbia, S. C.)	2.00	.....
Memphis St. Ry. Co. (Memphis, Tenn.)	0.84	.....
Brownsville St. & Interurban R.R. Co. (Brownsville, Tex.)	1.00	.....
Northern Texas Traction Co. (Fort Worth, Tex.)	0.08	0.26
San Antonio Public Service Co. (San Antonio, Tex.)	0.86	.....
Virginia Ry. & Power Co. (Richmond, Va.)	4.29	0.46
Puget Sound Elec. Ry. (Tacoma, Wash.)	0.38	.....
Puget Sound International Ry. & Power Co. (Everett, Wash.)	0.08	.....
Seattle Municipal St. Ry. Co. (Seattle, Wash.)	1.47	.....
Spokane United Rys. (Spokane, Wash.)	21.05	.....
Walla Walla Valley Ry. Co. (Walla Walla, Wash.)	2.00	.....
Yakima Valley Transportation Co. (North Yakima, Wash.)	.....	0.01
Charleston Interurban R.R. Co. (Charleston, W. Va.)	0.69	.....
Milwaukee Elec. Ry. & Lt. Co. (Milwaukee, Wis.)	1.50	0.12
CANADA		
Kitchener & Waterloo St. Ry. Co. (Kitchener, Ont.)	0.80	.....
Toronto Transportation Commission (Toronto, Ont.)	0.49	.....
Montreal Tramways Co. (Montreal, Que.)	0.90	.....
British Columbia Elec. Ry. Co. (Vancouver, B. C.)	.....	1.26
	110.53	105.09

The majority of electric railway companies still in receivership are now reporting more satisfactory earnings and there is every indication that the coming year will see the discharge of many receivers. The city lines show a greater improvement relatively than the interurban companies. The readjustment of fares to a reasonable and profitable basis, reduced operating costs and improved methods are all factors which have helped to bring about a more healthy condition of the industry. Owing to the unreasonable interest rate for money, only imperative financing has been done during the past few years. However, the gradual lessening of the interest rate is a promising factor which will make possible the handling of present and future business, to a greater advantage and at a relatively smaller cost. With credit being restored, the railways can now confidently look forward to securing long-needed new capital for additions and economy-producing improvements.

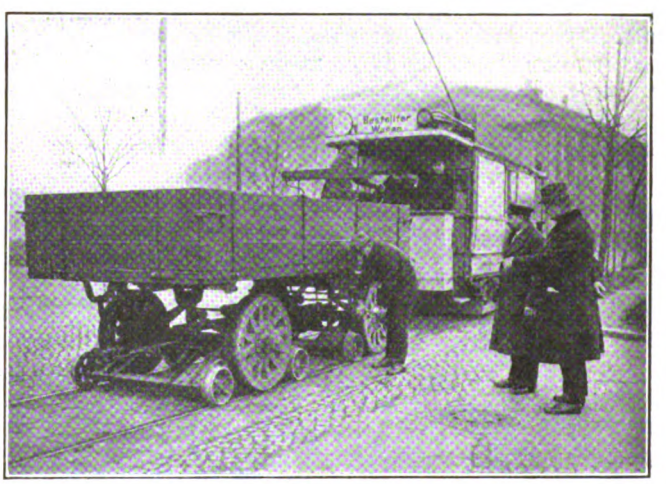
TABLE VII—SUSPENSIONS OF SERVICE—1922

(Includes miles of track on which companies have ceased to operate, but which have not been permanently abandoned or ripped up.)

	Miles
Columbus Elec. & Pwr. Co. (Columbus, Ga.)	0.50
Louisville Ry. Co. (Louisville, Ky.)	4.33
Eastern Massachusetts St. Ry. Co. (Boston, Mass.)	3.84
Grand Rapids Ry. Co. (Grand Rapids, Mich.)	1.98
Saginaw-Bay City Ry. Co. (Saginaw, Mich.)	67.48
Kansas City Rys. Co. (Kansas City, Mo.)	1.72
Bridgeton & Millville Traction Co. (Bridgeton, N. J.)	2.00
International Railway Co. (Buffalo, N. Y.)	14.79
Syracuse & Suburban R.R. Co. (Syracuse, N. Y.)	0.65
Community Traction Co. (Toledo, O.)	2.44
Conestoga Traction Co. (Lancaster, Pa.)	4.00
West Penn. Rys. Co. (Pittsburgh, Pa.)	1.66
Puget Sound International Ry. & Power Co. (Everett, Wash.)	2.80
Walla Walla Valley Ry. Co. (Walla Walla, Wash.)	3.50
Total for 1922 (14 companies)	111.69

Hauling Wagons with Electric Cars

THE accompanying illustration shows a wagon mechanism which has been developed by the Berlin Street Railway, so that heavy loads can be hauled on the rails throughout the city by electric cars, thus doing away with the necessity for horses which are scarce.



Wagon for Use Either on Track or Pavement

When the wagon is hauled over the rails, the large wheels used for transporting over pavements are raised and the small flanged wheels on either side of the larger wheels take the load and follow the track. The wagon can be raised and lowered through a mechanism operated by hand levers.

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Statistics Showing Extent of the Industry

Number of Operating Companies, Miles of Tracks, Number of Cars and Buses Comprised in Electric Railway Field in 1922

AS IN PREVIOUS years the ELECTRIC RAILWAY JOURNAL has again compiled statistics of the miles of track and type of rolling stock of the electric railway companies in the United States to compare with a similar table which was published on page 41 of the JOURNAL for Jan. 7, 1922. This information was obtained from the August, 1922, "Electric Railway Directory" of the McGraw-Hill Company and is indicative of the conditions as they existed about July 1.

The country has been divided into the same geographical divisions for the purpose of comparisons, but two changes have been made in the form of the table. The principal one is to include a column giving the total number of cars in each state. The other is to add a column of buses owned. A few changes have been made in the totals for 1921, as reported last year, because of additional information received and the discovery of some errors in the calculation.

Although, according to these statistics, there has been a slight decrease in number of companies, miles of track and number of cars reported, this does not mean that there has been a decrease in the number of cars and miles of track operated. At least some of the decrease is due, in the opinion of the compiler, to the decision of several companies during the last year no longer to include in their reports equipment whose use was given up some time ago.

In this connection a word of caution should be said against too great reliance on the figures of this and previous tables as giving the exact status of the industry from year to year. The only claim made for these tables is that they are compilations from the directories, and in these compilations some assumptions have had to be made in regard to proportioning track and cars between lessor and lessee companies, holding and subsidiary companies, etc. But the same compiler has prepared the tables for the last three years and the same bases for estimating these divisions have been followed each year. Other bases assumed in the compilation of the table were explained in connection with the article in the Statistical Number of 1922.

According to the table there has been a decrease of eleven companies and 406 miles of track in June, 1922, as compared with June, 1921. Of these 406 miles, 116 belonged to the eleven companies which had entirely suspended operations, so that only 290 miles belonged to companies still in business.

During the same period the rolling stock decreased 869 after allowance for the seventy-seven cars belonging to the eleven companies which suspended operations. Figures elsewhere in this issue show that the cars purchased or built this year greatly exceed those purchased or built in 1921, but as already explained probably there has been a greater writing off from inventories of old equipment.

The column of bus data, it should be remembered, is for July, 1922. Later figures published in *Bus Transportation* show that by September, 1922, the number of buses owned by electric railway companies had increased to 345.

There seems to be a slight tendency toward the use of the trailer by electric railway companies, and it seems that the passenger motor cars are suffering in number as a consequence. The increase in the former amounts to 1,482 over 1921, while at the same time the latter has decreased over last year by 2,479.

STATISTICS OF CARS, BUSES AND TRACK OPERATED BY ELECTRIC RAILWAY COMPANIES IN THE UNITED STATES IN JULY, 1922

State	No. of Companies Operating	Miles of Single Track	Passenger Cars: Motor	Passenger Cars: Trailer	Electric Locomotives	Freight Cars: Motor	Freight Cars: Trailer	Service Cars	Other Cars	All Cars	Buses Owned by Electric Railways
New England States											
Connecticut	8	1,618.42	1,696	75	108	63	18	281	1	2,242	30
Maine	14	527.42	456	10	9	45	82	94	38	734	...
Massachusetts	30	2,775.60	5,282	267	12	61	8	883	87	6,600	7
New Hampshire	11	245.85	303	.....	1	4	1	25	15	349	...
Rhode Island	4	425.83	1,056	46	3	32	46	175	5	1,363	...
Vermont	7	98.00	108	4	4	11	1	15	1	144	...
Total	74	5,691.12	8,901	402	137	216	156	1,473	147	11,432	37
Eastern States											
Delaware	1	141.80	188	107	...	3	....	35	....	333	...
D. of Columbia	6	377.68	1,091	277	6	5	29	108	....	1,516	3
Maryland	10	704.52	2,055	59	11	5	48	30	38	2,246	52
New Jersey	25	1,540.30	3,261	107	2	22	1	350	41	3,784	2
New York	189	5,433.66	17,266	2,050	130	111	64	1,716	507	21,844	5
Pennsylvania	04	4,588.19	7,502	521	5	155	104	974	207	9,468	3
Virginia	13	447.27	859	64	3	16	32	53	5	1,032	...
W. Virginia	15	624.38	499	14	19	19	30	37	41	659	...
Total	263	13,857.60	32,721	3,199	176	336	308	3,303	839	40,882	65
Central States											
Illinois	58	3,528.09	5,784	892	60	36	2,146	656	88	9,662	...
Indiana	28	2,328.17	1,790	230	12	50	482	148	218	2,930	3
Iowa	23	957.07	792	53	39	24	421	80	141	1,550	3
Kentucky	7	493.38	781	62	...	16	10	148	8	1,025	...
Michigan	24	1,819.42	2,715	300	22	128	200	196	306	3,867	3
Minnesota	13	769.06	1,252	8	6	46	....	24	94	1,430	2
Missouri	22	1,143.89	2,513	255	4	19	26	332	54	3,203	2
Ohio	63	4,040.01	4,291	583	29	258	360	557	330	6,408	15
Wisconsin	16	765.50	1,038	125	7	11	27	337	21	1,566	34
Total	254	15,844.59	20,956	2,508	179	588	3,672	2,478	1,260	31,641	62
Southern States											
Alabama	12	360.74	443	130	3	6	82	58	17	739	...
Arkansas	8	126.26	225	19	...	1	6	18	3	272	12
Florida	7	197.41	321	11	...	10	20	20	....	382	...
Georgia	11	479.17	625	45	1	7	12	44	27	761	...
Louisiana	8	309.50	670	47	...	8	1	109	2	837	...
Mississippi	7	94.79	109	20	2	....	....	4	2	137	...
North Carolina	11	382.48	314	23	18	6	167	30	9	567	...
South Carolina	4	128.65	152	11	...	....	1	5	13	182	...
Tennessee	10	437.83	701	68	1	17	13	36	23	859	1
Total	78	2,516.83	3,560	374	25	55	302	324	96	4,736	13
Western States											
Arizona	3	43.79	49	...	...	....	....	3	....	52	...
California	36	3,281.74	3,796	481	73	63	1,640	565	111	6,729	43
Colorado	12	470.15	388	150	8	12	156	112	6	832	...
Idaho	3	100.20	35	....	...	25	4	4	....	68	...
Kansas	14	514.69	382	39	2	20	118	30	14	605	3
Montana	7	847.30	117	26	90	....	5	15	....	253	...
Nebraska	5	254.65	556	63	3	4	....	63	....	689	2
Nevada	1	7.50	5	....	...	....	....	....	....	5	...
New Mexico	2	10.95	16	....	...	....	....	....	....	16	...
North Dakota	4	25.79	51	23	...	....	....	8	....	82	...
Oklahoma	15	357.63	313	12	7	2	107	8	5	454	18
Oregon	10	706.13	716	92	22	4	446	182	31	1,493	...
South Dakota	3	26.60	33	....	...	....	2	4	....	39	...
Texas	21	1,005.82	1,358	111	1	22	13	97	39	1,641	43
Utah	5	465.75	216	45	21	10	244	13	211	760	...
Washington	15	1,099.04	1,260	98	28	18	730	78	32	2,244	14
Wyoming	2	22.00	13	1	...	....	....	1	4	19	...
Total	158	9,239.73	9,304	1,141	255	180	3,465	1,183	453	15,981	123
Total U. S. 1922	827	47,149.87	75,442	7,624	772	1,375	7,903	8,761	2,795	104,672	300
Total U. S. 1921	838	47,555.23	77,921	6,142	760	1,324	7,712	7,005	4,754	105,618	129

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As has been explained previously, unless the same official reports the cars each year, there is bound to be some discrepancy in the division of cars into "freight" service and "other" cars. The terms are more or less ambiguous and interchangeable, but it has been the purpose of the compiler to classify as much as possible the column "other" cars and he has succeeded further this year. This column has been diminishing as follows: the 1919 table reported 10,144 "other" cars, the 1920 table 6,899; 1921, 4,754, and now in 1922 the figure has been reduced to 2,795 cars. As a result of this decrease the freight, and express, both motor and trailer, and the service cars have increased. It is worthy of note that the number of electric locomotives is always on the increase. The policy of eliminating trailer freight cars of companies operating a large percentage, in comparison to other types of cars, has been continued this year.

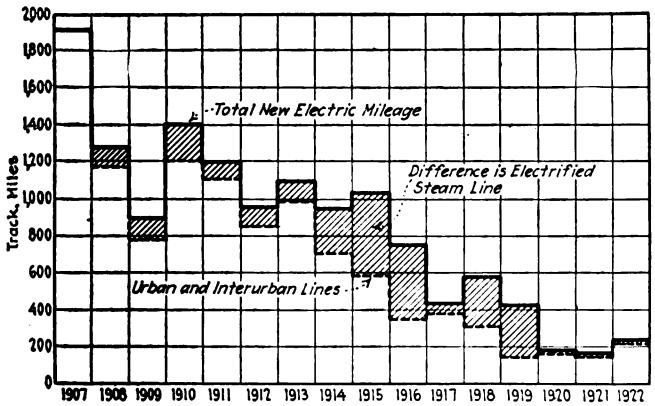
In the Jan. 7 issue of last year of the JOURNAL there was produced on page 42 a graphical chart of the rolling stock as operated in the various states in 1921. This chart would apply for 1922, as the conditions have not changed enough to warrant any marked adjustments on the map.

Track Extensions and Reconstruction Work Increased

The Amount of New Track Built During the Past Year Showed a Small Increase Over that Reported for 1920 and 1921 — Track Reconstruction Shows a Considerable Increase — More Miles Were Rebuilt During 1922 than in Any Year Previously Recorded

THE following tables give statistics of track built and rebuilt during the year 1922 and show that very little new construction has been undertaken, but that track forces have been particularly active in reconstructing old lines. While the amount of new track constructed exceeds that reported for the years 1920 and 1921, still this remains at the low level that has existed since 1916. The mileage reported for urban and interurban track extensions during the year 1922 for the United States and Canada is 211.38. This is divided: 126.27 miles for city lines and 85.11 miles for interurban lines. Few additions of any considerable extent were carried out, and practically all of the increased mileage is made up of spurs and short extensions.

Electrification of steam lines was also at a standstill during 1922. The extensions reported amount to but



Miles of Track Built by Years Since 1907

12.35 miles, which is slightly greater than that reported for the years 1920 and 1921. The fact that electrified steam lines have added very little mileage during the past three years makes these totals in comparison with totals for previous years seem very low.

While new track extensions have been at a standstill, railway track forces have been kept busy by a large amount of reconstruction. A total of 212 railways report reconstruction as having been carried out during the past year, and they report a total of 739.70 miles reconstructed. This is greater than for any year since the JOURNAL began compiling this information, the largest amount previously reported being that for last year, when 615.21 miles were reconstructed.

The accompanying chart and tables give a comparison of new track extension by years since 1907. The shaded area in the chart represents the amount of electrified steam line extensions, which has dropped to

SUMMARY OF TRACK CONSTRUCTION FOR 1922

	New England District	North of the Ohio and East of the Mississippi	South of the Ohio and East of the Mississippi	West of the Mississippi	Total for United States	Canada	Grand Total
Track Extensions							
Number of companies...	11	41	10	33	95	9	104
Miles of track							
Urban	7.45	30.33	11.17	39.23	88.18	38.09	126.27
Interurban	3.63	21.52	2.04	57.92	85.11	.....	85.11
Total track extensions	11.08	51.85	13.21	97.15	173.29	38.09	211.38
Track Reconstruction							
Number of companies...	25	92	29	53	196	16	212
Miles of track							
Urban	94.80	242.52	43.93	145.89	527.14	57.61	584.75
Interurban	53.20	72.09	5.99	23.67	154.95	.....	154.95
Total track rebuilt....	148.00	314.61	49.92	169.56	682.09	57.61	739.70

COMPARISON OF TRACK CONSTRUCTION

Year	No. of Companies	Extensions: Urban Track	Extensions: Interurban Track	Extensions: Electrified Steam Lines	Extensions: Total	Track Rebuilt
1907	(a)	(a)	(a)	.....	1,880.00	(a)
1908	157	1,174.5		84.00	1,258.50	(a)
1909	160	774.7		112.40	887.16	(a)
1910	217	1,204.8		192.40	1,397.20	(a)
1911	223	1,105.0		86.50	1,191.50	(a)
1912	171	869.4		80.80	950.20	(a)
1913	181	974.9		119.00	1,093.90	(a)
1914	163	716.5		229.00	946.40	(a)
1915	136	596.0		448.20	1,044.20	(a)
1916	104	115.40	240.90	388.00	744.30	(a)
1917	121	251.10	125.60	66.00	442.70	375.40
1918	80	216.41	97.41	275.70	589.53	155.43
1919	73	110.90	29.67	287.60	428.17	390.64
1920	87	145.69	30.87	8.92	185.48	361.77
1921	78	108.15	38.95	8.08	155.18	615.21
1922	104	126.27	85.11	12.35	223.73	739.70

(a) Not available.

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Statistics of Track Built and Rebuilt During 1922

NEW ENGLAND DISTRICT

Railway	Extensions, Miles City	Extensions, Miles Interurban	Rebuilt, Miles City	Rebuilt, Miles Interurban
Connecticut				
The Connecticut Co., New Haven	0.33	0.39	27.73	2.91
The Shore Line Elec. Ry. Co., Norwich	.....	1.26	.....	0.56
Maine				
Aroostook Valley R.R. Co., Presque Isle	.....	.....	.....	4.00
The Androscoggin & Kennebec Ry. Co., Lewiston	.....	.....	.....	1.50
Bangor Ry. & Elec. Co., Bangor	1.95	0.05	0.14	1.18
Central Maine Power Co., Rockland	.....	.....	1.00	....
Cumberland County Power & Light Co.	0.20	.....	3.07	0.22
Massachusetts				
Berkshire St. Ry. Co., Pittsfield	0.01	.....	1.14	0.14
Boston Elevated Ry. Co., Boston	2.58	.....	20.52	....
Brockton & Plymouth St. Ry. Co., Plymouth	.....	.....	1.00	2.00
Conn. Valley St. Ry. Co., Greenfield	.....	.....	.....	0.50
Eastern Mass. St. Ry.	0.42	1.93	18.59	12.75
Holyoke St. Ry. Co., Holyoke	.....	.....	1.10	0.96
Massachusetts Northeastern St. Ry. Co.	.....	.....	0.03	4.22
Middlesex & Bost. St. Ry., Newtonville	.....	.....	5.30	....
Milford & Uxbridge St. Ry. Co., Milford	.....	.....	.....	4.00
Nahant & Lynn St. Ry. Co., Lynn	.....	.....	.....	2.82
Springfield St. Ry. Co.	0.70	.....	1.90	6.04
Union St. Ry. Co., New Bedford	0.26	.....	0.26	....
Worcester Consol. St. Ry. Co.	0.28	.....	2.52	1.50
New Hampshire				
Berlin St. Ry. Co.	.....	.....	0.50	....
Laconia St. Ry. Co.	.....	.....	.....	3.00
Manchester Trac., Lt. & Power Co.	.....	.....	0.54	....
Rhode Island				
Newport Electric Corp.	.....	.....	.....	3.00
United Electric Rys. Co., Providence	0.72	.....	9.46	1.90
Total	7.45	3.63	94.80	53.20

North of the Ohio and East of the Mississippi River

District of Columbia				
The Capital Traction Co., Washington	0.55	.....	3.37	....
Washington Ry. & Electric Co.	.....	.....	4.25	3.08
Washington-Virginia Ry. Co., Wash.	.....	.....	0.11	....
Illinois				
Centralia & Central City Trac. Co.	.....	.....	.....	2.00
Chicago & Interurban Traction Co.	.....	.....	0.58	20.00
Chicago & Joliet Elec. Ry. Co., Joliet	0.38	.....	2.76	....
Chicago Surface Lines	.....	.....	9.10	....
Chicago & W. Towns Ry. Co., Chicago	.....	.....	3.50	....
E. St. Louis, Columbia & Waterloo Ry.	.....	0.66	.....	....
East St. Louis & Suburban Ry.	.....	.....	1.80	3.60
Elgin & Belvidere Elec. Co., Chicago	.....	.....	0.38	4.00
Illinois Central Electric Ry. Co.	.....	.....	.....	0.26
Indiana				
Chicago, South Bend & Northern Indiana Ry. Co., South Bend	.....	.....	1.25	....
Gary Street Railway Co., Gary	0.51	.....	1.50	....
Indianapolis & Cincinnati Trac. Co., Indianapolis	.....	.....	0.33	....
Indianapolis St. Ry. Co., Indianapolis	0.11	.....	2.45	....
Lafayette St. Ry., Inc., La Fayette	1.40	.....	4.20	....
So. Indiana Gas & Elec. Co., Evansville	0.06	.....	1.88	....
Union Tract. Co. of Indiana, Anderson	.....	0.14	0.95	0.57
Washington St. Ry. Co., Washington	.....	.....	0.50	....
Maryland				
United Rys. & Elec. Co., Baltimore	1.59	.....	12.00	....
Michigan				
Benton Harbor-St. Joe Ry. & Lt. Co., Benton Harbor	.....	.....	0.75	....
City of Detroit—Dept. of St. Rys.	1.31	.....	9.94	....
Detroit United Rys.	.....	5.10	.....	....
Grand Rapids Railway Co.	0.32	.....	2.77	....
Menominee & Marinette Lt. & Trac. Co., Menominee	.....	.....	0.50	....
New Jersey				
Bridgeton & Millville Traction Co. Bridgeton	.....	.....	3.00	....
Jersey Central Tract. Co., Keyport	.....	.....	0.50	....
Millville Traction Co.	.....	.....	0.24	....
Trenton & Mercer County Traction Corp., Trenton	0.36	.....	4.93	....
New York				
Auburn & Syracuse Elec. R.R., Co., Auburn	.....	.....	0.28	....
Batavia Traction Co., Inc.	.....	.....	0.25	....
Binghamton Ry. Co.	.....	.....	0.22	....
Black River Tract. Co., Watertown	.....	.....	0.14	....
The Brooklyn City R.R. Co., Bklyn.	.....	.....	12.09	....
Brooklyn Rapid Transit Co., N. Y. C.	.....	.....	15.00	....
Buffalo & Lackawanna Tr. Co., Buffalo	.....	.....	1.36	....
Empire State R.R. Corp., Syracuse	.....	.....	1.61	....
Fonda, Johnstown & Gloversville R.R.	.....	.....	0.58	....
Interborough Rapid Transit Co., N. Y.	1.24	.....	.....	....
International Railway Co.	0.16	.....	7.83	....
New Paltz, Highland & Poughkeepsie Traction Co.	.....	.....	.....	1.50
New York State Rys. (Rochester lines), Rochester	1.26	.....	7.17	....
New York State Rys., Syracuse	0.09	.....	2.08	....
New York State Rys. (Utica Lines)	.....	.....	2.24	....
Niagara Junction Ry. Co.	0.23	.....	.....	....
Ogdensburg St. Ry. Co., Odgensburg	.....	.....	0.09	....
Poughkeepsie & Wappingers Falls Ry. Co., Poughkeepsie	0.23	.....	0.23	0.63
Richmond Light & R.R. Co., New Brighton, Staten Island	.....	.....	2.00	....
Rochester, Lockport & Buffalo R.R. Corp., Rochester	.....	.....	.....	1.22
Rochester & Syracuse R.R. Co.	.....	0.61	.....	....
Southern New York Pwr. & Ry. Corp., Oneonta	.....	.....	0.34	0.50
Second Ave. R.R.	0.04	.....	.....	....
Syracuse & Eastern R.R. Co. Syracuse	.....	.....	.....	0.47
Third Ave. Ry. Co., New York	.....	.....	7.06	....
United Traction Co., Albany	1.36	.....	7.23	....
Ohio				
Ashtabula Rapid Trans. Co., Ashtabula	.....	.....	1.00	....
Cincinnati & Dayton Trac. Co., Hamilton	.....	.....	0.09	....
Cincinnati Traction Co., Cincinnati	0.20	.....	5.00	....
The City Ry. Co.	1.58	.....	.....	....
Cleveland, Southwestern & Columbus Ry. Co.	.....	.....	6.99	....
The Columbus, Delaware & Marion Elec. Co., Columbus	.....	6.35	.....	....
The Columbus Ry., Pwr. & Lt. Co.	4.64	4.83	6.97	....
The Community Tract. Co., Toledo	0.09	.....	4.53	....
Northern Ohio Traction & Light Co.	0.06	1.26	1.97	2.34
People's Railway Co., Dayton	.....	.....	0.50	....
The Dayton & West. Tract Co., Dayton	.....	.....	.....	0.75
The Penn.-Ohio Elec. Co., Youngstown	.....	.....	3.63	....
Toledo, Bowling Green & Southern Traction Co., Findlay	.....	.....	2.00	....
Pennsylvania				
Allegheny Valley St. Ry. Co., New Kensington	.....	.....	.....	1.38
Altoona & Logan Valley Elec. Ry. Co.	0.09	.....	0.61	....
Beaver Valley Traction Co., New Brighton	.....	.....	1.06	....
Buffalo & Lake Erie Trac. Co., Erie	3.30	0.03	0.63	0.87
The Citizen's Traction Co., Oil City	.....	.....	0.10	....
Conestoga Traction Co., Lancaster	0.07	.....	1.88	....
Frankford, Tacony & Holmesburg St. Ry. Co., Philadelphia	.....	.....	3.00	....
Harrisburg Rys. Co.	0.25	.....	0.98	....
Indiana County St. Rys. Co., Indiana	.....	.....	0.62	1.21
Johnstown Trac. Co.	0.03	.....	1.14	....
Lehigh Traction Co., Hazleton	.....	0.53	.....	....
Mauch Chunk & Lehighton Transit Co., Mauch Chunk	.....	.....	0.07	....
Montgomery Transit Co., Norristown	.....	.....	.....	0.50
Northern Cambria Ry. Co., Patton	.....	.....	1.50	....
Northwest. Pennsylvania Ry. Co., Erie	.....	.....	.....	1.12
Northampton, Easton & Washington Traction Co., Easton	.....	.....	.....	3.27
Philadelphia & Easton Transit Co., Doylestown	.....	.....	.....	1.00
Philadelphia & Westchester Trac. Co., Upper Darby	.....	0.76	.....	....
Pittsburgh Railways Co.	1.25	.....	30.00	1.00
Pottstown & Phoenixville Ry. Co.	.....	.....	1.25	....
Reading Transit & Light Co.	.....	.....	3.80	12.00
Schuylkill Railway Co., Girardville	.....	.....	1.00	....
Scranton Railway Co.	0.30	0.04	0.84	0.27
Stroudsburg Traction Co.	.....	.....	0.17	....
Westmoreland County R.R. Co., Pittsburgh	.....	.....	.....	1.00
West Penn. Rys. Co., Pittsburgh	.....	.....	3.05	0.34
Wilkes-Barre Ry. Co.	.....	1.00	.....	3.00
Valley Railways, Le Moyne	.....	.....	.....	4.00
Wisconsin				
Ashland Lt., Powr. & St. Ry. Co.	.....	.....	1.25	....
Beloit Traction Co.	.....	.....	2.00	....
Milwaukee Elec. Ry. & Lt. Co.	5.10	0.21	13.10	....
Wisconsin-Minnesota Lt. & Pwr. Co.	.....	.....	0.07	....
Wisconsin Public Service Corp.	1.92	.....	0.38	0.21
Wisconsin Rapids St. R.R. Co.	0.25	.....	.....	....
Total	30.33	21.52	242.52	72.09

South of the Ohio and East of the Mississippi River

Florida				
Municipal Ry. of St. Petersburg	1.02	.....	0.75	....
Pensacola Elec. Co.	1.83	.....	.....	....
Georgia				
Augusta-Aiken Ry. & Elec. Corp. of South Carolina	.....	.....	2.42	0.49
Brunswick & Interurban Ry. Co.	.....	.....	0.30	....
Columbus Elec. & Power Co.	.....	.....	0.50	....
Georgia Ry. & Power Co., Atlanta	1.24	.....	6.12	....
Rome Ry. & Lt. Co.	.....	.....	.....	0.25
Savannah Elec. & Power Co.	0.34	.....	.....	....
Kentucky				
The Cincinnati, Newport & Covington Ry. Co., Covington	.....	.....	0.43	....
Louisville Ry. Co.	.....	.....	7.04	....
North Carolina				
Asheville Power & Light Co.	.....	.....	2.00	....
Durham Public Service Co.	.....	.....	2.00	....
North Carolina Power & Lt. Co.	0.16	.....	0.27	....
North Carolina Public Service Co.	.....	.....	1.09	....
South Carolina				
Charleston Consol. Ry. & Ltg. Co.	.....	.....	1.17	....
Tennessee				
Chattanooga Ry. & Lt. Co.	1.56	.....	1.09	....
Chattanooga Traction Co.	.....	2.00	.....	....
Knoxville Power & Light Co.	.....	.....	2.62	....
The Memphis St. Ry. Co.	1.28	.....	1.69	....
Virginia				
Danville Traction & Power Co.	.....	.....	.....	0.14
Newport News & Hampton Ry., Gas & Elec. Co., Hampton	.....	.....	0.50	....
Radford Water Power Co.	.....	.....	2.62	....
Virginia Ry. & Power Co., Richmond	2.78	0.04	3.45	0.11

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Railway	Extensions, Miles City	Extensions, Miles Interurban	Rebuilt, Miles City	Rebuilt, Miles Interurban
West Virginia				
Charleston Interurban R.R. Co	.....	.....	1.14	5.00
Monongahela Pr. & Ry. Co., Fairmont	.....	.....	1.46	....
Ohio Valley Electric Ry. Co	.....	0.96	....	1.25
Princeton Power Company, Princeton	.....	.....	2.50	....
Tygarts Valley Traction Co., Grafton	.....	.....	1.00	....
Wheeling Traction Co	.....	.....	0.50	....
Total	11.17	2.04	43.93	5.99
West of the Mississippi River				
Arizona				
Tucson Rapid Transit Co	.....	.....	1.21	....
Arkansas				
The Pine Bluff Company	.....	.....	0.75	....
Southwest. Gas & Elec. Co., Texarkana	.....	.....	3.00	....
California				
Fresno Traction Co	3.50	.....	.....	....
Los Angeles Railway Corp	.....	.....	13.18	....
Market St. Ry. Co	.....	.....	4.50	....
Municipal Railway of San Francisco	1.69	.....	.....	....
Pacific Electric Railway Co	.....	10.22	11.04	4.31
Petaluma & Santa Rosa R.R. Co., Petaluma	.....	1.08	.....	....
San Diego Electric Railway Co	0.50	.....	6.57	....
San Francisco, Napa & Calistoga Ry. Co., Napa	.....	.....	0.19	....
San Francisco-Oakland Terminal Rys	0.54	.....	1.26	....
San Francisco-Sacramento R.R. Co	0.36	.....	0.03	9.00
Southern Pacific Co	.....	0.98	.....	....
Visalia Electric R.R. Co	.....	0.49	.....	9.66
Colorado				
Colorado Springs & Interurban Ry. Co	.....	.....	4.00	....
Denver & Intermountain R.R	.....	1.93	.....	....
Fort Collins Municipal Railway	0.28	.....	1.75	....
Southern Colo. Power Co., Pueblo	0.50	.....	5.50	....
The Western Lt. & Pwr. Co., Boulder	.....	.....	2.28	....
Idaho				
Boise Street Car Co	.....	.....	1.00	....
Iowa				
Cedar Rapids & Marion City Ry. Co	.....	.....	1.00	....
The City Railway Co	1.57	.....	.....	....
Clinton St. Ry. Co	.....	.....	2.50	....
Des Moines City Ry. Co	0.70	.....	2.00	....
Iowa Ry. & Light Co., Cedar Rapids	.....	.....	1.00	....
Keokuk Elec. Co	.....	.....	0.78	....
Mississippi Valley Elec. Co	.....	.....	0.85	....
Ottuma Railway & Light Co	.....	.....	0.64	....
Sioux City Service Co	.....	.....	1.51	....
Tri-City Railway Co., Davenport	0.33	.....	6.38	....
Kansas				
The Hutchinson Interurban Ry. Co	.....	.....	0.85	....
Salina Street Railway Co	0.13	.....	1.32	....
Louisiana				
Monroe Street Railway	.....	.....	0.69	....
New Orleans Public Service, Inc	2.87	.....	5.70	....
Minnesota				
Mankato Elec. Trac. Co	.....	.....	0.57	....
Twin City Rap. Trans. Co., Minneapolis	3.48	0.76	6.75	....
Wisconsin Ry., Lt. & Pwr. Co., Winona	.....	.....	1.37	....
Missouri				
Cape Girardeau-Jackson Int. Ry	.....	.....	2.00	....
Hannibal Ry. & Elec. Co	.....	.....	0.38	....
The Kansas City Railways Co	0.11	.....	1.68	....
The Missouri & Kansas Ry. Co	0.15	.....	.....	....
Springfield Traction Co	.....	.....	0.75	....
St. Joseph Ry., Lt., Heat & Pwr. Co	.....	.....	2.92	....
United Railways Co. of St. Louis	2.66	0.08	19.16	0.70
Montana				
Great Falls St. Ry	.....	.....	0.25	....
Nebraska				
Omaha & Council Bluffs St. Ry. Co., Omaha	.....	.....	9.96	....
Oklahoma				
Northeast Oklahoma R.R. Co., Miami	.....	13.53	.....	....
Oklahoma Ry. Co	.....	.....	1.80	....
Pittsburg County Ry. Co., McAlester	0.09	0.13	.....	....
Tulsa St. Ry. Co	.....	.....	0.75	....
Oregon				
Pacific Power & Light Co., Astoria	.....	.....	0.36	....
Texas				
Dallas Railway Co	1.53	28.05	0.27	....
Eastern Texas Elec. Co., Beaumont	0.42	.....	0.27	....
El Paso Electric Railway Co	0.29	.....	1.51	....
Houston Electric Co	5.30	.....	4.60	....
Northern Texas Tract. Co., Fort Worth	0.67	.....	1.20	....
San Antonio Public Service Co	.....	.....	2.34	....
Wichita Falls Traction Co	1.50	.....	.....	....
Washington				
Grays Harbor Ry. & Lt. Co., Aberdeen	.....	.....	0.01	....
Lewiston-Clarkston Tr. Co., Clarkston	.....	.....	1.50	....
Seattle Municipal St. Ry.	6.93	.....	3.04	....
Spokane United Rys	3.13	.....	0.97	....
Walla Walla Valley Ry. Co	.....	0.62	.....	....
Yakima Valley Transportation Co	.....	0.05	.....	....
Total	39.23	57.92	145.89	23.67
Outside the United States				
Alberta				
Lethbridge Municipal Ry	.....	.....	2.00	....
British Columbia, Canada				
British Columbia Elec. Ry. Co., Ltd., Victoria	2.21	.....	0.20	....
Nelson Street Railway Co	.....	.....	0.50	....
Manitoba, Canada				
Winnipeg Electric Railway Co	1.36	.....	0.88	....
New Brunswick, Canada				
New Brunswick Pr. Co., St. John, N. B.	.....	.....	0.47	....
Nova Scotia, Canada				
Nova Scotia Tramways & Power Co., Ltd., Halifax	.....	.....	2.00	....
Ontario, Canada				
The Cornwall St. Ry., Lt. & Pwr. Co	.....	.....	1.00	....
Dominion Power Transmission Co., Ltd., Hamilton	.....	.....	1.55	..
Kingston, Portsmouth & Cataraqui Elec. Ry. Co., Kingston	.....	.....	0.50	...
Kitchener & Municipal St. Ry. Co	2.00	.....	0.25	....
The London Street Railway Co	.....	.....	1.20	....
Niagara, St. Catharines & Toronto Ry. Co	.....	.....	0.75	....
Toronto Transportation Commission	27.72	.....	34.69	....
Quebec, Canada				
Hull Electric Company	.....	.....	0.17	....
Montreal Tramways Company	3.23	.....	10.76	..
Quebec Railway, Light & Power Co	1.08	.....	.....	...
Sherbrooke Ry. & Pwr. Co	0.11	.....	0.69	....
Saskatchewan, Canada				
Regina Municipal Railway	0.10	.....	.....	....
Saskatoon Municipal Railway	0.28	.....	.....	....
Total	38.09	.....	57.61	....

almost nothing during the last three years, but which gives every indication of becoming greater than ever in the next few years. In the table the mileage for track extensions has been separated between urban and interurban service since 1916. Previous to that date information for such a segregation was not available.

The large general table gives the single-track mileage for extensions and reconstruction by individual companies. Following our usual practice the various railways are alphabetically grouped by states, and the states are divided into five geographical districts to correspond with other similar tables in this issue. The group west of the Mississippi River has made more extensions of new track, but the group north of the Ohio and east of the Mississippi River has done more work in reconstructing old track. The information for this table was prepared from replies to a questionnaire sent to all railways in the United States and Canada. Approximately 750 companies replied. New York State has the largest mileage for track rebuilt with twenty-two companies reporting a total of 72.12 miles reconstructed. Sixteen companies in Canada report 57.61 miles of track reconstructed.

ELECTRIFIED STEAM LINES

	Extensions, Miles
British Columbia Electric Railway	8.15
Denver and Intermountain R.R	3.30
Lake Erie and Northern Railway (Ontario)	0.25
New York Central R.R	0.06
New York, New Haven and Hartford R.R	0.49
Southern Pacific Co	0.10
Total	12.35

Indicator Shows Location of Car

AN INGENIOUS "road guide" is being tried out on the Metropolitan Electric Tramways, Ltd., London, to indicate to passengers just where they are at any particular time. As described in the *Electric Railway and Tramway Journal*, this indicator is a box arrangement, some 36 x 14 in., containing a film or chart of the road being traveled. Midway along the glass dial is a pointer, which indicates to the passenger the exact position of the tram at all times. As the tram moves along the chart unwinds itself from one spool to another, and on this moving chart are printed all the features of the journey, such as streets, compulsory stops, museums, places of business, etc.; in fact, it keeps the passenger well informed at all stages of the journey.

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Association News & Discussions

Recent Air-Brake Developments

At Its December Meeting the New England Street Railway Club Devoted One Session to Discussion of Air-Brake Development, with Particular Reference to Recent Improvements in Traction Equipment

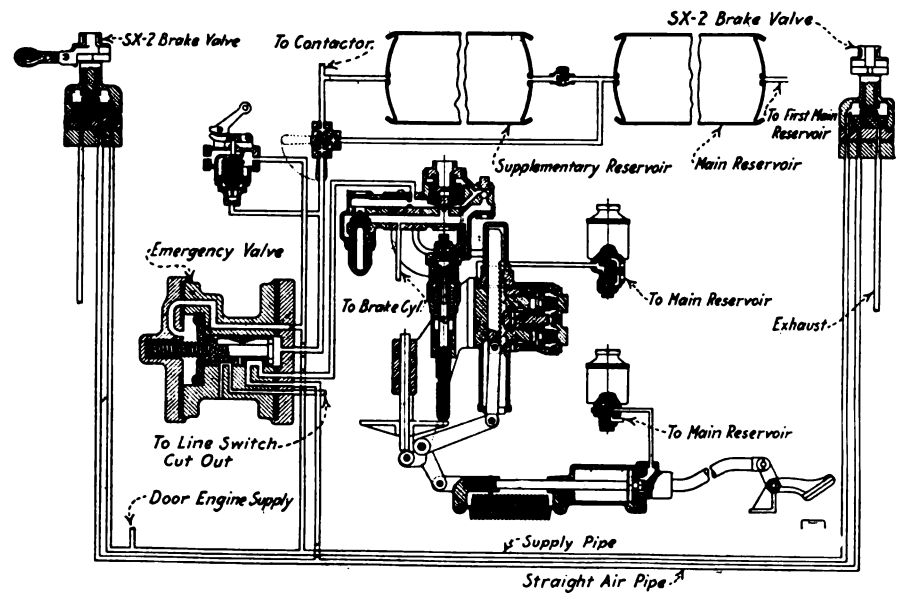
A COMPREHENSIVE paper, covering the whole field of air-brake development, in both the steam and electric railway fields, was presented at the December meeting of the New England Street Railway Club, held at the Engineers' Club and the Copley-Plaza Hotel on Dec. 14. The speaker was Joseph C. McCune of the New York office of the Westinghouse Air Brake Company. In opening his paper he said that many of those closely associated with the air-brake art feel that the subject of brakes is not given the consideration in the transportation industry that really belongs to it.

Mr. McCune pointed out that the air brake may be considered, first, as a safety device and, second, as a utility device. The importance of provision for stopping a car is so great that the ability of the air brake to bring this about has rather obscured its utility characteristics. By this he meant the effect on schedule speed, resulting from ability to stop a car quickly. Mr. McCune then gave a detailed statement of the history of the air brake, leading up to the variable-load brake. This was applied first on cars designed in 1914 for the subway service of the New York Municipal Railway, under the general supervision of W. G. Gove, superintendent of equipment.

This variable-load brake has as its basic element an automatic brake. The deflection of the truck springs corresponding to the passenger load on the cars is utilized to cause movements of various parts of the air-brake system so as to adjust the braking effort to the load on the cars. The reservoir volume by this means is changed as the load on the car changes. As a result the cylinder pressure secured from a given pressure reduction is made to correspond to the load on the car. In addition, limiting valves are used which limit the cylinder pressure obtainable to the proper value for whatever load the car may be carrying, and give a finer adjustment than is secured from the variable reservoir volume alone.

The newest development is an attachment to the braking equipment of surface cars, which may be added to straight air or semi-automatic brake equipment, so as to enable the loaded car to be braked to a greater degree than has hitherto been possible. The need for such an attachment originated in the recent development of light-weight city cars with a high passenger-carrying capacity.

In the late fall of 1921, said Mr. McCune, John Lindall of the Boston Elevated Railway was making studies of designs of surface and subway cars, both involving cars of low weight empty, but with high passenger-carrying capacity. From these studies it became evident that if the usual brake equipment were applied to these cars their full traffic capacity could not be utilized. Thus the variable-load attachment was developed.



Sectional Diagram of Air-Brake Equipment With Variable Load

The speaker said that the difficulty heretofore encountered has been that the air brake developed a certain retarding force which was based on an empty car weight, and was a constant force regardless of whether the car was empty or loaded. With straight air-brake equipment it might be possible to use a high reservoir pressure and depend upon the motorman to use in his brake cylinder only enough pressure properly to control the car. In actual service, however, it was not considered advisable to provide too high a pressure, because the motorman could not always be depended upon to use exactly the pressure needed for a particular load and therefore there would be a tendency to flatten the car wheels.

With semi-automatic equipment, or in any equipment when an emergency valve is provided, the control of the cylinder pressure obtainable in emergency valve is provided, the control of the cylinder pressure obtainable in emergency is taken away from the motorman. To prevent wheel sliding in an emergency application, therefore, it has been the practice to limit the maximum braking effort upon the empty weight of the car. This was all right with cars having a relatively low ratio of live to dead load. Where the ratio is high, however, the case is different.

Mr. McCune next described in detail the operation of the variable-load attachment, which was covered in an article in the issue of this paper for Sept. 16, page 934. This article dealt with the new light-weight one-man cars for the Eastern Massachusetts Street Railway, which were the first to which the new device has been applied. In summing up this part of his paper, Mr. McCune pointed out that with this device the braking effort is adjusted to the weight of the car by a mechanism which in effect weighs the live load. Advantage is taken of the fact that as the load on the car increases the body bolster approaches the truck transom through the compression of the truck springs.

Some of the advantages secured from the variable-load attachment were stated by Mr. McCune to be as follows: First, with respect to safety, its use makes it possible to stop a loaded car in a shorter distance than has heretofore been possible. Quicker stops are obtainable, not only when an emergency application is made, but also in service applications.

To illustrate the benefits to be obtained from quicker stops, he assumed the case of a car weighing empty 32,000 lb., in one case equipped with the usual brake apparatus and in the other with the variable-load apparatus added. Assume in each case a braking ratio of 100 per cent and a live load of

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100 passengers, or 14,000 lb. The loaded car without the attachment can be stopped from 20 m.p.h. in 9.6 seconds, while with the attachment it can be stopped in 7.4 seconds. With sixty stops per single trip the saving would be 132 seconds, or 4.4 minutes for a round trip. If the cars on an assumed line had a four-minute headway this would mean a saving of one car. It is true that the saving of 2.2 seconds could not be secured on every stop; moreover, it is possible only with a high ratio of live to dead load. The example, however, indicates the potentiality of the variable-load attachment for saving.

Other advantages of this device mentioned by Mr. McCune were: The cutting down of running time in order to increase schedule speed; the more uniform braking secured, and the ease of changing the adjustment of the limiting valve so as to vary the braking ratio on the car.

In conclusion the speaker mentioned also, as very recent developments in air brake equipment, the apparatus designed for gas rail cars as used in steam railroad service, and the automotive brake equipment as applied to trolley buses, auto buses, trucks, etc. These are special applications of straight air or semi-automatic equipment.

Central Association to Meet in Louisville on Jan. 18 and 19

THE program for the C. E. R. A. has been announced by Secretary L. E. Earlywine as below. The meeting will be held at the Seelbach Hotel, in Louisville, Ky., on Thursday and Friday, Jan. 18 and 19. The Interstate Public Service Company has arranged to furnish a special car to be operated between Indianapolis, Ind., and Louisville on Jan. 17, leaving at 3 p.m. and arriving at 6:45 p.m. The car will return on Friday at a time to suit the convenience of the passengers.

THE PROGRAM

THURSDAY, JAN. 18, 9 A.M.

Meeting of Executive Committee

Morning Session, 10 a.m.

Report of Secretary and Treasurer and Appointment of Convention Committees.

Presidential address by S. W. GREENLAND, general manager Indiana Service Corporation.

Address on "The One-Man Car and Economic Need" by C. E. MORGAN, general manager Brooklyn Rapid Transit Company.

Discussion led by Mr. Greenland, E. M. Walker, and G. T. Seely.

Address on "Publicity" by ARTHUR KROCK, managing editor *Courier-Journal-Louisville Times.*

Discussion led by E. R. Kelsay and W. H. Sawyer.

Afternoon Session, 2 p.m.

Meeting of the Engineering Council, Harry Reid, president, Interstate Public Service Company, Chairman. Report of the chairman.

Paper on "Emergency Stops" by H. C. DECAMP, assistant general manager, The City Railway, Dayton, Ohio.

General Discussion

Paper on "Operation of High-Speed, Light-Weight Interurban Cars" by E. B. GUNN, superintendent of transportation & equipment Western Ohio Railway.

General Discussion

Papers on "Full and Semi-automatic Versus Manually Operated Substations for Electric Railways," by C. A. Butcher, general engineering department Westinghouse Electric & Manufacturing Company, and C. M. Davis, railway engineering department General Electric Company.

General Discussion

Address on "Co-operation between Sectional Associations and the American Electric Railway Association by W. H. SAWYER president East St. Louis Railway.

Annual dinner for members, Safety Hall, Louisville Railway, 6:30 p.m. Dinner for ladies, Pendennis Club.

FRIDAY, JAN. 19, 9 *a.m.*

Paper on "Use of the Interurban Bus" by G. T. SEELY general manager Pennsylvania-Ohio Electric Company.

Paper on "City-Bus Operation," by A. C. BLINN, vice-president and general manager, Northern Ohio Traction & Light Company.

General Discussion

Paper on "The Safety Chairman, His Duties, His Authority, His Responsibilities," by N. W. FUNK, safety chairman, Louisville Railway.

General Discussion

Address on "Modern Regulatory Franchises," by CHURCHILL HUMPHREY, assistant general counsel, Louisville Railway.

General Discussion

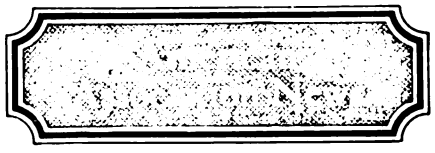
Address on "Marketing Your Own Commodities," by R. H. WYATT, general superintendent, Louisville & Interurban Railroad Company.

General Discussion

Unfinished business, report of committees, and election and installation of officers.

New Name for Southwestern Association

EFFECTIVE Jan. 1, 1923, the name of the association previously known as the Southwestern Electrical & Gas Association is changed to Southwestern Public Service Association. The office remains Slaughter Building, Dallas, Tex. The 1923 convention will be held in Fort Worth, May 15 to 17.



Banquet in Washington

APPLICATION blanks will be sent out from association headquarters next week to be filled out by those who wish to attend the banquet to be held on Feb. 16 at the New Willard Hotel, Washington.

The committee in charge of the program for the midyear meeting on Feb. 16 is completing arrangements for the program but is not yet prepared to make a definite announcement as to who will present addresses. It will be remembered that the general topic to be considered in the morning session is that of public utility regulation and in the afternoon session that of taxation of public utilities.

Educational Committee Announces Plan

THE American Association committee on education has addressed a letter to member companies outlining the first step in the year's activities. The committee first points out that there are three fundamentals in the educational problem, as follows:

1. Vocational training of employees.
2. Education of employees for responsibilities of advancement in railway work.
3. Co-operation with educational institutions to assure a supply of capable recruits for the industry.

It then asks for the appointment of an official on each property to organize the educational work along these lines and act as a connecting link hereafter between the company and committee.

American Publicity Committee Meets

THE joint meeting of the publicity committee of the American Electric-Railway Association and the subcommittee on information of the Committee of One Hundred was held in New York Jan. 3. Those in attendance were C. D. Emmons, F. R. Coates, B. C. Cobb, Barron Collier, P. H. Gadsden, Henry R. Hayes, J. W. Welsh and Labert St. Clair. The purpose of the meeting was to review the work of the publicity department of the advertising section of the association and to lay out plans for the future. Recommendations will be prepared by the two committees in regard to future work, and they will be presented to the Committee of One Hundred.

Special Reports Available

THE American Association announces the preparation of the following special reports which are available to members in good standng:

Public Utility Laws: A summary of the laws creating the state public utility commissions, giving an analytical digest of the main provisions covering their jurisdiction and powers over transportation companies. This is the eighth and last installment of this compilation, which was begun last June.

Wages of Employees Other Than Trainmen: Gives wages paid shop, barn, overhead line, way and power house employees by more than 150 electric railway companies.

One-Man Car Operation: Summary of the replies to the Association's questionnaire on the subject, showing the number and types of one-man cars operated, fare collection methods, accident record and attitude of public toward operation with one man.

State Motor Vehicle Laws: A tabulated statement prepared by the Motor Vehicle Conference Committee showing annual state taxes and fees on motor vehicle operation and size and weight restrictions in state motor vehicle laws.

Electric Railways Operating Motor Buses: A list of fifty-eight companies operating bus routes, showing length of route, number of vehicles, type of vehicle, fare charged, method of collection, transfer arrangements, etc.

Supplement to Weekly Pass Compilation: Gives data on three additional companies received too late for inclusion in Nov. 1 compilation.

In addition to the above, supplements to the "Wage Bulletin," the "Fare Bulletin" and "Cost of Living Studies" have been prepared, bringing them down to date.

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The News of the Industry

Outline Construction Activities of 1922—Surveys Outlook for 1923

Robert M. Feustel, president of the Indiana Service Corporation, Fort Wayne, Ind., has issued a statement reviewing the construction and service activities of the past year, and giving a few views on the outlook for the coming year. He says that $800,000 was spent on construction work and of this all but $125,000 was spent in Fort Wayne.

Excerpts from his statement follows:

The new substation for city railway and light and power purposes at Webster and Melita streets afforded the greatest individual improvement in service to our patrons. This station, which cost $150,000, enabled the company to raise the voltage on all city railway lines so that the improved power conditions could be had at the ends of all the city lines. This has assisted materially in maintaining the new and faster schedules with an increased number of cars on the lines. This substation has also permitted the company to hook up the underground power lines which serve the downtown merchants from the south side.

This substation-expenditure is just a sample of the construction costs which must be met by a utility company purely in the interest of better service.

Fifteen new cars of the improved type, with air controlled doors and up-to-date devices, were ordered last spring for November delivery. The first six of these cars arrived six weeks late and were recently put in service. The remaining nine cars are en route between St. Louis and Fort Wayne and will be put into service within the first week of the new year. The cost of these fifteen cars was $120,000. The increased riding this winter will require the use of the new cars and every other available car for city service.

Power station changes comprised the installation of a new 6,000 kw. 60-cycle generator. The company is in the midst of changing all the interurban substations over to 60-cycle plants so that all of the small towns which are served with light and power can have advantage of the modern 60-cycle equipment instead of the 25-cycle service which was in vogue when these interurban lines were built.

Of the pass Mr. Feustel said:

One of the service items which did not require construction money but which proved to be of great value to our patrons was the installation of the dollar weekly pass. This was put in the last of February for a six months' trial and has proven so popular that it will probably be continued indefinitely. It is of interest to the Fort Wayne patrons to know that while Fort Wayne was the second city in the country to adopt this pass, more than twenty cities now have a weekly pass which is being sold for $1 to $1.50 depending on local conditions.

He outlined the needs and requirements for the year 1923 saying that the demands for additional facilities were staggering. The growth of the city including its industrial developments was responsible for these needs. In conclusion he said the only problem would be how to get the construction money.

Votes Down Service at Cost and Municipal Ownership

Both the service-at-cost contract and the purchase by the City of Ottawa of the Ottawa (Ont.) Electric Railway were defeated by the public on Jan. 1. During the past year the railway company has been negotiating with the City of Ottawa for an extension of its franchise.

The questions on which the people voted were whether the city should sign an agreement for a new franchise allowing a flexible rate of fare and a guaranteed return of 7½ per cent to the company on $4,500,000 and on $500,000 to the city, which was the city's equity in the road, or whether the city should buy out the Ottawa property and assets for $4,500,000 and have it operated by an independent commission. As a result of the vote no additions to the plant or equipment are contemplated in 1923. The questions at issue were dealt with previously in the ELECTRIC RAILWAY JOURNAL.

Hydro Radials Voted Down

By a majority of 5,245 votes Toronto, Can., rejected on Jan. 1 the agreement to give a free six-track right of way on the city's waterfront for provincial Hydro-commission radials. However, a proradial board of control was elected by a small vote.

Mayor Maguire, the champion of the agreement, was elected mayor for 1923, over R. J. Fleming, who led the anti-waterfront forces, by a majority of 840 in a total poll of over 80,000, the largest ever recorded in Toronto. The 1922 board of control, were all re-elected with the exception of Controller Russell Nesbitt. An unusually large number of new men were swept into aldermanic seats on the crest of the anti-radial agreement wave in the business wards.

The old council endorsed the agreement in September last by 18 to 10, with one alderman absent through illness, while the new council stands 16 to 13 for the agreement. There will probably be no advocacy for the present agreement however, since the ratepayers have disposed of it, though the vote does not preclude the council from entering into new negotiations.

The electors also seemed to think that Fleming, who was manager of the Toronto Street Railway up to the time of its transfer to the city sixteen months ago, and is said to be a stockholder, might, if elected mayor, be in a position to influence the city's action on the award for the car system which will come before the 1923 Council.

During the campaign the antis emphasized that they were not opposing radials, but only the agreement between the city and the commission, which, it was contended, gave too much. The right to collect fares within the city and thus compete with the city's own system and the underground franchise to the heart of the business district particularly were regarded as objectionable.

In Hamilton, Ont., the hydro radials were also defeated. The result was not unexpected. Guy Long was elected hydro-commissioner and the hydro radials by-law was rejected by 1,200.

Subscribed Fund to Be Returned

Arrangements for the return of a fund of $25,000 subscribed by persons living along the line of the abandoned Springfield, Troy & Piqua Railway, to the subscribers has been made by Judge John E. Sater of federal district court. The fund was subscribed some months ago when promoters sought to organize a new company to take over and operate the traction line. The project failed, however, and the property was sold to the Schonthal Company of Columbus which has taken steps to junk it with the exception of a strip between Springfield and Maitland which may be taken over by a local company to be used for switching and transfer purposes.

The court ordered the payment of taxes due Clark, Champaign and Miami Counties by the traction company, to be made out of the sale price. The penalty. however, was eliminated by the court. The taxes ordered paid amounted to $10,029 plus a penalty of $700, covering a period of four years, and are against personal and real property of the company.

The transmission lines of the company have been sold to the Springfield Light, Heat & Power Company, and will be left standing. They will be used to supply electricity to towns along the route by the Springfield company.

Railway's Value Again Being Disputed

G. F. Fisher, Mayor of St. John, N. B., has notified the Investment Bankers' Association of America through Henry R. Hayes, chairman of the committee on public service securities of that association, that he does not wish to discuss further the matter of arbitrating the dispute between the city of St. John and the New Brunswick Power Company. He has instructed Mr. Hayes that he wishes the latter to direct all communications to the City Council and not to himself, as Mayor of St. John. In reply Mr. Hayes has advised that he would rather communicate with the Mayor and not the City Council.

Mayor Fisher has stated that the city will not offer more than $2,577,665 for the company's property. According to him, at least $1,000,000 would be needed to put the railway into first-class condition. Representatives of the company say that the railway property is now in good shape.

Mr. Fisher reiterates his refusal to submit the dispute over the price to arbitration. He states the city has made its offer and the offer has been refused by the company. The Investment Bankers' Association of America is making an effort to reopen the negotiations and on Jan. 10 a delegation of the association will be heard by the City Council of St. John.

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New Governor for Home Rule

New York Executive Declares for City Instead of State Control of Purely Local Utilities and for Municipal Ownership—Cities Should Be Free to Adopt Any Form of Transit

GOVERNOR SMITH of New York in his inaugural message delivered to the Legislature on Jan. 3 made recommendations for "home rule" of utilities and sweeping changes in the public service commission law along the lines which have been predicted and have already received much publicity. He also made reference to the water powers of the state, postponing his direct advice on this matter till later in the legislative session.

The Governor said that probably no political principle has received so much statewide discussion as the question of a greater grant of power by the State to municipalities over such things as are wholly local. In his opinion the cities of the State today, and particularly New York City, find themselves restricted by what is really a charter of limitation. The phenomenal growth of the cities brings up constantly for settlement new problems that in his opinion the city should be left free to determine without interference by the State. He said in part:

The Legislature of 1921 passed an amendment to the Constitution to bring this about which is now pending before your honorable body for passage the second time. If, in your judgment, this amendment accomplishes the purpose it should promptly pass. If objections raised against it are of a minor nature it might be well to pass it any way and then start the legislative machinery again looking to further amendment that will cure any defect to which any real objection has been made. I make this suggestion having in mind the delay of the whole proposal that would occur through an entirely new initiation. Whatever action is taken on the present amendment at this session, I suggest for your consideration the initiation of a new amendment that would give to the communities of the State that full degree of local self-government which they are demanding and to which they are justly entitled. As this is a matter exclusively for the Legislature and the people themselves, I leave that matter for determination by your honorable body.

Illustrative of this whole principle has been our treatment of the subject of control of public utilities.

About thirty years ago, the State, through a commission named by an act of the Legislature, provided for the construction of subway railroads in the city of New York.

In 1907 that commission was abolished by the enactment of the public service commissions law and its duties transferred to the Public Service Commission. The new commission exercised supervision over construction and also regulatory powers as to character of service and certain supervision over the issuance of bonds or certificates of indebtedness of any kind.

In 1919 the Public Service Commission for what was known as the First District, which was New York City, was radically changed by separating regulatory powers from supervision of construction and provision was made for a single commissioner with regulatory powers and a single commissioner to supervise construction.

In 1921 the two single-headed commissions for New York were abolished and there was created in their place a single commission composed of three commissioners. This commission, known as the Transit Commission, was given power to propose routes and supervise new construction. In addition, it was given certain powers of regulation among which was the right to fix the fare, although the fixation of the fare had, prior to that time, been a matter of contract between the city of New York and the operating companies. Power was also lodged in the State to cancel contracts between municipalities and public utility corporations. This enabled the Transit Commission to nullify contracts under which the city by investment of its own funds had secured the agreement of the railroad company to a 5-cent fare. I need hardly tell you of the violent storm of opposition that came practically from a united press and from the great majority of the people when the State divested the municipality of power over her own contracts.

Rapid transit construction is purely a municipal enterprise and a municipality is not assisted by the State in its conduct of this activity in the slightest degree. In every other municipal activity the city of New York has always enjoyed a free hand to work out the will of her citizens through her own elected officials, as for example when the Legislature empowered the city of New York to bond itself for $150,000,000 in order to provide an adequate water supply. The State granted an extraordinary power to the municipality in giving it the right to go outside of the city's corporate limits and condemn property for the purposes of a water supply.

Naturally the people are unable to understand upon what theory the State undertakes to supervise the construction of its subways. They are wholly within the limits of the city. They are paid for entirely by the city and they do or will in time belong to the city and cannot be considered as anything other than a purely municipal enterprise.

The Public Service Commission of the State exercises regulatory powers over all public service corporations, except railroads within the city of New York. In the fifteen years that have passed since the organization of the two public service commissions, we have had fifty-four commissioners and the Public Service Commission has not yet succeeded in being much more than an object of political patronage. I think that I am within the truth when I say that the theory in itself never commanded a great amount of public respect. It makes little difference upon what you predicate it. The people in cities are unable to understand why the State interferred with the things that they believe to be local to themselves.

In the last reorganization of the State Public Service Commission in 1921 the people of the State found that the control that they exercise over their own public utilities through their franchise agreements was taken away from them and vital portions of the contracts were nullified and the powers formerly exercised by the cities were transferred to the Public Service Commission. No defense can be made of this as it constitutes an absolute denial of self-government and home rule in the matter of contracts in all the cities of the State. The Public Service Commission is merely the agency of the State for the exercise of police power. There is no reason why the State should not select a municipality as its agent. To my mind we would get a better result.

In a democracy the people want the kind of government that suits the majority and not the kind that squares with some principle that has in all probability outgrown its usefulness.

In this connection the Governor said that the people are thinking more about their public affairs than they did some years ago and the State can make no mistake by selecting the elected officials of the cities to determine questions that have to do with the welfare of the municipality, such as proper regulation of its public utilities. He then continued:

The people of the State, in the fundamental law have granted to cities throughout the State exclusive power to pass upon any proposal to lay down railroad tracks. Where this power rests all other power should rest with it to the end that there may be no division of responsibility. It is obvious, therefore, that no State commission can take any action looking to the construction of additions to our subway system or railroads in other cities without the consent of the cities. No proposal by a State commission can result in actual construction unless that proposal receives the approval of the city. This divided power has resulted in complete deadlock, which can be broken only by placing the statutory powers in the municipalities which already has the constitutional powers necessary for authorizing construction. You cannot give the constitutional powers inherent in the city to a State commission and, therefore, in my judgment, it is necessary to give the city the statutory powers also. Not only do I believe that all jurisdiction over the construction of rapid transit railroads should be given to the local authorities, but I also believe that they should have delegated to them the State's police power of control over all public service corporations operating within their corporate limits.

There are certain public utilities that are not within the confines of a single city, as their operations are either between cities or state-wide. As to these utilities the State must retain its powers of control and regulation.

It may also be that some of the cities of the State may be unwilling to assume the obligations of regulation. We must not force it upon them, as that would again constitute an interference with home rule. We might, in such cases, say that should a city by resolution of its Common Council and, in the case of the City of New York, by its Board of Estimate and Apportionment, or after referendum to its people, petition the State to perform its regulatory service for it, the State should do it through its Public Service Commission. If a city decides to carry out its own regulation, it should be left free to bring into existence by local ordinance the board, commission, bureau or agency to perform this service.

In order to carry out this policy it is the opinion of the Governor that the present Public Service Commission should be abolished and power given to him to appoint not more than three commissioners to regulate such utilities as will not be regulated by the cities, either because they operate outside the corporate limits of a city or because the city may, by proper resolution, request the State to do it. In this connection he recommended:

1. That in the preparation of the legislation to abolish the present Public Service Commission the power heretofore held by cities over the terms of their franchises be returned to them, where it belongs.

2. That the Transit Commission in the City of New York be abolished and all its power with regard to the laying out of routes and supervision of construction be transferred to the Board of Estimate and Apportionment, to be exercised by this body through any agency which it may select. Its regulatory powers should be restored to the Public Service Commission Act which will contain the provision that a city may be the agent of the State for carrying out these powers unless it should, by proper resolution, request the State to relieve it of the duty.

In conclusion the Governor said:

Directly in line with this program is the municipal ownership of public utilities.

Public utilities have become so essential to the life of our great cities that the cities themselves should be permitted to purchase, build, own or operate them when a municipality determines this to be in its best interest.

As far as transit is concerned the cities should be free to adopt any form of conveyance found suitable to their needs, whether it be railroads or omnibuses. This is not the introduction of any new and untried principle in government. New York City now owns railroads and owns and operates ferry boats. I am simply asking for an extension of the principle to all the utilities and for all other cities.

To the people themselves, as distinct from their organized communities, certain political rights and privileges of which they have been deprived, should be restored.

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$24,000,000 Construction Program

Roads in London Plan to Expend This Amount in Addition to Similar Sum Now Being Spent—Important Plans Under Way for Linking Up Lines

THE London underground electric railways have announced a further scheme of developments, which if carried out are estimated to cost more than £6,000,000. This is in addition to the new works now under construction, which will cost a similar amount. The notices which were given in the latter part of November show that in the 1923 session of Parliament the London Electric Railway and the City & South London Railway intend to promote bills to authorize them to carry out the new scheme. This means the development of a policy which has already been partially carried out, namely, the extension of the "tube" railways through the outer suburbs, the connecting of them with surface lines in the country round, and the interconnecting of the "tubes" themselves so that through trains may be run from one to another.

Tunnels Being Widened

The tunnels of the City & South London Railway are at present being widened to approximately the same diameter as those of the other railways. At the same time a junction line is being formed near Euston to connect this line with the Charing Cross & Hampstead Railway. Further, a 4½-mile surface extension from Hampstead to Edgeware is now being built. This will enable trains to be run from Edgeware in Middlesex through the City of London to Clapham, a southern suburb —a total distance of about 12 miles. The new proposal is to extend the City & South London Railway for 6 miles southwest to Norden in Surrey, where a junction will be formed with the authorized Wimbledon & Sutton Electric Railway. When the latter is built it will be possible to run through trains from Edgeware in the country north of London to Sutton in the country to the south of it, a distance of about 22 miles.

The other proposed extensions are shorter, but they are important connecting links. In order to provide for the City & South London Railway a connection with the fashionable West End it is proposed to continue the Charing Cross & Hampstead Railway south from Charing Cross to a junction with the City & South London Railway at Kennington, south of the Thames, a distance of about 2 miles. Junctions will be constructed near Waterloo Station (on the south side of the Thames), by means of which Baker Street & Waterloo Railway trains also can be run to Kennington and thence on to the City & South London line. As at present through trains are run from Watford in Hertfordshire over the electric lines of the London & North Western Railway on to the Baker Street & Waterloo Railway at Willesden and thence by that line to Waterloo, it will be possible, if desired, to have through trains from Watford to Sutton, a distance of 30 miles. In any event, train services will be provided between Sutton in Surrey and both the City and the West End.

The anticipated large increase of traffic will require station developments in the central area, and accordingly it is proposed to build a new station at Piccadilly Circus under the roadway with staircases giving access to all points in the Circus. Escalators will connect direct to the station platforms on the Baker Street & Waterloo Railway and the Great Northern & Piccadilly Railway, which cross one another (at different levels) at this point. At Leicester Square Station (where the Hampstead Railway crosses the Piccadilly Railway) additional lifts will be installed.

At Waterloo Station elaborate interchange facilities will be provided between the Baker Street & Waterloo and the Hampstead lines, while escalators will enable passengers rapidly to reach the street and the Waterloo terminal station of the London & South Western Railway, which at this particular location is an elevated line.

From a railway construction point of view, one of the most important of the London underground development schemes is the linking up of the City & South London Railway with the Hampstead line between Burton and Camden Town. This junction must provide for the City & South London Railway trains and the trains of both Golder's Green and Highgate branches on the Hampstead Railway. On a flat junction it would be impossible to accommodate the trains of all three lines without serious delay occurring, but an ingenious system has been planned by which the tracks of one line will be carried over or under the tracks of another with the result that just south of Camden Town, where the lines converge, there will be six separate "tubes" within a very short distance of each other.

$500,000 in Improvements

Extensive improvements and betterments in the properties of the El Paso (Tex.) Electric Railway will be started at once, according to Alba H. Warren, general manager, and J. Frank McLaughlin, superintendent. These two officials have just returned from Houston, where they conferred with Luke C. Bradley, district representative of Stone & Webster, and secured Mr. Bradley's approval to the program of improvements to be made in the El Paso lines. Several extensions will be built, new cars purchased, an addition made to the power plant, and the lines in El Paso put in first-class condition. More than $500,000 will be spent by the railway company in making the improvements.

Another Development on Ruling on Passenger Terminal

The California State Railroad Commission has announced that it will attempt to obtain a rehearing before the California State Supreme Court, whereby the court annulled the commission's order directing the steam road and electric interurban lines entering Los Angeles to provide a joint passenger terminal.

If the Supreme Court's ruling is upheld, the commission declares it would initiate proceedings before the Interstate Commerce Commission with a view to bringing about the co-operative erection of the terminal. The Supreme Court's decision in effect conceded the commission's power to order elimination of grade crossings, but held that the commission did not have jurisdiction in cases involving terminal facilities.

With the proposed union terminal project annulled by the State Supreme Court, the only feasible and comprehensive plan for a joint station and for elimination of traffic congestion in Los Angeles is the immediate adoption of the elevated railway and joint passenger scheme of the Union Pacific, Southern Pacific and Pacific Electric Railways. This was the statement of Frank Karr, vice-president and chief counsel of the Pacific Electric Railway, who announced that every effort will be made by the railway interests to have the project immediately approved by the State Railroad Commission. This plan, which was first announced in 1917, provides for an expenditure of more than $10,000,000 by the three railway concerns in the following manner:

> The Pacific Electric Railway to provide elevated railways to connect its Main Street passenger terminal with Fourteenth and Alameda Streets, passenger station of the Southern Pacific Lines at Fourth Street and Central Avenue, Los Angeles River and Ninth Street and Macy Street.
>
> A joint station to accommodate both the Union Pacific and Southern Pacific lines will be erected on a downtown location.

Officials of the Pacific Electric Railway declare that if the scheme is adopted all through passenger and freight trains, as well as light engine movements, on Alameda Street will be eliminated.

The plan will also make possible the elimination of all grade crossings along the Los Angeles River and provide adequate terminal station for the Union Pacific and Southern Pacific, with convenient transfer at such stations to and from the Pacific Electric interurban trains.

The joint plan, if carried out, will give immediate relief to interurban and suburban traffic of the Pacific Electric lines reaching all the territory to the north and east via Aliso Street and to the south along Long Beach Avenue.

If the project is approved by the State Railroad Commission the sanction of the Interstate Commerce Commission will then be obtained and the next step will be the filing of an application with the city of Los Angeles for a franchise to construct the elevated system over public streets.

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Mayor Discusses Transit

Acting Head of City of Detroit Says Existing Transit Facilities Should Be Doubled

That regardless of the management of Detroit's (Mich.) Municipal Street Railway system, there will always be congestion as long as surface lines alone are depended upon for transportation in Detroit was the opinion expressed by Acting Mayor John C. Lodge, Mayor Couzens' successor, in discussing plans for a rapid transit system and the question of appointing a man to give his entire time to the management of the street railway system as proposed by members of the Detroit Board of Commerce. According to statements attributed to Mr. Lodge, with the present system operating on a 100 per cent basis and all possible cars in operation, the city would still lack 50 per cent of the necessary transportation facilities.

Congestion Still Prevails

He further outlined that the street railway system is operating as efficiently as possible but congestion still prevails during the rush hours and what is needed is a subway system to get away from existing conditions. No immediate relief is looked for inasmuch as several years would be required for the construction of a rapid transit system.

For the month of November, last, the Detroit Municipal lines showed a profit of $91,768 or slightly less than for the month of October. The decrease in net earnings is attributed to the increase in operating expenses because of the cold weather. The maintenance program was kept up during November, which increased the expenditures for the month.

The semi-annual payment of $500,000 due the Detroit United Railway next June has been paid in advance in order to save the interest on that amount. The department, in making the payment in advance, took the money from the reserve accounts that are set aside in a separate bank account obtained from the pro-rata monthly charge to operations covering deferred obligations—money that could not properly be used for other purposes. This was not a question of "robbing Peter to pay Paul" but simply using in advance the money that was intended for the purpose, and thereby creating a saving of approximately $9,000 in the interest earned.

Board Continues in Control

According to the present plans the street railway department will continue to be operated and managed by the three-man board of street railway commissioners, and it has been announced that at the end of a thirty-day period, the subject of management will again be considered.

Plans are being considered for the municipal construction of street cars, a large amount of equipment and material having been taken over by the city when the property of the Detroit United Railway was acquired. The Peter Witt cars ordered by the city last year are being delivered and put into operation as fast as they arrive in the city.

The motor bus line operating on Lynch Road and Mt. Elliott Avenue as a convenience to residents in the section not served by street cars, although operating at a loss will be continued by the Municipal Railway Department. The loss for the last eleven days in November after the service was started by the city on Nov. 19, amounted to $265.

Small Property Makes Fine Showing

At a meeting of the directors of the Charlottesville & Albemarle Railway, Charlottesville, Va., the regular semi-annual dividend of 3½ per cent on its preferred stock was declared, while a 5 per cent with an extra 1 per cent was declared on the common stock, making 10 per cent for the year on the common, which paid 4 per cent June 30, 1922. Both dividends were paid Dec. 21, so that the stockholders had the use of the dividends for Christmas.

The company had a net surplus for the eleven months ending Nov. 30, 1922, after the payment of all fixed charges, including dividend on preferred stock, of $85,104.

Christmas gifts of five new crisp $5 bills were made to each employee regardless of how long he had been employed. A letter from the president John L. Livers, accompanied each gift, thanking them for their co-operation during the year.

The company was 100 per cent free of accidents of any kind during the year. It is one of the few electric railways which did not change its rate of fare from 5-cents, even during the war, and its traffic has increased rapidly in spite of the increasing number of automobiles in Charlottesville.

An additional turbine of 1,500 kw., was installed and paid for out of the earnings during the year. The company also purchased thirty of its $1,000 first mortgage bonds.

The company operates 3.5 miles of road with nine cars and does general lighting and power business.

Progress Noted in Ten Years Operation

The tenth anniversary of the opening of the San Francisco (Calif.) Municipal Railway was celebrated by officials and employees of the company on Dec. 28. The progress in the ten years operation is noted in the statistics of the property. At the start the system consisted of 10 miles of single track, ten cars and seventy-five employees. The city now owns 67 miles of trackage, divided into ten routes, and two bus lines, 209 cars and includes 1,050 employees.

According to Mayor Rolph, the valuation of the system is $7,150,000 and up to Nov. 1, 1922, a total revenue of $20,412,000 had been paid by the users of the city's lines.

Seek Permanent Relief from Massachusetts Excise Tax

A committee has been formed by the street railway companies of Massachusetts to put before the new Massachusetts Legislature their proposition for a permanent exemption from the provision of the so-called excise tax. This tax was temporarily removed from being operative on street railway companies during the years 1920 and 1921, when the companies in that State were so handicapped by adverse financial circumstances. The abatement was then further extended to April, 1923. The Boston Elevated Railway, due to its special charter, has never been under the provisions of this tax and it is the only street railway at present not concerned with this legislation.

In the last few years several fact-finding and investigating committees of the Legislature, as well as the Public Utilities Commission, have gone on record as favoring the abolition of the excise tax so far as applied to electric railways in that State. It has been pretty clearly demonstrated to the public and to the legislators that such a tax is merely an added burden on the car-riding public, which results either in increased fares or diminished service.

The committee which has been formed is now doing missionary work among the Boards of Trade and Chambers of Commerce in the various communities in which the street railway companies operate. They hope to create a sufficient public sentiment to point out to the new Legislature the advisability of permanently removing the street railway companies from the operation of this tax.

Kept Public Informed in 1922

What the Ohio Committee on Public Utility Information accomplished in its second year toward building a better understanding between the people and the utility industry in Ohio is told in its pamphlet report entitled "Informing the Public and Gaining Its Support."

The Ohio committee was formed two years ago. Its publicity activities are in charge of Benjamin E. Ling. The report for the second year tells how group co-operation in that time has promoted better public relations. In 1922 102 utility companies actively supported the Committee, against thirty-nine supporters in the first year of its existence. The fact that Ohio newspapers gave their interest and support to the committee's activities is evidenced by the fact that 290 papers in 187 different cities and towns used 22,958 column inches, approximately 1.148 solid columns of the material sent out during the year, mainly in the committee's weekly *News Bulletin*. In the first year these figures were 16.584 and 830 respectively. Another method of learning about fair play for the utilities was the public address which 20,000 business men heard. Under the auspices of the Ohio committee eighty-six public talks were delivered before civic organizations during the year just ended.

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Montgomery Purchase Negotiated

Local Chamber of Commerce Behind Proposal Under Which Alabama Power Will Take Utilities

The Alabama Power Company will take over the street railway system of Montgomery, the two lighting companies and the gas service when its purchase of the properties is approved by the Public Service Commission. Thomas W. Martin, president of the Alabama Power Company, announced at Montgomery on Dec. 28 that negotiations for the purchase of the properties had been concluded following the indorsement of the proposal by the Montgomery Chamber of Commerce, and other interests of Montgomery, and that an application for the approval of the purchase would be submitted to the Public Service Commission.

No statement was made regarding the purchase price. The announcement of the purchase subject to the approval of the Public Service Commission was made following a meeting of the Chamber of Commerce, which resulted in the unanimous indorsement of the proposal. The Montgomery Light & Traction Company and Montgomery Light & Water Power Company, which control the street car service, lighting service, power service and gas service, have been administered by the bankrupt court for several years through S. B. Irelan, receiver of the two companies.

The Chamber of Commerce of Montgomery initiated the negotiations several months ago, according to announcement, as a result of many inquiries from companies which desired to locate in this territory if adequate electric power could be provided. W. F. Black, secretary of the Chamber of Commerce, told the conference of members of the organization that several concerns have recently sought to enter this territory, but had found the power rates on some classes of industry would not compare favorably with other parts of the South. He said this would be changed under the rates of the Alabama Power Company.

Thomas W. Martin, president of the Alabama Power Company, and Col. R. A. Mitchell, vice-president, in talks to the members of the Chamber of Commerce told of the negotiations for the purchase of the property which had been started as a result of the demand for additional and less expensive power. Colonel Mitchell said the power company has an organization adequate to care for the power and lighting needs of the Montgomery territory as well as the gas and street railway service, and that certain important changes in the service would be made which would be of public interest.

Following addresses of various members of the Chamber of Commerce a resolution was unanimously adopted "expressing the view that it would be to the interest of the district to have the Alabama Power Company take over the utilities and offering the co-operation of the Chamber of Commerce in working out any further details."

Service Discontinued

The prolonged controversy between the city administration and the South Carolina Gas & Electric Company, Spartanburg, S. C., reached a crisis on Dec. 31 when the company discontinued all car service without notice. The cars did not leave the carhouse at all that day. The company issued a statement in the form of an advertisement reciting its efforts to reach an agreement with the city and stating that "it has become imperative to discontinue operating the railway, at least for a time." Apparently the city officials were without any notice of the company's intentions. Following the discontinuance of the cars, Mayor John F. Floyd declined to make any statement.

The South Carolina Gas & Electric Company is successor to the South Carolina Light, Power & Railway Company. The company owns the street railway system, the gas plant and supplies the city with light and power from Gaston Shoals, a 12,000-hp. plant on Broad River.

After the foreclosure and reorganization of the property last August, the owners advanced a plan to substitute bus operation in districts where the railway lines were unprofitable, but the city never acted on the matter. This is the issue on which the two split.

Takes Formal Possession of Newly Acquired Property

The Rochester & Syracuse Railroad has formally taken possession of the Empire State Railroad Corporation, in which it purchased controlling stock recently. The details of the Rochester & Syracuse acquiring the stock of the Empire State Railroad were outlined in the ELECTRIC RAILWAY JOURNAL issue of Dec. 9, 1922.

Officers elected by the new company were: President, Alexander H. Cowie; vice-president, Talmadge C. Cherry; secretary, M. V. White; treasurer, W. K. Zinzmeister. Mr. Zinzmeister was named auditor; D. E. Crouse, chief engineer; H. E. Motsiff, superintenedent; H. C. Stanton, general freight and passenger agent; R. S. Messenger, claim and tax agent; Milton Badgero, purchasing agent.

The board of directors includes Messrs. A. H. Cowie, Carleton A. Chase, T. C. Cherry, W. K. Zinzmeister, W. J. Harvie, James M. Gilbert, Frederick W. Barker, M. V. White and W. O. Morgan of New York.

Report Shows Decrease in Deficit

For the fiscal year ended June 30, 1922, the Interborough Rapid Transit Company, New York, N. Y., shows a deficit of $2,766,797. This compares with a deficit of $4,464,826 for 1921 and a deficit of $2,235,835 for 1920. The accompanying table shows the outstanding items of the report as based on figures filed with the Public Service Commission.

At a special meeting of the stockholders, the by-laws were amended increasing the number of directors from fifteen to eighteen. The personnel of the new board is as follows: For the term ending September, 1923—August Belmont, Edward J. Berwind, Mortimer N. Buckner, Charles Day and Alfred Skitt; for the term ending September, 1924—Thomas I. Parkinson, Robert C. Rathbone, Samuel W. Rayburn, F. de C. Sullivan and Cornelius Vanderbilt, and for the term ending September, 1925—Bertram Cutler, Frank Hedley, Grayson P. Murphy, Frederick H. Ecker and William C. Potter.

	1922	1921
Gross revenue	$53,540,859	$55,031,941
Operating expenses	32,272,509	36,024,646
Net revenue	$21,268,350	$19,007,295
Taxes	2,802,823	2,735,694
Operating income	$18,465,527	$16,271,601
Other income	652,875	639,123
Gross income	$19,118,402	$16,910,724
Charges	$21,885,199	$21,375,551
Deficit	2,766,797	4,464,827
Previous surplus	$2,242,878	$7,093,101
Credits	19,343	34,779
Deficit	$504,576	*$2,663,053
Appropriations	20,290	‡420,175
P & L deficit	†$524,866	*$2,242,878

* Surplus.
† Exclusive of accruals under Contract 3 and related certificates, payable from future earnings.
‡ Includes $394,757 loss upon sale of Liberty bonds.

The three additional members, who will represent the public officials, as provided in the recently adopted plan of readjustment, were named on Jan. 4 by the Transit Commission. They are Abel E. Blackmar, William W. Niles and Herman A. Metz.

Traffic Decreases in 1921 in Washington

According to the annual report of the Public Utilities Commission of the District of Columbia 197,374,924 passengers were carried by the two electric railway companies during the calendar year 1921. Of that total the Washington Railway & Electric Company hauled 103,502,136, while the Capital Traction transported 93,872,788.

These figures showed that both companies suffered a reduction in volume of traffic in 1921, as compared with the year 1920, when the Washington Railway & Electric carried 104,900,024 and the Capital Traction, 95,375,179.

The report also shows that the Washington Railway & Electric Company operated more car miles during 1921 than the Capital Traction Company, the figures being 10,682,222 and 9,536,478 respectively.

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Announces Appeals Taken on Tax Payment

Appeals to the United States Supreme Court have been taken from the judgment won by King County, which required the Puget Sound Power & Light Company, Seattle, Wash., to pay taxes, now totaling more than $500,000, on the street railway for the year that ownership was transferred to the city. This announcement was made recently by Deputy Prosecutor Howard A. Hanson, who has handled the litigation for the county for three years.

The street railway was transferred to the city on March 31, 1919, sixteen days after the state tax commissioner had placed the valuation on the property. The company's attorney asserted that the property became public property before the tax was due, and that taxes for 1919 could not be collected. The King County Superior Court and the State Supreme Court ruled that the tax was due when the transfer was made.

The city opposed the county and joined with the company in combating the tax, principally because the transfer contract provided that the company and city should pay the tax, if any were levied, proportionate to the time each owned the railway lines during 1919. On that basis, the company should pay one-fourth the tax and the city three-fourths.

However, the county has not recognized this agreement and is endeavoring to collect the tax entirely from the company, leaving it the company's duty to collect later from the city. The company, individually, and the company and the city, jointly, have each taken an appeal to the United States Supreme Court. The hearing has not been set.

The tax of $401,018 has been and is drawing 15 per cent interest, so that it is now well over the half million mark. The interest is accumulating at the rate of about $5,000 a month.

Adjustment Plans Announced

A plan providing for the retirement of its scrip indebtedness and adjustment of accumulated dividends on its preferred stock has been announced by the Commonwealth Power, Railway & Light Company, Grand Rapids, Mich. Holders are being offered preferred stock on the basis of one and one-third shares of 6 per cent, cumulative preferred stock of the Commonwealth Power Corporation for each share of 6 per cent preferred stock of the Commonwealth Power, Railway & Light Company with accumulated dividends of $19.50 in scrip at par or in cash.

Auction Sales in New York.—At the public auction rooms in New York, there were no sales of electric railway securities this week.

Takes Over New Business. — Bonbright & Company, Inc., dealers in investment securities, New York, N. Y., has announced the acquisition of the business of Charles L. Murphy & Company. Mr. Murphy has become identified with Bonbright & Company.

Common Stock Increase Approved.—At a special meeting of the stockholders of the Manila (P. I.) Electric Company the proposal to increase the common stock from $6,000,000 to $10,000,000 was approved.

Bond Issuance Authorized.—The Public Service Commission has authorized the Indiana Service Corporation, Fort Wayne, Ind., to issue $750,000 in first mortgage bonds to cover capital expenditures. No decision has been made on this bond disposition.

Issue Approved.—The department of Public Utilities has approved the issue by the Boston (Mass.) Elevated Railway of $700,000 of 6 per cent thirty-year bonds for the purpose of refunding a similar amount of West End Street Railway bonds maturing Jan. 1, 1923.

Abandonment Authorized.—The Public Service Commission has granted the application of the Pennsylvania & Maryland Street Railway, Elk Lick, Pa., to abandon a section of its line at Salisbury, Somerset County. Vigorous opposition to the abandonment had been made.

Will Buy Line.—The Goodall interests of Sanford, Me., are reported to have completed arrangements for buying the Sanford-Cape Porpoise trolley line which for several years has been operated by receivers. The line forms an important link in the Atlantic Shore Line between Biddeford and Kittery.

Approves Proposed Merger.—Attorney General Jesse W. Barrett has approved the proposed merger of the Springfield (Mo.) Traction Company and the Springfield Gas & Electric Company. The greater portion of the stock of both the traction and gas companies is owned by the Federal Light & Power Company, New York, N. Y.

Made Director.—Eugene E. Thompson of Crane, Parris & Company, Washington bankers who recently negotiated the purchase of 27,500 shares of common stock of the Washington Railway & Electric Company, Washington, D. C., has been elected a director to succeed Bates Warren, who resigned as a member of the noteholders' protective committee which sold the stock.

Payment Date Announced.—All of the outstanding ten-year 8 per cent sinking fund equipment trust gold certificates of the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., dated Oct. 1, 1920, have been called for payment April 1, 1923, at 107½ and interest. Redemption will be made at the office of Dillon, Read & Company, New York, N. Y.

State Regulating Commission Approves Discontinuance of Line.—On account of insufficient patronage to meet operating costs, the Pacific Electric Railway, Los Angeles, Calif., was authorized by the State Railroad Commission, in a recent decision, to abandon its Beverly Hills-Coldwater Canyon line of 1.2 miles. The company's receipts on this line for the first nine months of the past year were $2,345, while the direct operating charges were $5,147, or a deficit of $2,802, according to the evidence submitted at the hearing. The commission in its decision notes a divided sentiment among residents and property owners who appeared as witnesses. Some insisted that the line should be retained, or if discontinued that a bus line should be substituted. Others expressed a desire for the immediate abandonment of the line and removal of the tracks, claiming that the cars adversely affected property values. The commission further found available traffic would not justify a bus line.

Balance Amounts to $555,621.—The Republic Railway & Light Company, Youngstown, Ohio, for the twelve months ended Nov. 30, 1922, reports gross earnings of $7,956,506, against $7,433,635 for the twelve months ended Nov. 30, 1921. The balance for depreciation, dividends and surplus amounted to $555,621, an increase of $239,678 over the surplus for the year ended Nov. 30, 1921.

More Than a Million in Surplus.—The United Light & Railways Company, Grand Rapids, Mich., for the twelve months ended Nov. 30, 1922, reports gross earnings from all sources of $11,648,359, against $11,407,983 for the twelve months ended Nov. 30, 1921. The surplus earnings available for depreciation, debt discount and common stock dividends amounted to $1,059,739. This compares with $736,772 for the twelve months ended Nov. 30, 1921.

Remarkable Business for Christmas Rush.—During the six days preceding Dec. 24 the Boston (Mass.) Elevated Railway had the largest gross receipts in its history for a six-day period. Saturday, Dec. 23, was the heaviest of the six days, the receipts for that day being $124,718. The total for the six days was $662,350. In the same period the Eastern Massachusetts Street Railway collected $197,907 in fares, as against $184,566 during the corresponding six days in 1921.

Traffic Increases.—Nearly 6,000,000 more passengers were carried by the Public Service Railway, Newark, N. J., in November than during the month of November, 1921, as shown in the monthly statement filed in the Federal Court at Trenton. In November, 1922, 37,757,161 passengers were carried. Notwithstanding an increase of 6,000,000 in the number of passengers in November, the number paying the base fare of 8 cents was reduced by 1,353,903, with a corresponding increase in the number of tokens bought and used.

Purposes of Issue Explained. — The issue of $150,000 first mortgage 7 per cent bonds of the Hannibal (Mo.) Railway & Electric Company authorized by the Public Service Commission and referred to in the ELECTRIC RAILWAY JOURNAL, issue of Dec. 2, will be for the following purposes: $100,000 to be used for refunding purposes, $20,000 for retiring its present floating indebtedness and $30,000 to be placed in the hands of the board of trustees for extension of service and improvements. The company has filed with the Secretary of State a certificate of increase in capital from $100,000 to $150,000.

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Authorizes Operation of Jitney Buses in Emergency

Despite court rulings and the opposition of the city law department, Mayor Frank X. Schwab of Buffalo has declared an emergency and has authorized the operation of jitneys on all streets in the city of Buffalo. The City Council of Buffalo by unanimous vote upheld the action of the Mayor and by resolution the Council authorizes the operation of jitney lines in Buffalo until service on the lines of the International Railway is considered adequate.

Mayor Schwab has issued an order to the chief of police directing the police department not to interfere with the operation of jitney lines while the so-called emergency exists. The city law department gave an opinion to the Mayor and members of the City Council in which it advised against the declaring of an emergency and said the Mayor and the Council were without authority to authorize the operation of jitney lines in the city.

In commenting upon the action of the Mayor and the City Council, Henry W. Killeen, of counsel for the International Railway, said:

It was a Central Labor Council act. The emergency was declared after the Councilmen had counted the noses of 600 or 700 at the hearing who were hostile to the railway. It was a grandstand play. My suggestion to the Councilmen is that they count noses of the thousands who were not at the Council meeting.

Tens of thousands of passengers are being carried daily by the independent jitney drivers of the city, who are operating on all streets upon which the International operates car lines. Regular terminals have been established at downtown points were jitneys take on their loads, and many strikers are acting as starters at the central loading points.

Normal service is being given on all local lines of the International and the company has more platform men than necessary to operate cars, according to Herbert G. Tulley, president of the International. He explained that more passengers are riding every day and that in so far as the company is concerned the strike of the employees is a dead issue. The strike has been in progress since July 1, 1922.

One-Man Cars Scheduled for February

One-man cars will be operated in Cincinnati beginning Feb. 1 by the Cincinnati (Ohio) Traction Company. This announcement was made by A. Benham general manager of the traction company, following a conference with Jerome Kuertz, Street Railroad Director, regarding the use of the proposed cars, seventy-five of which have been under construction for months at the shops of the Cincinnati Car Company.

Two important questions in connection with the new cars have not yet been settled. One is the problem as to which lines the first of the new cars are to be operated over and the other is whether or not the cars will be operated at the very start as one-man cars or with a crew of motorman and conductor. The latter is a likelihood for the cars are adaptable to both forms of operation. These matters will be decided in the near future, Mr. Benham stated.

The new cars are different in some respects from any conveyance yet seen in Cincinnati. In design they give the impression of much roominess inside. They are 43 ft. long and weigh 28,000 lb., 10,000 lb. less than the double-truck cars now operated by the traction company. They will accommodate forty-six passengers seated and almost as many more standing.

A survey of the entire system of the traction company has been under way for several weeks and it is stated that it would be impracticable to operate one-man cars on all of the lines.

Through Freight Arrangements Effected

The Winona Interurban Railway, Warsaw, Ind., has completed traffic arrangements with the Wabash Railway (steam line) for through freight rates and divisions on both car load and less than car load freight. Considerable tonnage will be handled under this arrangement since it opens up new routings which have been denied shippers in the past.

The Winona Interurban Railway is one of the pioneers in effecting operating arrangements with steam lines and this is one of the very few arrangements of its kind which has up to this time been made in this country.

J. C. Schade, general manager of the Winona company, has always been an advocate of the idea that transportation, both steam and interurban, has reached the place where co-operation is a vital necessity to the industry as a whole.

Five-Cent Fare on Main Line

The Public Utilities Commission has reached a decision whereby Norwalk is to pay a 5-cent fare on the West Avenue line, which is the main line of the city, and the base fare for other places will be 10 cents, or three tokens for a quarter, each token representing a 10-cent fare.

The city of Norwalk has been on a trial basis for the 5-cent fare for the past year, and several hearings were held from time to time, but no decision reached, until this one which makes the fare of Norwalk, that is outside the West Avenue line, the same as elsewhere on other lines of the Connecticut Company, exclusive of the Bridgeport division.

Seven-Cent Fare Extended

The 7-cent fare on the lines of the United Railways, St. Louis, Mo., has been indefinitely extended by the Public Service Commission.

J. L. Harrop, chief engineer of the commission, estimated that the company's net income for 1922 on the 7-cent fare will be $3,465,486, which, the commission's order states, represents a return of only 6.93 per cent upon a valuation of $50,000,000; 6.30 per cent upon $55,000,000 and 5.78 per cent upon $60,000,000. Mr. Harrop estimated the total revenue passengers in 1922 at 286,000,000, total revenues at $20,167,886, and total expenses at $16,702,400.

Assistant City Counselor Dolan, who appeared in opposition to continuance of the 7-cent fare, argued that the company was collecting more than necessary for depreciation and could effect economy by inaugurating a "skip stop" system, some one-man cars, improving fare collection methods and rerouting cars. Power, he argued, will be reduced in cost because of reduction in coal prices. He suggested a 6-cent fare or sale of tokens at three for 20 cents. The commission disagreed with City Counselor Dolan upon each point.

The commission had set the valuation case for argument on Jan. 15, but the hearing may be postponed. Experts of the commission and the company have submitted inventories of the physical property.

The orders stated that in view of the income accounts of 1922 and the status of the valuation case the existing fare should be extended until the commission fixes the fare valuation of the property.

Will Change Numbers for Names in Denver

In an effort to bring about a more personal relation between their employees and the public, The Denver (Col.) Tramway has arranged to have its motormen and conductors known to the public by name.

Neat metal plates, bearing the names of the conductor and motormen, are to be displayed on the front of the fare box in each street car in Denver. The name plate system has already been put into operation on one division and will be extended to include the other divisions as promptly as the plates are received from the manufacturer.

Up to the present time members of the car crew have been known to the company patrons by number only. Under the new system, each passenger who boards a car can see, as he pays his fare, the name of the conductor in charge and the name of the motorman who is operating the car. If he wants to commend the handling of the car or if it displeases him, he knows exactly whom to praise or blame.

The theory of the name plate system is that acquaintance between passenger and car crew improves service. Conductor and motorman are more attentive and more efficient when they are known by name to the persons whom they serve.

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Railway Files Brief in Rate Case

Public Service Railway Contends Brief of Commission's Counsel Ignored Facts, Misconstrued Portions of Evidence and Attempted to Support Board's Contentions by Erroneous Use of Statistics

An answer to the brief of counsel for the Public Utility Commission in the fare rate and confiscation case hearing before Thomas G. Haight, as master in the United States District Court, was filed by Frank Bergen, Edmund W. Wakelee, and Robert H. McCarter, representing the Public Service Railway, Newark, N. J., on Dec. 30. It is a document of more than 150 pages, its length being due mainly to the thoroughness with which counsel analyzed and dissected the points set up in the brief filed by the lawyers for the board and other defendants.

Facts Ignored by Boyd's Brief

Statements are made, followed by quotations from the opposing brief and from the testimony adduced during the hearing, to the effect that the brief of counsel for the board ignored certain facts, misstated or misconstrued portions of the evidence and attempted to support contentions by the erroneous use of statistics or by attributing figures to witnesses who did not testify as to them.

In referring to objections set forth in the defendant's brief to the company's description of the proceedings before the utility board which led to the order of July 24, 1921, the railway's counsel say:

> There is, however, more severe disapproval of the board's proceedings than the plaintiff has expressed, indicated by the failure of the defendants in their brief to attempt to justify the reasons assigned by the board for the action that made this litigation necessary except by a few dutiful and commonplace generalities. . . . The authors of the defendant's brief seem to have found it advisable to ignore the reports or opinions of the board as indefensible, and proceed to make an effort to construct a defense along other lines, apparently with the board's approval.

The brief of the company declares that the board in its orders ignored certain cases defining the company's rights, decided by New Jersey courts. In this connection the brief adds:

> The defendants' brief is not only remarkable for its change of base, but for its omissions also. No attempt whatever is made to explain how items of property of the plaintiff, proved by unquestioned evidence to be worth at least $30,430,630, were passed over by the board when writing its report in the valuation case with repeated statements that they would be considered in fixing the amount of going value, and when the board came to fix the amount of going value only $12,000,000 was allowed.

Addressing itself to the method adopted by counsel for the board in attempting to arrive at a valuation of the company's property, the brief points out that the defendants have disregarded the cost of reproduction method for ascertaining value, which they formerly insisted upon when costs were low and

> Failing to find any method or theory of valuation heretofore employed that could be used even plausibly for their purpose, they have recently fallen into the habit of following every practice or method ever employed, but only so far as each could be used to afford a seeming support for a sum less than the true value of the property. They refuse to follow any method to its logical conclusion. As nearly as the defendants' brief indicates any theory of valuation they entertain, it seems to be that the physical property of a utility corporation is to be appraised as second-hand material, using pre-war prices, and then add the expense of putting the pieces together at the cost of construction prevailing seven or eight years ago; and that only physical property presently in existence is to be included in any appraisement for a rate base. Nothing is more clearly settled than that such a valuation would be illegal, and besides it be grossly unjust.

Much space is given to consideration of United States Supreme Court decisions in similar rate cases with especial reference to principles laid down for the determination of value and elements of value. It is then pointed out that while counsel for the board alleged in their brief that the company in its brief did not present the facts correctly, the board's counsel failed to point out a single error or misstatement of fact. The company's brief then goes on to say:

> In professing to estimate the value of the plaintiff's property counsel for the defendants now disapprove of the board's valuation in substantially every particular.

It is asserted that the Ford, Bacon & Davis valuation was disregarded and that figures introduced by Dean Cooley and the board's own expert, Mr. Feustel, were at times misused or employed in a misleading and erroneous manner.

Numerous excerpts from the testimony in the case are quoted to refute assertions made by counsel for the board or to expose the fallacy of claims set up by them. Chapters are devoted to the consideration of contingencies, engineering and superintendence, law expenditures and administration, interest during construction, taxes during construction, organization and development, cost of money, promoters, remuneration, going value and development cost, land and right-of-way, depreciation, appreciation, historical cost, valuation made by the State, electric power plant lease, the tables set up by the defendants, and the confiscatory character of the rates fixed by the Public Utility Board.

Value Claimed for Power Lease

The testimony covering the value of the power station lease is gone into at great length, the company maintaining that part of the value of the lease is measured by the value of the property turned over to the electric company in 1910, and that the lease has an additional value measured by the capitalized savings in operating expenses. These savings according to expert witnesses averaged $1,194,296 a year, which capitalized at 8 per cent amounts to $14,928,700. Defects and inaccuracies in the testimony offered by Expert Buck for the board, are set out in detail and words are not disguised in referring to certain statements set forth in the board's brief. To quote an example:

> The third reason given by the defendants why nothing should be allowed for the leased property is that Mr. Osgood testified that the value of these plants is nothing. This is another mis-statement of facts by defendants' Counsel. Osgood said nothing of the kind.

Attention is directed to a series of "calculations" made by Mr. Petty, one of the board's witnesses, which the brief points out were grossly inaccurate as compared with the facts. Mr. Petty calculated the company would earn $6,360,000 the first year under the rate permitted by the court; the actual earning was $5,593,958. The defendants admit that if the board's rate had been in force the earnings would have been some $300,000 less than they were but General Manager Danforth of the railway testified that they would have been $1,500,000 less. In connection with these losses accrued during the period the board refused to allow sufficient rates, reference is made to the Supreme Court decision in the Hackensack Water Company case and the brief adds:

> In any event the results of operations for the year under the court's permitted rate conclusively show that the rates fixed by the board would not produce a fair return upon the value of plaintiff's property, as proven in this case, and are therefore confiscatory.
>
> Beginning a summary of the brief, Counsel go on to say: "(1) Several years ago the plaintiff, owning one of the largest street railway systems in the country, found the cost of maintaining and operating its property rapidly increasing and it continued to increase until it had more than doubled (P. 32, and plaintiff's brief, page 7). The highest courts of New Jersey, with the facts before them, held that the plaintiff was entitled to increase its rates of fare sufficiently to provide for the increased expenses (O'Brien case, 92 N. J. L., 44; aff'd ib., 587,588) and that a valuation of its property was not necessary (p. 590). The New Jersey courts also held that rates should be "sufficient to induce the investment of capital in the business, and its continuance therein," which clearly the public interest requires (84 N. J. L., 463, 474; aff'd 87 N. J. L., 597; plaintiff's brief, pp. 4 and 5). Increased rates could not be established without the consent of the board of public utility commissioners, or long and costly litigation. Timely and repeated applications were made by the plaintiff for the income to which it was entitled, but they were denied by the board, except in part. The increases permitted were insufficient in every instance to provide for the increased expenses (p. 38, and Trans., p. 386). The rates allowed by the board during the four years 1918-1921, inclusive failed to produce sufficient money to provide for these increased costs over the year 1916 by approximately $12,000,000 (plaintiff's brief, p. 160). The income during those years was many million dollars less than the amount now stated by the board to be reasonable. (Exhibit P.38).

The summary sets forth that the primary question in this case is:

> What is the value of the plaintiff's property used in its business?

It goes on to answer the question by citing United States Supreme Court decisions to the effect that the ascertainment of value "is not a matter of formulas, but there must be a reasonable judgment having its basis in a proper consideration of all relevant facts," and adds, "The reasonable judgment to be exercised in ascertaining the value of the property of a utility corporation must be the judgment of those familiar with the property in question and with

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utility property generally. It is not the *ipse dixit* of anybody who chooses to assert a figure and call it fair."

In developing their arguments, counsel for the company refer to the Ford, Bacon & Davis report stating the value of the property to be $125,000,000, the value of the property turned over to the electric company in 1910, the saving to the railway as the result of the power plant lease; the fact that Mr. Wolff, a witness for the board, testified to a historical value of $95,000,000 and admitted that his findings were not complete and that he failed to include in his total of $95,000,000 many items of cost. Also that the utility board since it was created had approved issues of stock and bonds of the plaintiff and the payment of interest and dividends on other securities of the lessor companies to the amount of $71,029,650; that the utility board had approved a consolidation agreement of the railway company and the Newark Terminal Railway, dated Dec. 7, 1915, which agreement fixed the capital stock of the company at $39,250,000 and that subsequent issues of stock of the plaintiff amounting to $10,750,000 had been approved by the utility board in 1916 and 1917. In this connection counsel pointed out:

> The utility board, familiar with the law and with plaintiff's property cannot now deny the validity or value of the stock which it approved, or the value of the property represented by the stock when so approved. . . . It cannot be successfully contended that the value of securities lawfully issued and specifically sanctioned by the State can be impaired or destroyed in the process of rate making. . . . We claim nothing that has not been allowed in other rate cases and sustained by the courts.

The brief goes on to the effect:

> That a proper consideration of all the testimony in this case must lead to the conclusion that the value of plaintiff's property in these rapidly growing communities, with plaintiff's capacity to meet the increasing transportation needs of the State, is in excess of the amount of its capitalization; that the amount declared by the board of public utility commissioners to be the value of the property is a mere assertion shown to be grossly erroneous by the proof in this case, and that the rates based on the board's alleged valuation are clearly confiscatory.

A table of figures taken from the testimony is set up. It shows among other things that Mr. Feustel, one of the board's witnesses, testified that the reproduction costs of the property based on prices of July 14, 1921, excluding land, general contingencies, working capital and materials and supplies, organization and development of the project, cost of money, promoters remuneration, going value and power contract resulted in a valuation of $97,069,741, while Dean Cooley's figure for the same items was $100,856,658, the small difference, it being pointed out, being largely accounted for by the difference in the interest rate used, Mr. Feustel, the board's main witness, being in substantial accord with Dean Cooley as to the prices of July, 1921. It is shown also that Mr. Feustel admitted that other items should be allowed.

Toward the end of 1921 there was put into effect on the railway a base rate of 8 cents, with four tokens for 30 cents, and a 1-cent charge for each transfer. This was the result of a condition imposed by the United States District Court for New Jersey in an order restraining the State Board of Public Utility Commissioners from enforcing its finding that the company should charge no more than a 7-cent cash fare, with an additional charge of 2 cents for each transfer. The higher rate is still in force pending the outcome of the court proceeding. The plea of the railway was confiscation of property. The Board of Public Utility Commissioners and the Attorney-General for the State appealed to the United States Supreme Court from the decision of the district court, but the Supreme Court formally declined to advance the application. In the meantime the District Court appointed Thomas G. Haight as special master to take the evidence.

Under the terms of an act passed by the Legislature in 1920 and amended in 1921 Ford, Bacon & Davis were employed by a specially designated state commission to value the railway property. It reported that the value of the property was $125,000,000. This report was transmitted to the board, which also heard the testimony of other experts, some of whom fixed the value at a much larger amount. On July 14 the board handed down a report and order in which, after throwing out the state's valuation, it fixed the value of the property at $82,000,000 and decreed a rate of 7 cents, with a 2-cent charge for each transfer, effective Aug. 4, 1921. The contention of the company is for the right to earn a return on a valuation of $209,898,906.

Cuts Fare to Increase Revenue

The Jersey Central Traction Company, operating from Red Bank to Perth Amboy, New Jersey, will cut the fare in each zone from 10 cents to 8 cents and will discontinue the sale of low rate commutation tickets. In a statement announcing the change in the tariff W. H. Hitchcock, general manager of the company in the Perth Amboy district, said that the company's deficit amounted to $100,000. It is believed that if the change in rate does not result in increased revenue operation will be discontinued. The company was authorized to increase its rates from 7 to 10 cents in June of 1922. The extra fare charge was granted for a six-months period to see if it would increase the revenue of the company.

Will Have Dining Cars.—Dining car service will be started in the spring on the line between Indianapolis and Louisville operated by the Interstate Public Service Company. The dining cars will be run each way three times daily and will have seating accommodations for twenty-four persons.

Two New Passes Adopted.—The Citizens' Traction Company, Oil City, Pa., recently announced the adoption of two new passes. The first pass, which will sell for $1.25, will be good for a week on Oil City lines. The second pass, good for both Oil City and Franklin lines will sell for $3. The passes are transferable. This is in accordance with the plan previously announced.

Seven-Cent Fare in Effect.—The new rate of fare provided by the Lima City Railway ordinance, recently passed, went into effect on Nov. 26. The new fare will be 7 cents cash or four tickets for 25 cents. Announcement has been made that five new one-man cars will be in service by Feb. 1.

Reprints Journal Article. — The December issue of the *Northern Light*, published by the Northern Ohio Traction & Light Company, Akron, Ohio, contains a reprint of an article which appeared recently in the ELECTRIC RAILWAY JOURNAL by Frank H. Warren. The article is entitled "The Customer Is Always Right."

Seven Cent Fare in Danville.—As a result of an action of the City Council a 7-cent fare was to go into effect on Jan. 1 on the lines of the Danville Traction & Power Company, Danville, Va. This rate will remain in force for two and a half years. At the end of that time the 5-cent rate will go into effect. Ticket purchasers will still ride at a 6-cent rate.

More Cars to Be Put Into Service.—The Supervisor of Public Utilities of Dallas, Tex., has made a check of service, passengers carried, etc., of the Ervay-Bryan line of the Dallas (Tex.) Railway and has issued orders for five new cars to be put in service on this line during the morning and evening rush hours. The Supervisor of Public Utilities makes a complete check of all lines in the city once every six months and orders additional cars put in service where needed to keep the service up to the high standard set. Other lines are now being checked.

Authorizes Commutation Books.—The Georgia Public Service Commission issued an order granting the Georgia Railway & Power Company authority to sell individual commutation books on its Stone Mountain and Marietta lines containing twelve tickets each and good for ten days, and family commutation tickets containing ten tickets good for twenty-five days at slightly reduced rates under the regular rate. The Commission declines the petition of the company to discontinue issuing ninety-day and thirty-five-day books.

Demonstrates One-Man Cars.—Practical demonstrations of one-man street cars are being given by the Utah Light & Traction Company on some of its lines in Salt Lake City. These demonstrations are highly successful. Stops to take on and let off passengers are made in approximately the same time that is required on the two-man cars. To avoid any possible confusion or loss of time which might result from the first trials of the new system, an extra man was on hand on each of the cars to make change, issue transfers and demonstrate how entrances and exits should be made.

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Personal Items

Harry L. Brown Editor

Harry L. Brown, who has been for some time Western editor of ELECTRIC RAILWAY JOURNAL, at Chicago, and more recently managing editor at New York, has been appointed co-editor of the paper with Henry W. Blake. His appointment is effective with this issue of the JOURNAL and Mr. Brown will be from now on in executive charge of the editorial work.

Mr. Brown is well known in the railway field, particularly in the Central territory. He started his railway editorial work on the staff of *Electric Traction* soon after graduation in electrical engineering from the University of Michigan. He joined the ELECTRIC RAILWAY JOURNAL staff, at the Chicago office, in 1916, having come with

H. L. BROWN

the McGraw-Hill Company a year before as assistant editor of *Electrical World*. Earlier he was engaged in engineering work with the Aurora, Elgin & Chicago Railroad and Chicago Telephone Company. During the war he was Captain in the Signal Corps, and after the war was co-author of Lauer and Brown's "Radio Engineering Principles." He rejoined the staff of the ELECTRIC RAILWAY JOURNAL in 1919 and "covered" the hearings of the Federal Electric Railways Commission in Washington, thereafter going to Chicago as Western editor. In Chicago Mr. Brown's contributions to and other work for the JOURNAL were of a high character, and when H. V. Bozell, formerly co-editor of the JOURNAL, was appointed editor of *Electrical World*, Mr. Brown was transferred to New York to become managing editor, and now editor, of ELECTRIC RAILWAY JOURNAL.

The publishers of the JOURNAL believe that with Mr. Brown's acquaintance with the men and problems of the industry, his past experience in editorial work in the electric railway field and his conception of what the paper can do to help the industry, he will, as a responsible editor, help make the ELECTRIC RAILWAY JOURNAL more and more useful and valuable to the electric railway men and the electric railway industry.

Mr. Coblentz to Retire from Potomac Public Service Company

At the recent meeting of the executive committees and several boards of directors of the Potomac Public Service Company and its subsidiaries Emory L. Coblentz, president of the companies, stated that at his own request he would retire as president of the companies at the time of their annual meetings to be held in January and February next. This announcement, he said, was in accordance with a definite understanding which he had with the officials of the American Water Works & Electric Company when that company purchased the control of the Potomac Company in July last.

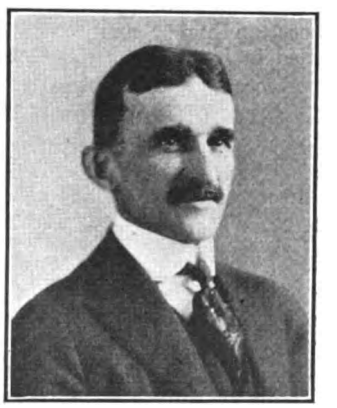
Mr. Coblentz further stated that at the request of the officials of the Water Works & Electric Company, he will, upon his retirement as president of the several companies, assume the position of chairman of the several boards of directors and executive committees. This will include the Potomac Public Service Company; the Chambersburg, Greencastle & Waynesboro Street Railway and the Waynesboro Electric Company with offices in Waynesboro, Pa.; the Potomac Light & Power Company, with offices in Martinsburg, W. Va.; and the Northern Virginia Power Company with offices in Winchester, Va. It was also stated that Mr. Coblentz and his associate still retain large financial interests in the Potomac Public Service Company, and that by occupying the position of chairman of the several boards and executive committees of the various companies, he would remain in touch with their affairs but would be relieved from all strictly operating problems.

Mr. Coblentz stated that he would be succeeded as president of the several companies by M. F. Riley, who has been on the several properties for some time studying their operating problems. Mr. Riley is an experienced public utility executive, having been actively connected with the American Water Works & Electric Company's properties for more than twenty-five years, and at the present time being president of about ten of the water works companies owned by the American Water Works & Electric Company, from which positions he will retire upon assuming the presidency of the Potomac Company and its subsidiaries.

It is understood that no changes in the officers or management of the Potomac Public Service Company are contemplated other than those just mentioned.

Mr. Dalgleish Honored

R. H. Dalgleish, chief engineer of the Capital Traction Company, Washington, D. C., was recently elected president of the Washington Society of Engineers, to serve in that capacity during the current calendar year. This society comprises in its membership most of the prominent engineers in all branches who make their headquarters at the capital. The honor is a well-deserved one, for there is no more alert, progressive and capable engineer in the District than Mr. Dalgleish. He is one of the most popular of the electric railway engineers and his capability has been recognized, among other ways, by appointment to committees of the American Electric Railway Engineering Association from time to time. For example, last year he was chairman of the committee on equipment, one of the most important in the association. He had previously been a member of this committee. This



R. H. DALGLEISH

year he is chairman of the committee on specifications for air tanks, a line of work requiring expert engineering knowledge. His enthusiasm for company section work in the association led to his election, in 1916, to the presidency of the Capital Traction Company section. He has also served as chairman of the Washington section, A.I.E.E.

Mr. Dalgleish is rounding out thirty years of service with the Capital Traction Company, practically his entire professional life. To be sure he did work for a short time with the Eckington & Soldiers' Home Electric Railway, but soon left to enter the electrical department of Capital Traction. He stuck right to his job, improving himself by study meanwhile, until in 1919 he demonstrated that he had made good by capturing the appointment as chief engineer.

Mr. Dalgleish is young yet, only forty-eight, and he looks ten years younger. He has the "pep" of a man of twenty-five. He is a good mixer and handles his varied work with skill and energy, and it is varied because it comprises all branches. He is a graduate of the Cochran Scientific School, now

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part of George Washington University, which accounts in part for his analytical attitude toward engineering problems.

Mr. Robertson Made Vice-President and General Attorney

Arthur W. Thompson, president of the Philadelphia Company, recently announced that Andrew W. Robertson had been elected vice-president and general attorney.

Mr. Robertson was born at Panama, N. Y., Feb. 7, 1880. He graduated from Allegheny College in 1906. He attended the Pittsburgh Law School and was admitted to the bar. Soon after he was elected title officer of the Guarantee Title & Trust Company and later trust officer. He became attorney for the Duquesne Light Company and the Pittsburgh Railways, and in 1913 was selected by the receivers as one of their attorneys. In 1919 he resigned this commission to accept the appointment as general attorney of the Philadelphia Company and affiliated corporations.

As vice-president and general attorney he will handle any necessary legal business and will have special duties assigned to him by the president.

Mr. Horn Resigns from I. T. S.

John M. C. Horn, comptroller of the Illinois Traction System, Peoria, Ill., with headquarters at Champaign, Ill., resigned that position, effective on Jan. 1, 1923. Mr. Horn has been with the Illinois Traction System and its component companies for fourteen years, having served in the general offices at Champaign during that entire time. The position vacated by Mr. Horn will be filled by T. A. Smith, supervisor of capital expenditures for the same company, who, for the present, will take over the work of both offices.

Changes in Duties Announced

H. A. Benjamin, general freight and passenger agent of the Waterloo, Cedar Falls & Northern Railway, Waterloo, Iowa, has resigned to engage in other business. His position has now been abolished.

The jurisdiction of Maurice A. Welsh is withdrawn from all matters pertaining to maintenance and is extended over the traffic department with the title of superintendent and traffic manager with office at Waterloo.

T. E. Rust, chief engineer, will now have authority over the mechanical department with office at Waterloo.

Mr. Couch a Potentate

H. C. Couch, president of the Arkansas Light & Power Company, and of the street railway in Pine Bluff, the former operating public utilities in forty-five cities and towns in Arkansas, was elected Potentate of Sahara Temple, Ancient Arabic Order of the Mystic Shrine, at the annual election on Dec. 7. Mr. Couch is also serving as president of the Chamber of Commerce of Pine Bluff and is a member of the board of the Arkansas Y.M.C.A., Henderson-Brown College, and of the Bankers Trust Company of Little Rock. He is secretary of the Caddo River Power & Irrigation Company, which will develop hydro-electric power on the Quachita and Caddo Rivers in Arkansas, the electrical energy to be distributed over the 500 miles of the high-voltage lines of the Arkansas Light & Power Company.

Frank R. Coates, president and general manager of the Community Traction Company, Toledo, Ohio, is now dividing his time between the New York and Toledo offices.

Col. John H. Trumbull, a director of the Bristol & Plainville Tramway Company, Bristol, Conn., has been appointed chief of ordnance on the staff of Governor-elect Charles A. Templeton of Connecticut.

Walter S. Dickie has resigned from the administrative staff of the Berkshire (Mass.) Street Railway to take up the duties of register of deeds for his county, to which office he was recently elected.

W. Nelson Smith has been made consulting electrical engineer of the Winnipeg (Man.) Railway. Mr. Smith, who has made a study of self-corrosions of cast iron, was recently elected a Fellow of the Royal Society of Arts of London.

H. C. Young, purchasing agent of the International Railway Company, Buffalo, N. Y., has been elected president of the Purchasing Agents' Association of Buffalo for 1923. He has been actively associated with the organization in Buffalo for many years.

Col. W. G. Arn, assistant engineer of maintenance of way Illinois Central Railroad, has been appointed assistant engineer of the Chicago terminal improvement. This improvement work is under an organization independent of the general engineering department of the railroad.

G. T. Hellmuth, who has been general claims attorney of the Chicago, North Shore & Milwaukee Railroad, was appointed on Jan. 1 claims attorney also of the Chicago Elevated Railroads. Mr. Hellmuth's connection with the North Shore began in 1911, a year following his graduation from the John Marshall Law School, Chicago.

B. H. Meyer has been elected chairman by the Interstate Commerce Commission to serve from Jan. 1, 1923, to Jan. 1, 1924. He succeeds Charles C. McChord. The election of Mr. Meyer is in line with the plan of organization of the commission under which the office of chairman is held by each member in turn for one year.

Ralph E. Tevebaugh, who for the last three years has been in charge of the traffic department of the Union Traction Company of Indiana, with headquarters in Indianapolis, has been added to the rate department of the Indiana State Chamber of Commerce. He was for two and one-half years in the rate department of the Indianapolis & Cincinnati Traction Company.

Lovick P. Miles has been appointed general counsel of the Memphis (Tenn.) Street Railway to succeed the late Gen. Luke E. Wright. The Memphis Street Railway is still in receivership and on this account the appointment of Mr. Miles is subject to confirmation by the Federal Court. Judge Ross has since confirmed the appointment.

Richard Groeninger, veteran Cincinnati newspaper man, has been appointed a member of the Board of Rapid Transit Commissioners by Mayor George P. Carrel of Cincinnati, Ohio. He succeeds Col. William Cooper Procter, whose term has expired as president of the Procter & Gamble Company. The appointment is for ten years at $3,000 a year. Mr. Groeninger is a resident of Cincinnati. He came from Germany twenty years ago.

Obituary

Stephen C. Hubbell, who served as the first president of the Spring & Sixth Street Railroad, which operated the first street railway in Los Angeles, Calif., died in that city on Dec. 14. He was born in Cattaraugus County, N. Y., in 1841.

F. A. Blackwell, pioneer in railroad building in Cœur d'Alene, Idaho, died recently at the age of 70 years. He came from Pennsylvania, where he had been engaged in the lumber business. He spent a few years in the purchase of timber and in becoming acquainted with the country. In 1903 he started the construction of the Cœur d'Alene & Spokane Electric Railway. This was the beginning of the Spokane & Inland Empire Electric Railway, later extended to Palouse and Colfax by the efforts of Mr. Blackwell and associates.

Charles A. McKinney, former secretary and treasurer of the Consolidated Street Railways of Houston, Tex., and late assistant cashier of the South Texas Commercial Bank of Houston, died recently at his home in that city. Mr. McKinney was sixty-seven years old and had lived in Houston since 1890, when he came to the city to become connected with the street railway lines then owned by O. M. Carter. Later he became connected with the South Texas National Bank and remained with this institution for twenty-seven years prior to his death.

Charles Ruff, well known in the electric railway industry from his connection as master mechanic with the railway properties at Minneapolis, Indianapolis, Buffalo, Anderson and Richmond, Ind., and Lincoln, Neb., died on a Chicago street car early on Dec. 12. He was going to work at the Standard Oil Company shops at Whiting, where he had charge of the department repairing gages, meters, steam traps, etc., for a number of years. Mr. Ruff was an exceptionally able mechanic, especially gifted in handling and instructing men and apprentice boys, and many persons who had worked with him will recall his helpful influence.

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100 per Cent Increase in Manufacturers' Business in 1922

Survey of the Business Obtained from the Electric Railways by a Number of Manufacturers Shows a Very Substantial Increase in Comparison with Their Sales in 1921—But 1923 Looks Even Better

SUMMING up the total sales made to electric railway companies during 1922 by a number of manufacturers from whom information was secured by ELECTRIC RAILWAY JOURNAL and comparing this total with the same figure for 1921, the result indicates that on the average the manufacturers derived a gross business which was 100 per cent greater than in 1921. This fine gain in the sales of those who serve the electric railway field gives one of the most direct and tangible evidences of the improving financial condition of the industry. The manufacturers have had some lean years while the railways were in trouble, but the reaction toward fat years is coming with a vim as the railway earnings have come up with increased fares and slightly decreased operating costs. The necessary deferring of great amounts of maintenance and betterment work on the physical properties of the interurban and street railways has naturally made it necessary for the companies to buy, and buy as quickly and as generously as their resources permitted.

FIGURES TELL THE STORY

Some interesting details from a few of the replies received from manufacturers will serve to show what the general trend of business in 1922 was in comparison with 1921. The General Electric Company sold $16,200,000 worth of equipment to the electric railways in 1922 as compared to $9,804,000 in 1921. The Westinghouse Electric & Mfg. Company also enjoyed approximately 100 per cent increase in its railway business. The business of the Cincinnati Car Company in 1921 amounted to $317,750, and increased 900 per cent to the figure in 1922 of $4,708,485. The National Brake Company had an increase of 40 per cent. The Consolidated Car Heating Company did a business of $526,000 in 1922 as against $285,000 in 1921 with the electric railways. The Differential Steel Car Company sold $240,000 worth of equipment to the electric railways in 1922 as against $40,000 in 1921, a 600 per cent increase. The International Steel Tie Company sold $600,000 worth of its ties to the railways in 1922, compared with $450,000 in 1921. The Johnson Fare Box Company reports that it will start the new year with better prospects than ever before as it has orders on its books amounting to $150,000.

The railways indicated some renewed interest in roller bearings during 1922 as shown by the fact that $5,000 worth of such bearings were purchased from the Stafford Roller Bearing Company, as against practically no electric railway purchases from this company the year before. The Spray Engineering Company, which manufactures spray painting equipment, reports the sale of $30,000 of this equipment to the railways in 1922, as against $20,000 in 1921, indicating a growing appreciation of the economy available from this scheme of painting cars and other equipment.

The Electric Railway Equipment Company had an increase of $50,000 in its sales of tubular steel poles and fittings, and overhead trolley material to the electric railways. The sale of Economy Electric Devices Company watthour meters for use on the cars increased about 200 per cent as compared to last year, and orders for 4,000 undelivered meters were on the books at the close of the year, though delivery is being made rapidly.

ANOTHER BIG YEAR IN PROSPECT

So much for indications of railway purchasing during 1922. Good as this year has been, 1923 looks even better, and substantially so. The development of budget figures covering expenditures for new plant and equipment to be made by the railways during 1923, as compiled by the JOURNAL and printed elsewhere in this issue, indicates that these expenditures during the new year will exceed those of 1922 by two-thirds of another 100 per cent. This means that if no serious nation wide adversity comes upon us, the year 1923 is likely to be one of the best ever experienced for the manufacturers serving the electric railway field.

Pacific Coast Prospects Good

Thomas W. Casey, general manager of the National Pneumatic Company, New York, N. Y., has recently returned from an extended trip to the Pacific Coast. He visited all important electric railway centers between Vancouver and San Diego. Mr. Casey says that the electric railway executives and managers are optimistic. They are facing their problems squarely with a determination to solve them in the best interest of the industry. A very favorable turn in affairs on the coast was noted by Mr. Casey in connection with decisions under which a number of important extensions and improvements will be begun and completed during the year 1923.

ELECTRIC RAILWAY MATERIAL PRICES—JAN. 2, 1923

Metals—New York

Copper, electrolytic, cents per lb.	14.687
Lead, cents per lb.	7.25
Nickel, cents per lb.	36.00
Zinc, cents per lb.	7.30
Tin, Straits, cents per lb.	39.00
Aluminum, 98 to 99 per cent, cents per lb.	22.50
Babbitt metal, warehouse, cents per lb.:	
Fair grade	42.00
Commercial	25.00

Bituminous Coal

Smokeless mine run, f.o.b. vessel, Hampton Roads	$8.625
Somerset mine run, Boston	5.375
Pittsburgh mine run, Pittsburgh	3.25
Franklin, Ill., screenings, Chicago	3.125
Central, Ill., screenings, Chicago	2.325
Kansas Screenings, Kansas City	2.50

Track Materials—Pittsburgh

Standard Bessemer steel rails, gross ton	$43.00
Standard open hearth rails, gross ton	43.00
Railroad spikes, drive, Pittsburgh base, cents per lb.	2.75
Tie plates (flat type), cents per lb.	2.42
Angle bars, cents per lb.	2.75
Rail bolts and nuts, Pittsburgh base, cents, lb.	4.12
Steel bars, cents per lb.	2.00
Ties, white oak, Chicago, 6i n. x 8 in. x 8½ ft.	1.40

Hardware—Pittsburgh

Wire nails, base per keg	2.75
Sheet iron, (28 gage), cents per lb.	3.35
Sheet iron, galvanized, (28 gage), cents per lb	4.35
Galvanized barbed wire, cents per lb.	3.35
Galvanized wire, ordinary, cents per lb.	2.45

Waste—New York

Waste, wool, cents per lb.	15.00
Waste, cotton, (100 lb. bale), cents per lb.:	
White	14.00
Colored	7.00

Paints, Putty and Glass—New York

Linseed oil, (5 bbl. lots), cents per gal.	93.00
White lead, (100 lb. keg), cents per lb.	12.375
Turpentine, (bbl. lots), per gal.	$1.47
Car window glass, (single strength), first three brackets, A quality, discount*	$4 0%
Car window glass, (single strength), first three brackets, B quality, discount*	86.0%
Car window glass, (double strength, all sizes, A quality), discount*	85 0%
Putty, 5 lb. tins, cents per lb.	6.50

*These prices are f.o.b. works, boxing charges extra.

Wire—New York

Copper wire base, cents per lb.	16.90
Rubber-covered wire, No. 14, per 1,000 ft.	6.50
Weatherproof wire base, cents per lb.	16.50

Paving Materials

Paving stone, granite, 4 x 8 x 4, f.o.b. Chicago, dressed, per sq.yd.	$3.35
Common, per sq.yd.	3.10
Wood block paving 3½, 16 treatment, N. Y., per sq.yd.	2.30
Paving brick, 3½ x 8½ x 4, N. Y. per 1,000 in carload lots	50.00
Crushed stone, ¾-in., carload lots, N. Y., per cu.yd.	1.75
Cement, Chicago consumers net prices, without bags	2.05
Gravel, ¾-in., cu.yd., N. Y.	2.00
Sand, cu.yd., N. Y.	1.00

Old Metals—New York

Heavy copper, cents per lb.	12.15
Light copper, cents per lb.	10.60
Heavy brass, cents per lb.	6.90
Zinc, old scrap, cents per lb.	4.40
Yellow brass, cents per lb (heavy)	7.00
Lead, heavy, cents per lb.	6.00
Steel car axles, Chicago, net ton	$18.75
Old car wheels, Chicago, gross ton	25.75
Rails (short), Chicago, gross ton	21.25
Rails (relaying), Chicago, gross ton	33.50
Machine turnings, Chicago, net ton	11.75

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Rolling Stock

The Thousand Islands Railway, Gananoque, Ont., has placed an order for new equipment for the Oshawa Railway. It consists of one electric freight shunter, weighing 43 tons, to be delivered thirty days from the date of placing the order, and electric motor passenger cars to be delivered by April, 1923. The shunter has been ordered from the Canadian Westinghouse Company and the passenger cars are to be constructed by the Ottawa Car Manufacturing Company.

San Francisco-Oakland Terminal Railways, San Francisco, Calif., has ordered for the Key Route system from American Car Company fifty-five double truck cars to be delivered in four to five months and to cost delivered approximately $14,700 each. Arrangements will be made for one or two-man operation and for three men in two-car trains. Specifications include steel body with end platforms, length over bumpers 44 ft. 10 in., weight 35,000 lb., Brill trucks, four 40-hp. motors, General Electric multiple-unit control and air compressors, twelve side windows, rattan reversible seats for forty-eight passengers, folding steps, pneumatically controlled folding doors on each side of each platform, mahogany interior finish, Hunter illuminated end signs, automatic couplers for both air and electric connections, air sanders, Johnson cash fare boxes and single cash fare registers, push button signal system, safety devices same as installed on the standard one-man safety cars.

Power Houses, Shops and Buildings

Tri-City Railway & Light Company, Davenport, Iowa, will install a new generator and a 35,000-hp. steam turbine and new boilers and auxiliary equipment will constitute part of the $1,250,000 improvement program.

Louisville (Ky.) Railway has received a building permit for improvements of $2,750 in the carhouse at West Chestnut Street. This is the third unit in a $40,000 program by the company for better quarters for the men.

United Electric Railways Providence, R. I., has awarded the contract to William H. Hamlyn & Sons Providence for the construction of the new carhouse on North Broadway, East Providence. The structure will be of brick and steel, one and two stories high.

Fort Smith Light & Traction Company, Fort Smith, Ark., is included in a power construction program recently outlined by Byllesby management. The plan will increase the plants and systems of the Oklahoma Gas & Electric Company, Oklahoma General Power Company, the Fort Smith Light & Traction Company and the Mississippi Valley Power Company from their present capacity of 34,102 hp. to a total of 84,102 hp. a gain of 146 per cent.

Pacific Electric Railway, Los Angeles, Calif., has just recently ordered the materials necessary to install a complete alternating-current electric interlocking plant at La Habra, Calif. The plant will require a 7-lever type "F" electric interlocking machine, operating six style "T-2" signals and four style "M" electric switch movements. Alternating current will be used for both the interlocking and double rail return track circuits through the plant. The Union Switch & Signal Company is furnishing the materials, while the field work will be performed by the railway company's own signal construction forces.

Track and Roadway

Wilmington & Philadelphia Traction Company, Wilmington, Del., is planning to build an extension from the terminus at the Lobdell plant to the new Marine Terminal.

New York, N. Y.—The Transit Commission has awarded three contracts for construction work. The Fort Hamilton extension of the Fourth avenue subway, Brooklyn, awarded to T. A. Gillespie Company for $1,485,151; Fourteenth Street eastern lines has been awarded to Frederick L. Cranford, Inc., for $750,682. The third contract provides for the installation of two additional elevators at 168th Street station of the Broadway-Seventh Avenue subway line, which has been awarded to the Otis Elevator Company, whose bid was $89,805. The contract for the Fort Hamilton extension will be immediately submitted to the Board of Estimate for appropriation of the funds necessary to be provided to carry out the proposed work.

Trade Notes

Empire Tire & Rubber Corporation, Trenton, N. J., has been incorporated to manufacture tires and rubber products and invest in bonds in corporations operating street railways, etc. W. Holt Apgar is the agent in charge.

Universal Portland Cement Company, Chicago, Ill., announces a substantial reduction Dec. 28 in the prices of Universal cement. The reduction is 15 cents per barrel at its Chicago plant and 10 cents per barrel at its Pittsburgh and Duluth plants.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., announces the transferring of E. D. Lynch, railway department, to the New Haven office. He will fill the vacancy made by J. P. Alexander's removal to the Boston office.

International Combustion Engineering Corporation, New York City, is marketing the new "Aeroil" switch-throwing outfit. This is made in several sizes, the torch burns kerosene and the whole is designed to provide the maximum of portability.

Sir W. G. Armstrong, Whitworth & Company, Ltd., and the British Thomson-Houston Company, Ltd., have entered into an arrangement whereby they will undertake jointly the complete electrification of railways and the manufacture of all types of electric locomotives and rolling stock. The first-named firm will undertake the mechanical construction and the latter the electrical part.

Sir Philip Nash, recently one of the directors-general in the Ministry of Transport, has been elected chairman of the Metropolitan-Vickers Electrical Company (successors to the British Westinghouse Company). At one time he was chief of the locomotive department of the Great Northern Railway and afterward chief in the same department of the East Indian Railway. During the great war he held successively the posts of director of national filling factories and director-general of transport in France.

The Burry Railway Supply Company, Chicago, Ill., which handles the Hartman center bearings, and the Perry and Peerless type side bearings, has announced the following as its territorial representatives: Nic LeGrand, Rock Island, Ill.; W. McK. White, Goshen, Ind.; P. W. Wood, New Orleans, La.; H. F. Keegan Company, New York City; H. F. McKenney Company, Portland, Oregon; William T. Campbell, Washington, D. C.; Alfred Connor, Denver, Colo.; Charles W. Wood Company, Boston, Mass.; S. A. Roberts & Company, Salt Lake City, Utah; Railway & Power Engineering Corporation, Toronto, Ont., and Winnipeg, Man.; F. F. Bodler, San Francisco, Calif., and Allison E. Thornwell, Atlanta, Ga.

New Advertising Literature

Combustion Engineering Corporation, New York, N. Y., has issued a pamphlet which contains a condensed description of all the corporation's products. This is the first time the company has attempted to get out a general catalog containing everything it manufactures. The booklet contains sixteen pages with illustrations.

Uehling Instrument Company, Paterson, N. J., has just issued a twelve page folder which explains concisely the two biggest losses in the steam power plant, namely (1) the loss in steam turbine economy due to air leakage into the condensing system, and (2) the sensible heat in the flue gases lost up the chimney. A table gives data on steam turbine economy as related to the absolute back pressure. Data on combustion are given in another table, such as the variation of the chimney loss with the percentage of CO_2 and its relation to flame temperature and ratio of air to fuel supply. The Uehling CO_2 recorder and indicator are illustrated and twelve different kinds of important information which these instruments furnish are cited. A list of prominent users of Uehling equipment and a list of Uehling bulletins are also appended.

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Light-Weight Cars for 1923

ONE YEAR HENCE

The dawn of 1923 finds the electric railway industry in better condition, more optimistic and more hopeful than it was 365 days ago.

Although the past is behind us, and it is the present and future which now holds our attention, the lessons of recent bygone days will prove valuable in days to come.

Light-weight Cars during the past year have done much for the industry. Their lower cost of operation has solved the financial problem for many companies, and the increased service which it is possible to maintain therewith has proved popular with the riding public.

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Our Light-Weight Car Catalog is No. 266.

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PHILADELPHIA, PA.

AMERICAN CAR CO. ST. LOUIS, MO. — G. C. KUHLMAN CAR CO. CLEVELAND, OHIO — WASON MANF'G CO. SPRINGFIELD, MASS.

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In 1923

The Electric Railway Industry will be assisted in its efforts to improve operation by equipment developed or improved to keep pace with the industry's advancing needs.

The General Electric Company, for many years the leading manufacturer in this industry, and long represented by successful apparatus on electric railways throughout the world, can be of inestimable value to you in the selection of equipment to lower operating charges and better serve the public.

General Electric Company

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McGraw-Hill Co., Inc. January 13, 1923 Twenty Cents Per Copy

ELECTRIC RAILWAY JOURNAL

How Correct Lubrication builds up Operating Revenues

The Equipment Superintendent, out to make a record for himself by producing more revenue for his company, focuses his attention upon *analysis of his car failures.*

A study of his analysis would inevitably point in the direction of scientifically Correct Lubrication.

If you are interested to learn how the Vacuum Oil Company is cooperating to effect far-reaching economies on street railways throughout the world, our nearest branch office will be glad to get in touch with you.

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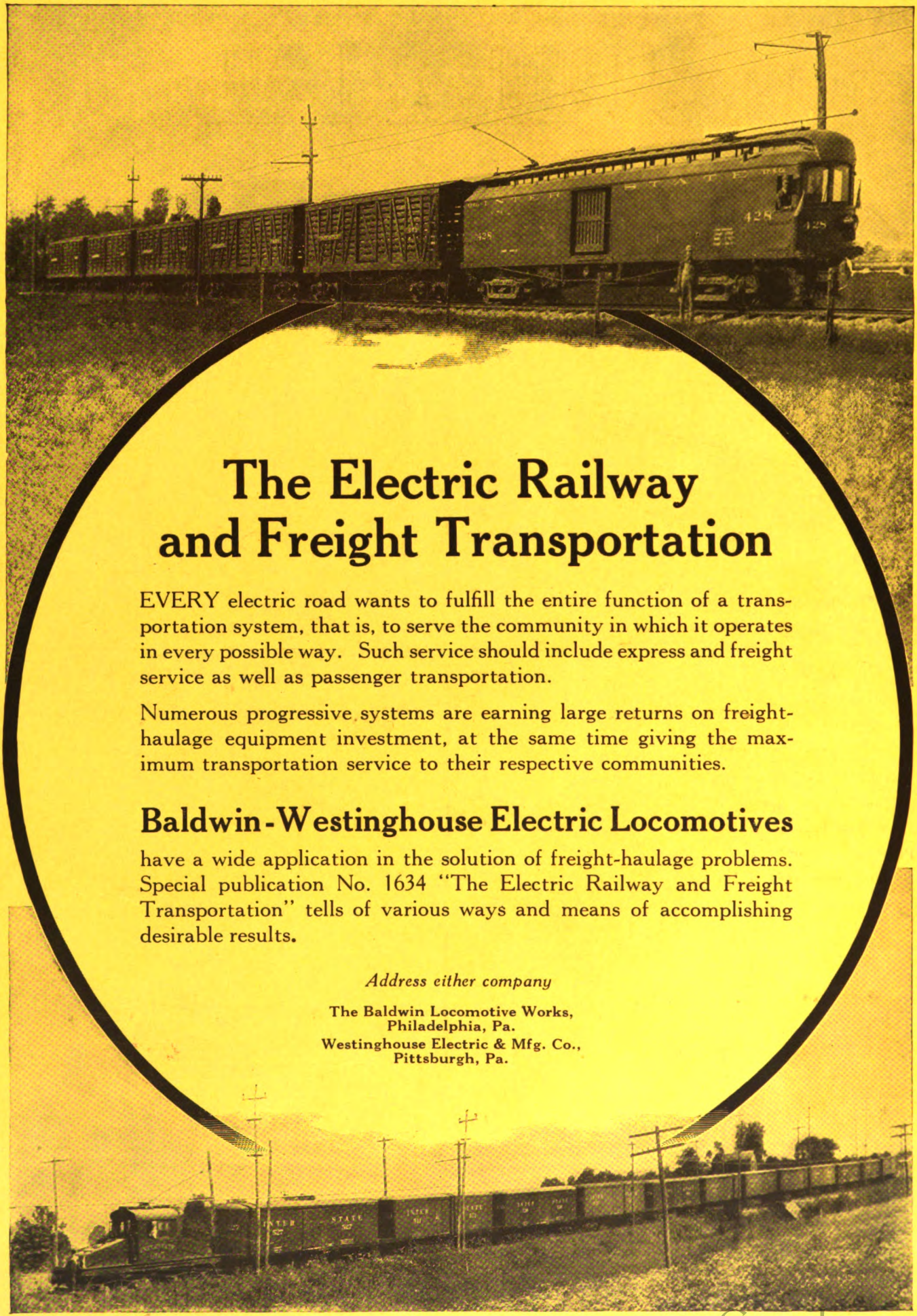

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ELECTRIC RAILWAY JOURNAL

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Company, Inc.

HENRY W. BLAKE and HARRY L. BROWN, *Editors*

Volume 61 New York, Saturday, January 13, 1923 *Number 2*

When It Comes to Seats Get Comfort First

A COMMUNICATION signed "Critic" published elsewhere in this issue ridicules those railway men who have purchased slat seats for recently built cars. While "Critic" goes pretty far in his discussion, there is some merit to his contention. Many railway men have long since been capitalizing upon the merchandising value of the spring cushion, even to the extent of insisting on its installation in the safety cars against the counter efforts of the stanch light-weight advocates. The car rider hardly expects the same luxury in deep spring seats on a street car that he finds in his or his neighbor's automobile, when he pays but a few cents for his ride. Nevertheless, a slat seat, or an unsprung car seat covered with rattan, does offer a very noticeable contrast, and hence helps to make the car rider want less to make his travel by street car. People do not like unsprung seats, and incidentally they do not like longitudinal seats. Certainly this matter of comfort and the ruling likes and dislikes of patrons is a very important factor in the general problem of merchandising transportation. The ride must be made as attractive as possible commensurate with the price, and it would seem that the slight saving in weight or the slight saving in first cost and maintenance from the use of slat seats are of minor importance as compared with the difference in degree of passenger comfort between slat seats and cushion seats and backs.

A Good Time to Start an Employee Thrift Organization

ELECTRIC railways can well encourage thrift movements among their employees. Some companies, like the Philadelphia Rapid Transit Company, have already taken steps along this line, even to the extent of having weekly account books printed especially for their men. An employee with property is likely to be a better workman than one without, one reason being that he can keep his mind on his work better because he has less financial worry.

During the war several extended campaigns were inaugurated to encourage corporations to start thrift organizations among their employees, and the electrical industry took a special interest in them because of the strong advocacy of such a plan by Henry L. Doherty, who personally gave a great deal of time to the study of various plans of employee thrift organizations. These campaigns were conducted, in a number of instances, under the name of Franklin, because in "Poor Richard's Almanac" and in other writings Benjamin Franklin made a great point of the virtue of thrift.

Fortunately, the idea is not being dropped with the termination of the war, and the fact that Jan. 17, 1923, will be the anniversary of the birth of Franklin has led to the naming of next week as "National Thrift Week." The announced purpose is to organize 5,000 Benjamin Franklin thrift clubs in industrial and commercial organizations, and in other ways to stimulate individuals to think straight and act wisely in regard to personal money matters in the realm of earning, spending, saving, investing and giving.

The encouragement of a thrift club is something which could well be taken up by every electric railway beneficial association. The conditions surrounding railway employment are such as to stimulate the practice of thrift. To a greater extent than in almost any other industry, the railway man has continuous employment and so can plan a personal budget and provide for a certain amount of saving better than a man in irregular employment. On its side the company will gain because a man who acquires regular and methodical habits about his personal expenditures will be likely to be more methodical and careful in his daily work.

Automobiles in Downtown Streets Should Be Limited

EVIDENCE is increasing on all sides that some restriction will have to be placed on the use of the downtown business streets of our cities by automobiles. Otherwise, the streets will fail in their function of providing the means by which traffic may move expeditiously. While the problem is more serious in some cities than in others, and naturally is more acute where the downtown streets are narrow, yet it is a matter which is of concern in practically every city with a population of more than 100,000. It may seem radical at first sight to limit the use of a public street to a vehicle owner when he has always been free in the past to drive where he wished. Nevertheless, in the interests of the majority, the time is coming, if it is not already here, when authorities will have to favor those vehicles which are economical of street space per passenger carried and restrict others.

Just how the automobile stands in this respect as compared with the electric car is shown by a recent traffic survey in Baltimore, where during the evening rush hour it was found that on the downtown streets upon which both street cars and other vehicles operate the automobiles represented 73 per cent of the total movements and the street cars only 27 per cent, whereas the street cars accommodated 88.8 per cent of the total passengers and the autos only 11.2 per cent. This corresponds, on a basis of traffic movement, to an efficiency more than twenty times as great for the electric car as for the automobile.

The evil of the automobile as a wasteful occupier of space is not limited to moving cars. The parked car is a still more wasteful use by certain individuals of public property, as well as a perversion of the streets from their original purpose, which was to permit traffic movement, not to provide free storage. It has been sometimes said that if stops, except for a limited time to discharge passengers, were forbidden, the automobile

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drivers would keep moving around on the streets and so cause more congestion than if they remained in one spot. This might be so if every automobile was continuously in charge of a driver. Actually there would undoubtedly be a considerable reduction in the number of cars taken downtown with a law like this in force, because it would then exclude those business men who drive their own cars and leave them parked all day.

Altogether the question is not an easy one to settle, but at least some steps can be made toward its solution.

Some Lessons We Can Learn from Europe

IT IS notable that electric railway engineering as practiced in the United States and electric railway engineering as practiced in Europe do not differ very greatly. In fact, the differences between the practice in this country and in any European country are probably no greater than those which would be noticed in comparing the practice of that country and that of some other in Europe. Thus the United States and Great Britain differ in regard to the use of double-deck cars, most of the cars in Great Britain being of that type, while there are very few here. But double-deck cars are also very uncommon on the Continent of Europe. It is the same way with the bow trolley. This form of construction is quite common on the Continent of Europe, but non-existent in Great Britain, as here.

In the matter of transportation methods a somewhat different condition prevails. Here the human element is predominant, and different conditions have brought about different results. Attention is directed to some of these points of difference in a report just presented by Daniel L. Turner to the New York Transit Commission and abstracted on another page. One striking point brought out in this report is the far more strict adherence to rules on the part of European crowds. This may be due to centuries of military training. There seems also to be a greater realization on the part of both the general public and the authorities of the need for good city transit and therefore of the desirability of co-operating with the transit companies. An example is given in the last meeting of the International Tramway Union in Brussels, where there were twenty-seven delegates officially appointed by their respective governments to attend. This difference in public regard was wittingly described by an electric railway operator some time ago who said that the prominent railway manager in Great Britain was rewarded by being knighted and in the United States by being indicted.

Another striking point of difference to which Mr. Turner and others returning from abroad have pointed is the better methods used by European railways to give travelers the information that they want to know. This is done in a variety of ways, as by signs on the cars, maps in poster or folder form, direction signposts and a thousand and one other ways which make traveling by street car abroad easy for the stranger. There may not be quite the same need here for this kind of information, because so many of our cities are laid out with rectangular blocks and numbered streets, but even in these circumstances adequate direction signs are not only helpful but they do much to encourage travel. The similarity of the remarks of Mr. Turner to those made by other returning travelers on this matter indicates that American companies could well copy some of the European practices.

Now Is the Time to Help the Rail Joint Committee

THE work of the committee on welded rail joints is at exactly the stage, at present, when it can benefit most by the suggestions of those who are qualified to make them. It is important that definite designs of testing machines be decided upon and, to a certain extent, the testing procedure also. The committee asks for the best thought of engineers and others to help it reach safe and sane conclusions. The response should be prompt and thoughtful.

To start the ball rolling there is printed elsewhere in this issue a digest of correspondence relating to the method, place and time of curving the joints, to the use of flangeless wheels on the trucks of the rotary testing machine, etc. This correspondence has been taking place between the United States Bureau of Standards and the committee, and among the members of the committee. It brings out the fact that there is so far a very fair degree of unanimity as to the general principles, the differences of opinion being largely as to details. This fact, however, need not restrain any one from criticising adversely any of the opinions expressed.

The Man Who Had Nothing to Sell

THIS is a true story, and, as Shakespeare remarked, "Pity 'tis, 'tis true!" It concerns an electric railway manager who applied for membership in the local Commercial Club shortly after its organization. The club seems to have been more selective than is the wont of such bodies. Our manager's application, at any rate, came up before the membership committee. It was rejected on the ground that the applicant was an electric railway operator and therefore was not eligible under the rules of the club because he had nothing to sell!

So far from being flabbergasted by this unexpected rejection, the railway man took the reason to heart and pondered it seriously. Was he really in the business of selling something or did the major part of his job consist in sitting around waiting for passengers who had to ride or for an accident to occur? "Every day and in every way" he could see how the individuals who had been accepted as members in the Commercial Club kept finding new reasons—and advertising those reasons—for the use of their products. He was forced to admit to himself that all the selling the railway did was of the "order-taking" variety. It did not go after business. It waited for customers to come along.

Looking more deeply into the matter, our manager discovered that he was needlessly handicapped by the uncommercial manner he had of pricing his goods. About all the differentiating he did was between the cash rider at 8 cents and the people who were so liberal as to invest the price of five rides for 35 cents to be used when they felt like riding in a car instead of in an automobile. Both classes were grumblers. Few passengers seemed to be really consistent patrons, but why not find out how many would be willing to use the service at wholesale if they could get a truly wholesale rate? This led to the adoption of weekly commutation, hand in hand with an advertising campaign in cars, newspapers and theaters. This innovation made so powerful an impression upon the membership committee of the Commercial Club that they did not wait for the railway manager to renew his application. They hunted him up to offer him membership, for had he not proved at last that he had something to sell?

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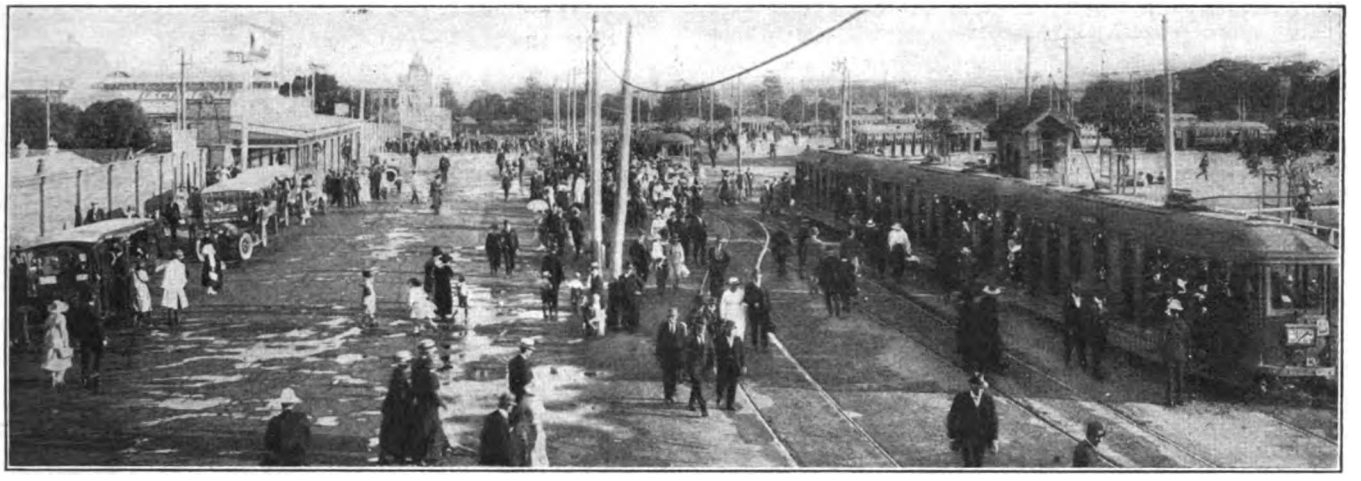


Loading Passengers at the Agricultural Fair Grounds, Which Attract Large Crowds of Exhibitors and Spectators

The Sydney Tramway System

Is Owned and Operated by the New South Wales Government and Last Year Carried Nearly a Million Passengers a Day—The Traffic Problems Include Street Congestion in the Business District and Transportation of Large Crowds to Races and Other Various Popular Outdoor Events in Sydney

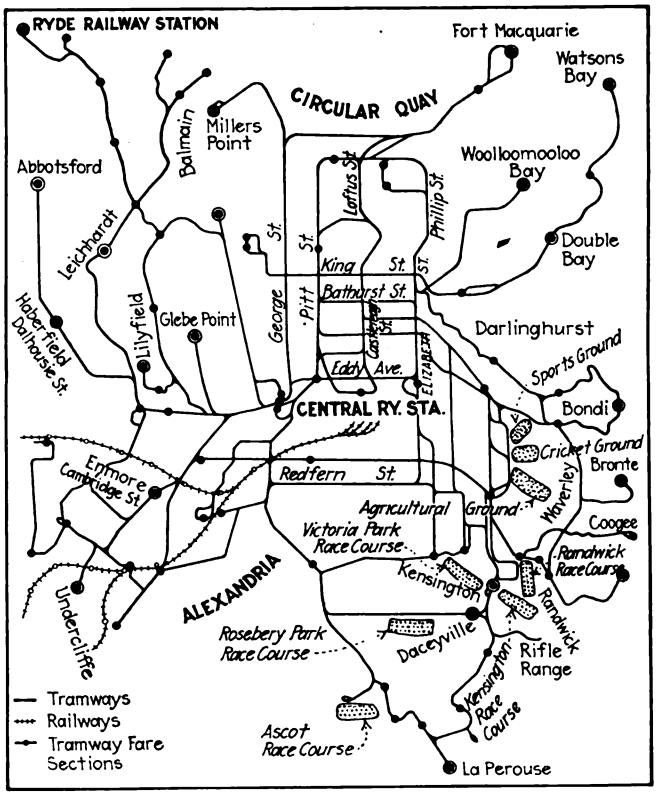
THE city of Sydney, New South Wales, in the southeastern part of the continent of Australia, is the capital and chief city of New South Wales. According to the census of 1914 there was a population within the city boundaries of 110,700, but including the neighboring suburbs the population was 641,800. The Sydney district has a magnificent harbor, into which a considerable part of the city proper juts as a peninsula, but the metropolitan area lies on a much larger peninsula between the Parramatta River and George's River, and includes many flourishing suburban municipalities. To the north, just across the Bay of Port Jackson, there are also other communities, including North Sydney.

All the tramways in this extensive district, as well as the steam railways of New South Wales, are owned by the New South Wales Government, so that there has been co-ordination in the development of both, and the tramway system has been extended so as to serve practically all of the surrounding suburbs as well as the city of Sydney itself, although politically they are distinct municipalities.

Tramway Statistics

The first tramway line was opened in 1879 as a horse line 1½ miles in length. This had increased up to June 30, 1922, to 229 miles of route or 366 miles measured as single track. The total capital cost of this property on the same date is given in Table I.

This represents an average for track per mile of route of £21,579, for the remainder of the equipment per mile of route, £19,889, or a total of £41,468. Additions to the tramway capital during the year ended June 30, 1922, were £444,975.



Map Showing Tramway System in Sydney

TABLE I—CAPITAL COSTS OF SYDNEY TRAMWAY SYSTEM

Track construction	£4,946,572
Rolling stock	1,927,806
Power station, substations and transmission system	1,901,897
Machinery	182,519
Repair shops	257,546
Furniture	2,392
Stores, advance account	287,000
Total	£9,505,732

In addition to some track extensions a great deal of work was done in track rehabilitation. The corrugation on 23½ miles of rails was ground out and 2,700 pieces of special trackwork and 8 miles of track were rehabilitated in place by electric welding, at a cost per piece of special work of £1 10s. and for rails

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The Business Portion of the City of Sydney Lies Between the Two Points Shown in These Two Views

The upper view was taken at Circular Quay at the northern end of the city, where there is a ferry service to the opposite side of the bay. The conditions here are not unlike those at the ferry house at the foot of Market Street, San Francisco. The lower view shows the plaza at the western entrance to the Central Railway Station. The passenger trains stop here about a mile from the center of the city proper, and from this point passengers are conveyed by street car to and from the city. The steam trains from this point run south and west.

The traffic is becoming so dense in the streets in the business district of Sydney that a subway is under consideration. On such a system, the two points which have been mentioned would be important traffic centers.

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Typical Pictures Showing Congested Street Conditions in Downtown Sydney. During the Rush Hour the Schedule Calls in Some Cases for a Car Across a Crossing Every Eight Seconds

of 2s. 11d. per foot. In this track rehabilitation and construction, extended use has been made of pneumatic equipment, including pneumatic wood borers, drills and tie-tamping machines.

During the past year also a number of additions have been made to the power equipment. The generator capacity has been increased by two 2,500-kw. turbo-alternators and it is expected that another of 2,500 kw. and one of 18,750 kw. will soon be installed. Three 1,000-kw. rotaries have been ordered, considerable overhead construction has been renewed and additional machinery and tools have been added to the shop.

In the car shops 633 electric cars have been overhauled and 486 were repainted; 352 trucks received a thorough overhauling or general repairs and 1,579 armatures were rewound. Vacuum drying and solid compound impregnating plants have been manufactured and installed for coil treatment.

In addition thirteen cars were built at the shops and put into service during the year and fourteen more are in process. It is intended to add seventy-five more cars, of which twenty-five will be built in the government shops and fifty let to local contractors.

A few financial statistics will now be given in Table II before an account of the operating conditions on the property. For the convenience of the American readers, the figures given in this report have been changed to dollars on the basis of a pound being worth $4.50. This ratio of exchange is of course considerably lower than that which existed in the years 1907 and 1888.

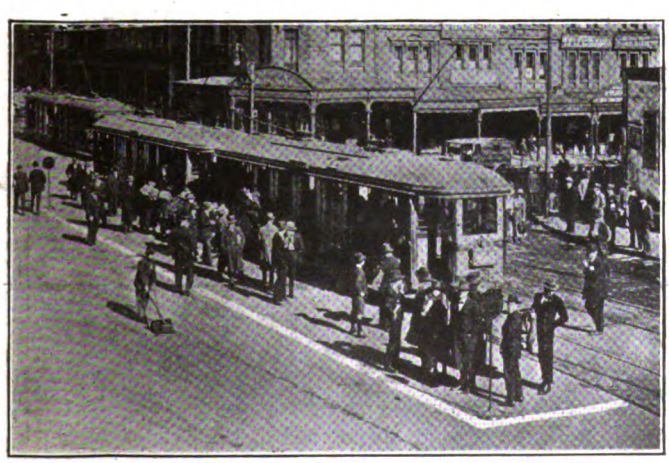
There are a number of special conditions which affect traffic in Sydney, which must be realized for a thorough understanding of the means adopted for overcoming them.

In the first place, the city has a very large number of parks, and the equable climate encourages the use of these parks generally throughout the year. In the second place, the fondness of the population for sports, particularly athletic contests, attracts to these events not only the citizens of Sydney and surrounding neigh-

TABLE II—RESULTS OF OPERATION
SYDNEY TRAMWAYS, ALL LINES

Particulars	Year Ended June 30 1922	1921	1907	1888
Amount expended on construction and equipment	$42,775,794	$40,773,406	$16,512,858	$3,947,598
Cost per mile open including repair shops and rolling stock	186,606	179,388	128,331	102,537
Total route-miles open for traffic	229¼	227¼	128¾	38¼
Earnings	$16,245,607	$15,622,821	$4,089,154	$1,064,335
Operating expenses	13,570,272	13,244,634	3,275,761	986,382
Earnings less operating expenses	2,675,335	2,378,187	813,393	77,953
Percentage of profit to capital invested	6.40	5.94	4.94	1.98
Operating ratio, per cent	83.53	84.78	80.11	92.67
Earnings per average route-mile open	$71,172	$69,052	$32,134	$28,008
Working expenses per average route-mile open	59,449	58,540	25,744	25,956
Return per average route-mile open (after paying operating expenses)	11,723	10,512	6,390	2,052
Earnings per car-mile, cents	54.3	55.4	24.3	76.4
Operating expenses per car-mile, cents	45.4	46.9	19.6	70.8
Return per car-mile (after paying operating expenses), cents	8.9	8.5	4.7	5.6
Number of passengers carried	330,938,567	337,689,873	155,017,982	*
Car-mileage	29,318,532	28,654,172	16,620,434	1,388,786

* Not obtainable.



Safety Zones Have Been Introduced in Recent Years to Good Advantage

The Motormen Receive Their Instruction in This Schoolroom

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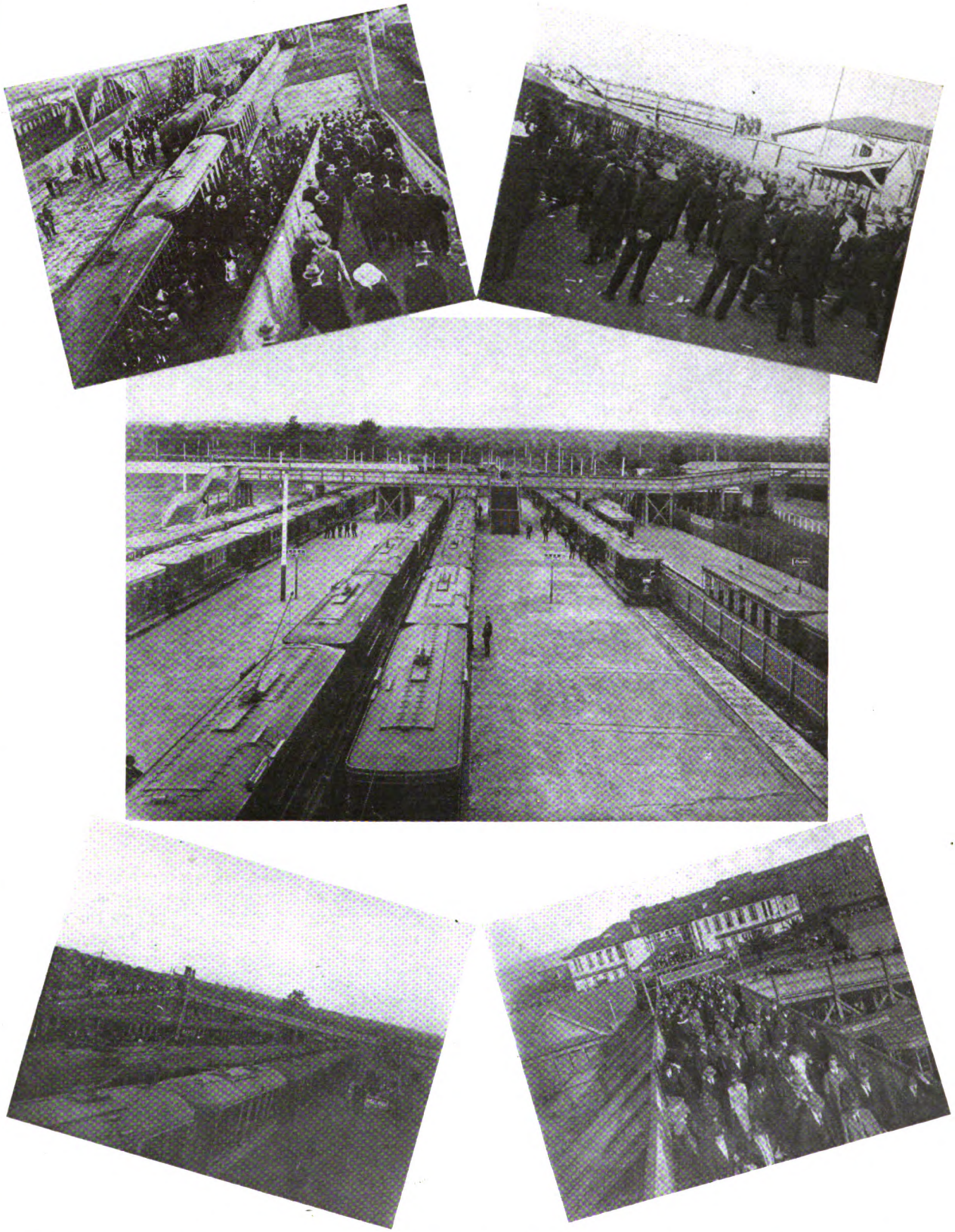
The Racetracks Attract Enormous Crowds and the System of Loading Passengers at the Conclusion of a Meeting Has Been Carefully Worked Out



The center view shows one of the overhead bridges at the Randwick Racecourse, through which passengers proceed to the various platforms. The others are typical views at the close of an afternoon at the racetrack. Passengers are dispatched at the rate of from 1,000 to 1,200 every minute.

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borhood, but also of more distant parts of New South Wales and from the other five states of the Commonwealth of Australia.

Another factor stimulating traffic in Sydney is the fact that the steam railroad services terminate in general about 1 mile from the center of the city, so that from this point passengers desiring to go "downtown" must take the trolley system. The suburban steam service, as shown in the map, extends south and west, leaving the other suburban districts to be served exclusively by the electric cars. The electric lines run in some instances adjacent to the steam railroad lines, but none of the racecourses, fair or sport grounds is served by the steam railroad. In addition to the steam railroads which serve the region south and west of Sydney, there is a very large ferry service at the north of the city to the suburban population across the bay. All these conditions tend to increase traffic. There are, however, some traffic difficulties, since the streets in the lower part of the city are narrow and there are many steep grades. Some of these conditions are set forth in two previous articles which have been published in this paper on the Sydney system, namely, in the issues of Aug. 5, 1922, and July 6, 1918. Some traffic statistics follow:

Maximum number of passengers carried on any one day, 1,273,000, carried on Dec. 24, 1920. Largest number carried during 1922 to date, Easter Saturday, 1,180,706. This number was carried in 1,232 cars without any accident. Average number of cars operated per day, 1,160. Maximum number of cars operated per day, 1,343. Headway of cars at most congested crossing during rush hours, eight seconds. This is a four-way crossing at the corner of George Street and King Street. Further particulars of the rush-hour conditions in Sydney were given in the article mentioned in the issue of Aug. 5, 1922.

STAGGERED HOURS FOR SPORTS HELP RAILWAY TO CARRY CROWDS

One of the most successful methods of caring for the heavy holiday traffic is by means of staggered hours. Arrangements have been made with the authorities controlling the various sporting associations to start and finish their programs at different times, so that a dual use can be made of the rolling stock. For instance during the Easter holidays, when some of the largest outdoor events take place, the Agricultural Society opens its fair at 9 a.m., and the racecourse authorities commence their program at 1 p.m., so that the cars can be diverted from one service to the other as the exigencies of the service demand. The ordinary suburban services are reduced to a minimum while there is the rush of traffic to and from the outdoor entertainments. To facilitate the collection of fares on such occasions, arrangements are made by which round-trip tickets are issued to the racecourse, including the entrance charge to the course. The same arrangement about the starting time of these outdoor entertainments is made for the finishing time; that is to say, the closing times are staggered. The closing time for a race meeting is usually between 4:15 and 4:30 p.m.

The loading arrangements at the racecourse are by means of aisle and platforms with overhead gangway and stairs, and with this system it has been possible to haul passengers away at the rate of 1,000 and 1,200 a minute. After these cars have run into town and discharged their load they are sent to the agricultural grounds, which close between 5 and 6 p.m. On some days the Randwick Racecourse traffic is as much as 90,000 passengers in a day.

For its city service the Sydney system has always been inclined favorably to the multi-compartment car with transverse seats back to back and running board on the side. This car was illustrated in the issue of Aug. 5 as the type "P" car. It weighs 36,176 lb., and seats eighty passengers, the weight including the motor equipment with multiple-unit control. This weight corresponds to a weight of 432 lb. per seated passenger, which E. J. Doran, traffic manager of the New South Wales Government Tramways, believes makes it the lightest car per seated passenger in the world.

WAGES RECENTLY REDUCED

The average number of employees on the entire railway and tramway system of the New South Wales Government for the year ended June 30, 1922, was 46,347, of which the tramways employed 9,344. Up to Jan. 1, 1912, the minimum adult wage paid these men was 7 shillings ($1.68) a day, but during the last ten years there has been a continuous increase in wages, with the peak reached Oct. 8, 1920. At that time the minimum adult daily wage was 14s. 2d. This wage, however, was reduced on Oct. 8, 1921, to 13s. 8d. and again by the Court of Industrial Arbitration on May 12, 1922, to 13s., the reduction to take effect July 28, 1922. These figures correspond respectively to $3.28 and $3.12 on the basis of 24 cents to the shilling.

The above information relates to the surface-transportation system of Sydney. There is also being carried out at present a comprehensive rapid transit plan involving extensive subway construction and electrification of the suburban railways. Details of this work will be given in the ELECTRIC RAILWAY JOURNAL from time to time as the construction proceeds.

Electric Cars in Edinburgh

PRINCES' STREET in Edinburgh, claimed by the citizens of that place to be the finest street in the world, has finally been equipped with the overhead trolley. After the decision to remove the cable line on this street was reached, much thought was given to the type of pole to be used and a design was finally selected with short brackets so as to be inconspicuous.

The accompanying illustration shows the first electric car on the street with the temporary bus service in operation during reconstruction.

On Oct. 22 the First Electric Car Was Run on Princes' Street, Edinburgh

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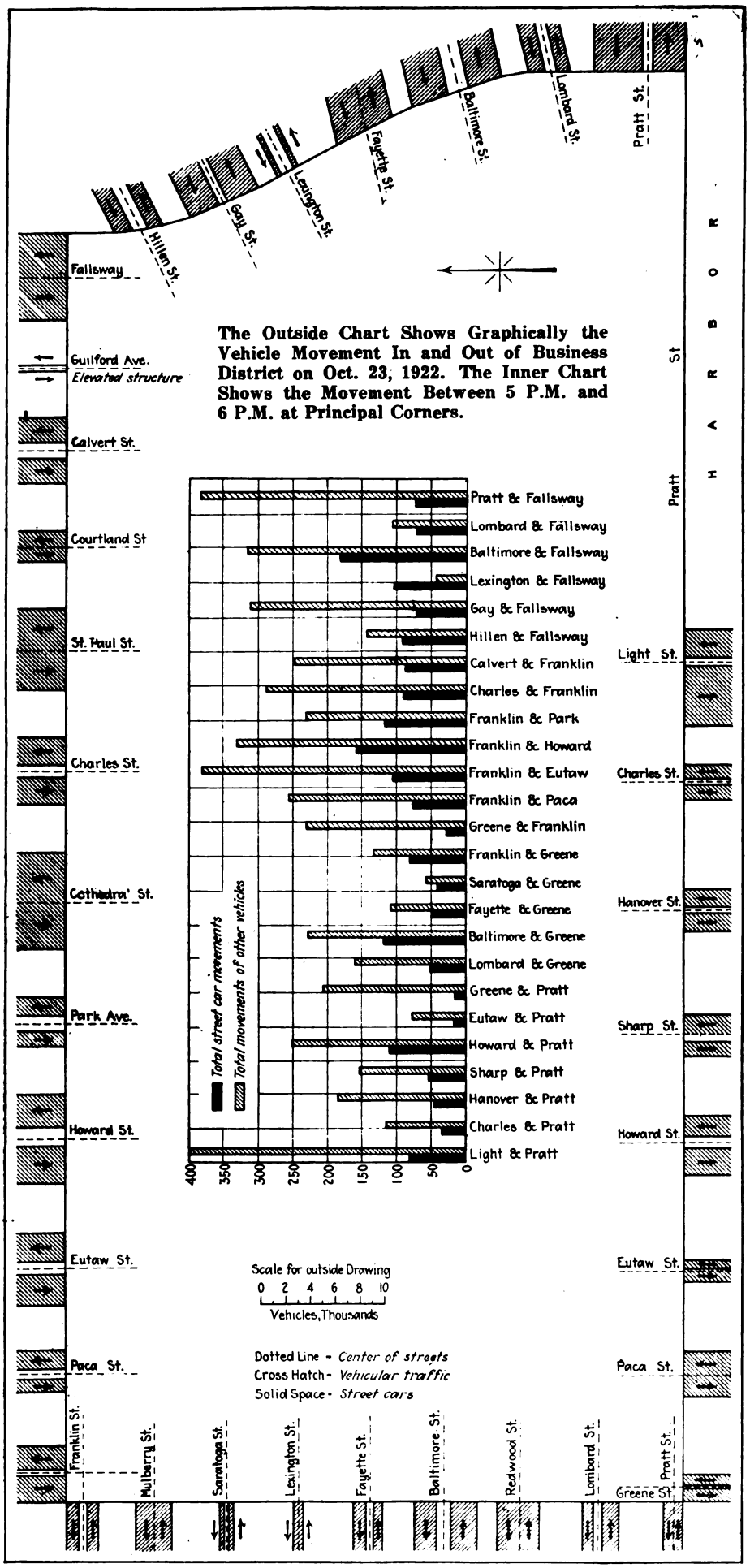

TABLE SHOWING NOMINAL VALUES FOR DATA GIVEN IN THE OUTSIDE CHART

Street Intersections		Street Cars	Other Vehicles
Light and Pratt Sts.	N	411	2,743
	S	281	5,034
Charles and Pratt Sts.	N	.....	.....
	S	927	2,947
Hanover and Pratt Sts.	N	522	3,629
	S	.....	.....
Sharp and Pratt Sts.	N	.....	1,194
	S	546	2,399
Howard and Pratt Sts.	N	664	2,317
	S	580	2,623
Eutaw and Pratt Sts.	N	200	960
	S	.....	846
Paca and Pratt Sts.	N	.....	2,036
	S	.....	1,755
Greene and Pratt Sts.	N	106	1,091
	S	98	1,271
Pratt and Greene Sts.	E	.....	735
	W	.....	809
Lombard and Greene Sts.	E	335	1,851
	W	336	1,306
Redwood and Greene Sts.	E	.....	1,614
	W	.....	1,922
Baltimore and Greene Sts.	E	590	2,905
	W	614	2,553
Fayette and Greene Sts.	E	264	1,148
	W	261	1,291
Lexington and Greene Sts.	E	.....	294
	W	.....	426
Saratoga and Greene Sts.	E	169	514
	W	174	537
Mulberry and Greene Sts.	E	.....	1,465
	W	.....	1,458
Franklin and Greene Sts.	E	337	1,236
	W	347	1,339
Greene and Franklin Sts.	N	199	2,172
	S	198	2,686
Franklin and Paca Sts.	N	351	1,988
	S	362	1,515
Franklin and Eutaw Sts.	N	518	2,912
	S	510	3,153
Franklin and Howard Sts.	N	949	3,584
	S	557	3,781
Franklin and Park Ave.	N	453	2,053
	S	811	2,127
Franklin and Cathedral Sts.	N	.....	3,607
	S	.....	4,218
Charles and Franklin Sts.	N	423	2,709
	S	451	2,822
St. Paul and Franklin Sts.	N	.....	3,588
	S	.....	3,156
Courtland and Franklin Sts.	N	.....	1,383
	S	.....	1,138
Calvert and Franklin Sts.	N	660	2,693
	S	688	2,700
Calvert and Bath Sts.	E	.....	73
	W	.....	114
Fallsway and Hillen Sts.	N	.....	3,705
	S	.....	3,543
Hillen and Fallsway Sts.	E	647	1,879
	W	619	2,222
Gay and Fallsway Sts.	E	317	3,123
	W	327	3,089
Lexington and Fallsway Sts.	E	609	927
	W	601	947
Fayette and Fallsway Sts.	E	.....	2,439
	W	.....	2,781
Baltimore and Fallsway Sts.	E	855	3,785
	W	965	4,146
Lombard and Fallsway Sts.	E	536	1,719
	W	398	1,817
Pratt and Fallsway Sts.	E	313	3,168
	W	457	4,635
Guilford Viaduct	N	273	.....
	S	273	.....
Outbound		10,767	76,047
Inbound		10,815	76,292
Total		21,582	152,339

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A recent traffic survey in Baltimore shows that car movement during the evening rush hour is greatly impeded by automobiles, which carry a very small proportion of the traffic out of the business district. Remedial measures are being considered by the authorities

Baltimore Vehicular Traffic Study

By Joseph A. Stoll
Superintendent of Traffic
United Railways & Electric Company of Baltimore

TO DETERMINE accurately the amount of vehicular traffic entering and leaving the business district of Baltimore, a comprehensive check was made by the traffic department of the United Railways & Electric Company on a normal weekday in the latter part of October, 1922. The check began at 6 a.m. and continued until 12 o'clock midnight and required a force of seventy-two checkers working in relays. Similar counts will be made annually in future. It is thought they will be useful not only in working out plans for the efficient development of street car facilities but also as a definite guide in the formulation of such regulations as will insure free movement of traffic to and from and through the congested business district.

The business section of Baltimore, as shown in the route map, lies mainly within the area bounded by Franklin Street on the north, Greene Street on the west, Pratt Street on the south and Fallsway on the east and comprises about eighty ordinary city blocks, i.e., ten blocks east and west and eight blocks north and south. Into this territory the vast bulk of the traffic of the city flows via thirty-seven arteries of travel. On twenty-six of the streets entering this district, street cars are operated, and eleven of the streets are entirely free of car tracks.

Altogether there was a total of 152,339 vehicular movements in and out of the business section, made up of:

Pleasure autos	76,234	or 50%
Commercial autos	37,024	24%
Street cars	21,036	14%
Buses and taxicabs	4,224	3%
Horse-drawn	13,821	9%
Total	152,339	100%

The heaviest point for each kind of traffic was:

Pleasure autos, Franklin and Cathedral Streets	6,311
Commercial autos, Pratt and Fallsway	3,058
Street cars, Baltimore and Fallsway	1,820
Horse-drawn, Pratt and Fallsway	1,457

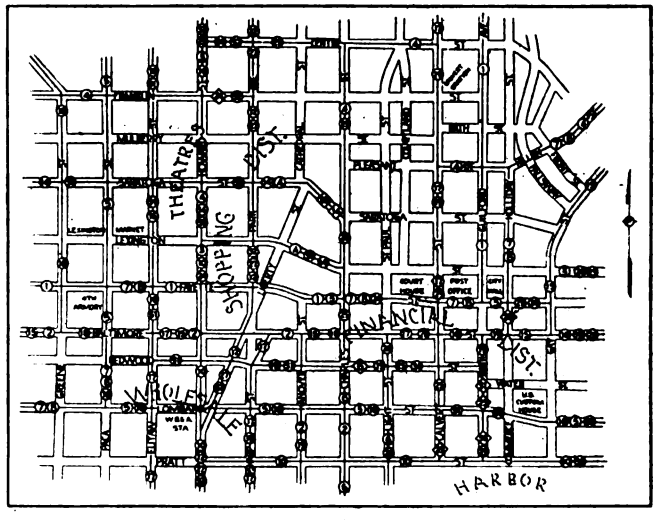
Cathedral Street, upon which there are no car tracks, is the natural outlet for passenger carrying automobiles. The street is wide and well paved, and connects with lateral streets to and through the main residential sections, as well as with the main thoroughfares leading out of the city. Pratt and Fallsway is the heaviest point for commercial vehicles, both motor and horse-drawn, for the reason that it is the gateway to the wharves from the east and southeastern manufacturing districts. Baltimore and Fallsway, while shown to be the heaviest point for street cars, is not congested, as the vehicular movement parallel to the street cars at this point is comparatively light. The points of maximum congestion for both street cars and vehicles are well within the area bounded by the streets at which the check was made.

The outside chart on page 76 shows the various streets entering the business district and illustrates the relative density of traffic on each street for the entire day. It also shows the proportion of street cars to total vehicles inbound and outbound for the entire day. The classification by hours of the total number of vehicles entering and leaving the business district is given in a table on page 78.

The heaviest hour for each kind of traffic was:

Pleasure autos,	5.00 to 6.00 p.m.	6,300
Commercial autos,	2.00 to 3.00 p.m.	3,941
Street cars,	5.00 to 6.00 p.m.	1,926
Buses and taxicabs,	5.00 to 6.00 p.m.	361
Horsedrawn,	2.00 to 3.00 p.m.	1,466

As in most cities, the morning inbound travel is fairly well distributed throughout the three hours from 6 to 9 a.m., and the afternoon outbound rush travel is



Route Map of Cars Within the Business District

peaked between 5 and 6 p.m. It is interesting to note that during the peak hour there were 6,300 pleasure autos and 1,986 street cars entering and leaving the business district. The automobiles represented 76 per cent of the total movements in this hour and 60 street cars entered and left via the Guilford elevated structure during this hour.

On the streets upon which both street cars and other vehicles operate, there were in the hour from 5 to 6 p.m. 5,360 autos and 1,926 street cars, the automobiles representing 73 per cent of the total movements and the street cars representing 27 per cent of the total movements—whereas, the street cars accommodated 85,050 or 88.8 per cent of the total passengers, and the autos accommodated only 10,720 or 11.2 per cent of the total passengers. To arrive at these figures, two passengers were calculated for each auto and twenty passengers inbound and sixty passengers outbound for each street car, which is a very conservative estimate.

A comparison of all other vehicles with street cars

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for the entire day, the p.m. rush and the peak rush follows:

			Per Cent
6 a.m. to 12 mid.	Street cars	21,036	13.7
	Other vehicles	131,303	
4 p.m. to 7 p.m.	Street cars	4,875	17.6
	Other vehicles	22,869	
5 p.m. to 6 p.m.	Street cars	1,926	17.8
	Other vehicles	8,899	

There were 4,895 autos inbound during the three morning rush hours, 6 to 9 a.m., and 11,150 or 108 per cent more outbound during the three afternoon rush hours (4 to 7 p.m.). During the p.m. peak hour from 5 to 6 p.m., there were almost as many automobiles outbound as there were inbound during the entire three morning hours, namely, 4,132. The number of street cars entering and leaving the district during the various periods of the day were:

Morning rush, 6 to 9 a.m.	4,550
Afternoon rush, 4 to 7 p.m.	4,875
Maximum hour, 5 to 6 p.m.	1,926

Due to the lack of effective traffic regulations, the roadways on either side of the car track area are not available for moving vehicles, hence practically all of the vehicles counted on these streets used the car tracks in conjunction with the street cars.

Narrow Streets Increase Congestion

Baltimore is handicapped with narrow streets to the extent that all traffic movement is very seriously interfered with, particularly during the congested rush-hour periods. There are comparatively few streets upon which it is possible for a vehicle to pass between a street car and a vehicle parked at the curb and there is no time during the busy hours of the day when the main downtown streets are not occupied with standing vehicles along the curb on each side of the street.

Congestion is intensified by the peculiar topography and physical layout of the city. Crosstown vehicular traffic through this section, which is very heavy, must of necessity use a limited number of streets. This is also true of the majority of car lines which are through-routed. Hence the urgent need for unclogging the available arteries or mains through which the currents of travel must flow and for establishing definite routes for through vehicles with such slight detours as will avoid congestion and incidentally enable them to reach their destination in shorter time.

The only measure of relief that has been realized was through the comparatively recent passage of the ordinance which prohibits parking of vehicles on certain downtown streets between 4:30 and 6 p.m. However, when consideration is given to the fact that nearly 90 per cent of all persons anxious to reach their homes after business are carried on the street cars it seems only right and proper that the relief that is possible should be given if only during the p.m. rush hours.

This company has resorted to rerouting its lines in an effort to distribute the car service better and relieve congestion, but while these changes, which were very costly on account of special track connections involved, greatly improved the situation, the constantly increasing use of automobiles shortens the time when drastic measures must be adopted in order to insure a continued improvement in transportation facilities commensurate with the growing needs of the city.

The company recognizes fully the necessity for providing ample roadways and parking places for autos,

TABLE SHOWING CLASSIFICATION OF TOTAL VEHICLES ENTERING AND LEAVING BUSINESS DISTRICT BY HOURS

a.m.	Pleasure Autos	Commercial	Street Cars	Buses and Taxicabs	Horse-drawn	Total
6.00– 7.00	659	673	1,239	55	393	3,019
7.00– 8.00	1,972	1,960	1,589	245	944	6,710
8.00– 9.00	4,849	3,369	1,722	236	1,355	11,531
9.00–10.00	5,675	3,826	1,296	220	1,435	12,452
10.00–11.00	5,817	3,914	990	271	1,402	12,394
11.00–12.00	5,737	3,407	903	233	1,291	11,571
p.m.						
12.00– 1.00	5,979	2,998	934	284	1,114	11,309
1.00– 2.00	5,630	3,307	889	290	1,095	11,211
2.00– 3.00	5,665	3,941	1,038	223	1,466	12,333
3.00– 4.00	4,892	3,329	1,212	312	1,350	11,095
4.00– 5.00	5,203	2,968	1,621	305	1,199	10,296
5.00– 6.00	6,300	1,725	1,926	361	513	10,825
6.00– 7.00	3,280	621	1,328	255	139	5,623
7.00– 8.00	3,855	344	1,125	244	68	5,636
8.00– 9.00	3,626	239	931	223	25	5,044
9.00–10.00	2,449	190	797	175	17	3,628
10.00–11.00	2,460	101	859	152	9	3,581
11.00–12.00	2,186	112	637	140	6	3,081
Total	76,234	37,024	21,036	4,224	13,821	152,339

but realizes unless intelligent regulation is adopted it will always be confronted with the very difficult problem of spacing its cars with such frequency and regularity as fully to meet the popular idea of adequate service.

Parked vehicles necessarily will force all moving traffic through about one-half the available width of the street, namely, in the car track area. Estimating 20 ft. per auto and 50 ft. per street car, the total linear space occupied during the p.m. rush hour (5 to 6 p.m.) by autos was 107,200 ft. and by street cars 96,300 ft. There was a vehicular movement every ⅔ second in addition to a street car movement every 1.8 seconds. If there were no parked vehicles much of this vehicular traffic would move parallel with the street cars and the result would be quicker movement and at the same time increased capacity for both classes of traffic.

The small chart within the large chart on page 76 illustrates the relation between street car movements and other vehicles during the peak hour.

In working out the traffic problems of this city the question must be studied from a physical standpoint and without regard to the feelings of the individual shopkeeper. It is evident that no one rule can be applied uniformly. During the rush hours there are certain natural arteries through which the heavy currents of traffic should be allowed to flow unobstructed by parked vehicles. There are other streets and portions of streets upon which parked vehicles would not in any way interfere with the free movement of travel. The local authorities realize that the time has arrived when more effective regulation must be had and they are at the present time engaged in working out a solution to this problem. It is believed that the plan finally decided upon will insure well ordered movement and consequent increased street capacity for all moving vehicles and will provide for future growth.

Experts from the Public Service Commission of New York who have completed a brief survey of trolley service in Buffalo, as a result of complaints made by municipal authorities, have recommended to the International the employment of additional traffic supervisors to see that cars are operated under normal headway instead of in groups as at present. In making the recommendation, Public Service Commissioner Pooley said the traffic experts find that a sufficient number of cars are in operation to provide adequate transportation but the railway should exert a greater effort to see that cars are spaced properly. The difficulty that has arisen in this respect is chargeable largely to effects of the strike that was declared by the trainmen last July.

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New York, London, Paris and Berlin Transit Compared—I*

While Social and Other Conditions Greatly Affect City Transit Methods There Is Much that Can Be Learned from the Properties Abroad, Especially Methods of Merchandising Transportation—More Passengers Are Carried Annually on the City Systems of New York than on Those of Any Other City

By Daniel L. Turner
Consulting Engineer, New York Transit Commission

THE transit conditions in this country and in Europe are unlike physically, socially and psychologically. In comparing them, it is a matter of pointing out their contrasts. Generally, it is fair to say that municipal transportation has been developed farther here than abroad, but in some particulars, as we shall see, London and Paris lead us.

The painted platforms is one illustration of the psychological difference in conditions. The mental attitude of the passengers toward the operators of the transit lines is different. Also, the mental attitude of the public authorities toward those responsible for the operation of the facilities is different. The passengers are more amenable to suggestion and control than they are here. They expect to have information furnished to them in such a way that they can conveniently use it. They seek out the information for themselves, and from our point of view, the strange part of it is that they endeavor to be guided by the directions given them. They are willing to do what they are told to do. On some of the London Underground station platforms, painted white lines were observed. They were guide-lines within which the passengers were expected to form queues so that they might board the trains in the order in which they arrived at the station, and in an orderly manner. Without protest, the passengers formed up within these painted lines. Here we have to mark out such spaces with 2-in. pipe railings, and we have to have policemen on hand to compel the passengers to keep in formation behind the railings.

The practice which is very generally in vogue abroad of permitting passengers to open the car doors themselves, and to debark from the train before it has stopped, and also of opening doors and boarding trains after they have started, is an illustration of the difference in mental attitude of the public authorities over there and over here. If we permitted our companies so to equip the cars as to enable passengers to open the car doors and enter and leave the trains at their will, and injuries occurred, there would be a hue and cry about indicting the railroad officials and others responsible for permitting such a thing to happen. Over there, the rules are against the passenger leaving and entering the train while in motion. If he is injured under such circumstances, he—the passenger—is to blame, and is held responsible, not the operators of the line. In other words, over there the fool is punished. Over here, those responsible for not making things foolproof are punished.

The difference in mental attitude may be well summed up in a statement made to me by one of the railroad officials, which was to the effect that their idea was to train the individual to use his head, and to do what he should do and when he ought to do it. He was speaking of training railroad operating men and was objecting to our tendency to develop all kinds of mechanical devices which automatically control the operations and take the responsibility out of the hands of the operatives themselves. In other words, their idea is that since we must always deal with the human element, we should train the human machine to be as perfect a human machine as possible, and require it to function and not destroy the efficiency of the human machine by taking all control away from it, and setting up a mechanical device in its place.

While I admire the principle, I am convinced it cannot be applied under our conditions. For example, the train crews must lock our train doors, and thereby stop most of the passengers, who could easily and safely do so, from getting on and off the trains as they please, in order to prevent the fools from getting on and off at the wrong time and in the wrong way. That is to say, with us, in municipal transportation, as well as in every other human activity, the liberty of action of the great majority must be restricted to safeguard the incompetents and fools.

Social Conditions

When I first saw the red and gray and green toy towns on the banks of the Mersey as we approached Liverpool, and compared them in my mind with the skyline of upper Manhattan, I realized at once the outstanding difference in the social conditions over here and abroad. There were the home areas of a great city, consisting of two- or three-story garden homes, as compared with the ten- or fifteen-story family barracks of New York. Each little family had a separate little home. There were trees and shrubs in plenty. Compare such a picture with our conditions here in New York, where we house forty or fifty families under a single roof, in a barracks, for it is just that. And where there are no gardens, no shrubs and no trees. The same contrast prevails in the business parts of London, Paris and Berlin. In those cities the maximum height of the buildings is five or six stories; here, we have gone to forty stories and have not yet reached the limit. There, by restricting the building heights, they have compelled the diffusion and distribution of the home and business activities. Here we are superimposing six or eight cities on one and expect the circulating and distributing systems designed to serve the one city serve the six or eight cities.

*Abstracted from the first part of a report just presented to the New York Transit Commission. Mr. Turner spent last summer in Europe studying city transit conditions. An abstract of the second part of Mr. Turner's report, comparing operating practice, will appear in a later issue of this paper. The portion on buses is given in greater detail in *Bus Transportation* for January.

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When they were told in London and Paris that we would build a subway, and then some one would come along and build a single building on a single block that would absorb one-third of the subway capacity, they were astonished. They have no such problem to contend with.

Average densities of population do not disclose these conditions. It is the concentration of living and business activities which intensifies and complicates the municipal transit problem. Paris has the greatest average population density, with 151 people per acre. This is nearly six times the average density of New York City and two and one-half times the density of London. Berlin comes next to Paris, with a density of 118 people per acre (municipal Berlin, I mean). Its density is four times that of New York and two times that of London, and London has a density of sixty people per acre, which is two times that of New York, with an average of twenty-eight per acre. But in Manhattan Borough of New York the population density is 163 per acre on the average, even greater than in Paris, and in some parts of New York the congestion of population is very great. Reduced to blocks, there is a single block within the most congested area, which had a population of 2,963 in 1920, or a net population of 1,650 people per acre; and the whole area in which this block was located, consisting of about 100 acres, had a population density of about 500 per acre.

There is no other place in the world except New York where a single business building during working hours has a resident population of 12,000 people. In this same building, the total number of people passing in and out a day was about 50,000, or measured in transit passengers coming and going, it amounted to 100,000 passengers that had to be carried to this one block and taken away during the day. In another part of the city, a single big shop is visited during the business day by approximately 60,000 people. Or, going to and from the building, transportation has to be provided for 120,000 passengers per day, again only in a portion of a single block. That is to say, more than the entire population of Albany, of the capital of the state, has to be transported on the transit facilities to and from a single shop every working day throughout the year, and this is only one such shop. Innumerable instances such as these might be cited.

We cannot compete against this kind of thing. Transit cannot be provided for such concentrated demands. Something must be done to compel a better distribution of our living activities. We must exercise a more drastic control over the height of buildings and our various community activities. We have our zoning laws, but they are not effective enough. The lid must be clamped down so that our population cannot grow up into the air. Then it will utilize the transit facilities and distribute itself over the whole city.

AREAS—CIRCUMSCRIBING RADII—POPULATIONS

New York, London, Paris and Berlin differ physically in many particulars. They differ not only in their populations and the size of the cities, but they differ with respect to the character of the transit facilities supplied for the accommodation of the people, the use made of the various types of facilities, and the manner in which they are operated in the public interest.

Each of these great cities has a municipal entity. In other words, there are central areas, municipally governed, which form the nucleii of great metropolitan areas or greater cities. One cannot reasonably compare the municipality of New York with the greater cities of London, Paris and Berlin. Such comparisons as are made will either be comparisons between the municipally governed areas, that is, the cities of New York, London, Paris and Berlin, or between their metropolitan districts.

In area, New York is the greatest city of them all. In fact, these three great capitals of England and Europe all together only aggregate about 176 square miles, and are only a little more than half as large as New York City with its 315 square miles of area. London with its 117 square miles is just about the exact area of the Borough of Queens. Paris and Berlin, with their 30 and 29 square miles respectively, are only about 50 per cent larger than Manhattan Borough, or only about one-half the size of Richmond Borough. By Berlin is meant the old city as it existed as late as 1920. In that year a Greater Berlin was created.

Dealing with the metropolitan districts surrounding the great cities, Greater New York is assumed to mean the area included under the Port Authority control, the only legal entity now in existence. Greater London is the area under the control of the Metropolitan Police, and Greater Paris is the area within the Department of the Seine. Greater Berlin is assumed to be the area which was included within the city under the consolidation effected in 1920.

Even in comparing these greater cities, New York again stands out as being larger than any of the others. Greater London with its 693 square miles is only a little less than half of New York with its 1,463 square miles. Greater Paris with its 188 square miles is only a little more than one-tenth the size of Greater New York. Greater Berlin with its 339 square miles is about the same size as the New York City of today.

TABLE I—MUNICIPAL FARE PASSENGERS IN MILLIONS, AND PERCENTAGE OF TOTAL TRAFFIC

Type of Facility	New York	London	Paris	Berlin
Rapid transit	1,451— 59%	551— 25%	529— 46%	60— 13%
Trolley or tramway	978— 39%	688— 32%	372— 33%	390— 83%
Bus	51— 2%	932— 43%	246— 21%	21— 4%
Total	2,480—100%	2,171—100%	1,147—100%	471—100%

But the most important thing from the transit standpoint is not the area of these communities, but the radii which circumscribe them. This measures the distance which passengers have to be carried from the business center of the city to the outlying sections. New York City is a semi-circular city, whereas the three other cities, London, Paris and Berlin, are approximately circular cities. The greater area of New York as compared with those of the other cities is accentuated from the transit standpoint because of the fact that its area is included within a semicircle, while that of the others is included within a circle. To reach the outermost limits of New York, passengers have to be carried 20 miles; that is, to outer Richmond. The outer limits of Manhattan are about 13 miles from the center; Brooklyn 11 miles; Bronx and Queens both 16 miles. The most populous part of London is the part north of the Thames, which is about double the density per acre of the area south of the Thames. The circumscribing radius of the area north of the Thames is only about 6 miles, and 10 miles will include all parts of the area south of the Thames. In other words, the greater part of London is not any further away from its business center than from City

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Hall to Eighty-first Street in Manhattan. The maximum distance away from the center is no further away than from City Hall to 190th Street in Manhattan. The outer limits of Paris are only 3 or 4 miles away from the center, or a distance of only from City Hall to Sixty-fifth Street at the most. In the case of Berlin, any point in old Berlin can be reached in a ride of a similar distance as from City Hall to Sixty-fifth Street.

When we consider the "greater cities," they are all approximately circular in form, but the circumscribing radius of New York is 31 miles, London 16 miles, Paris 10 miles, and Berlin 16 miles. In fact, from the transit standpoint, to reach the outer limits, passengers have to be carried a greater distance in municipal New York City than they have to be carried to reach the outer limits of the greater cities of London, Paris or Berlin.

These limitations emphasize the relative simplicity, from a transit standpoint, of distributing the populations of London, Paris and Berlin, when compared with the problem of distributing New York's population to the outer limits of the city.

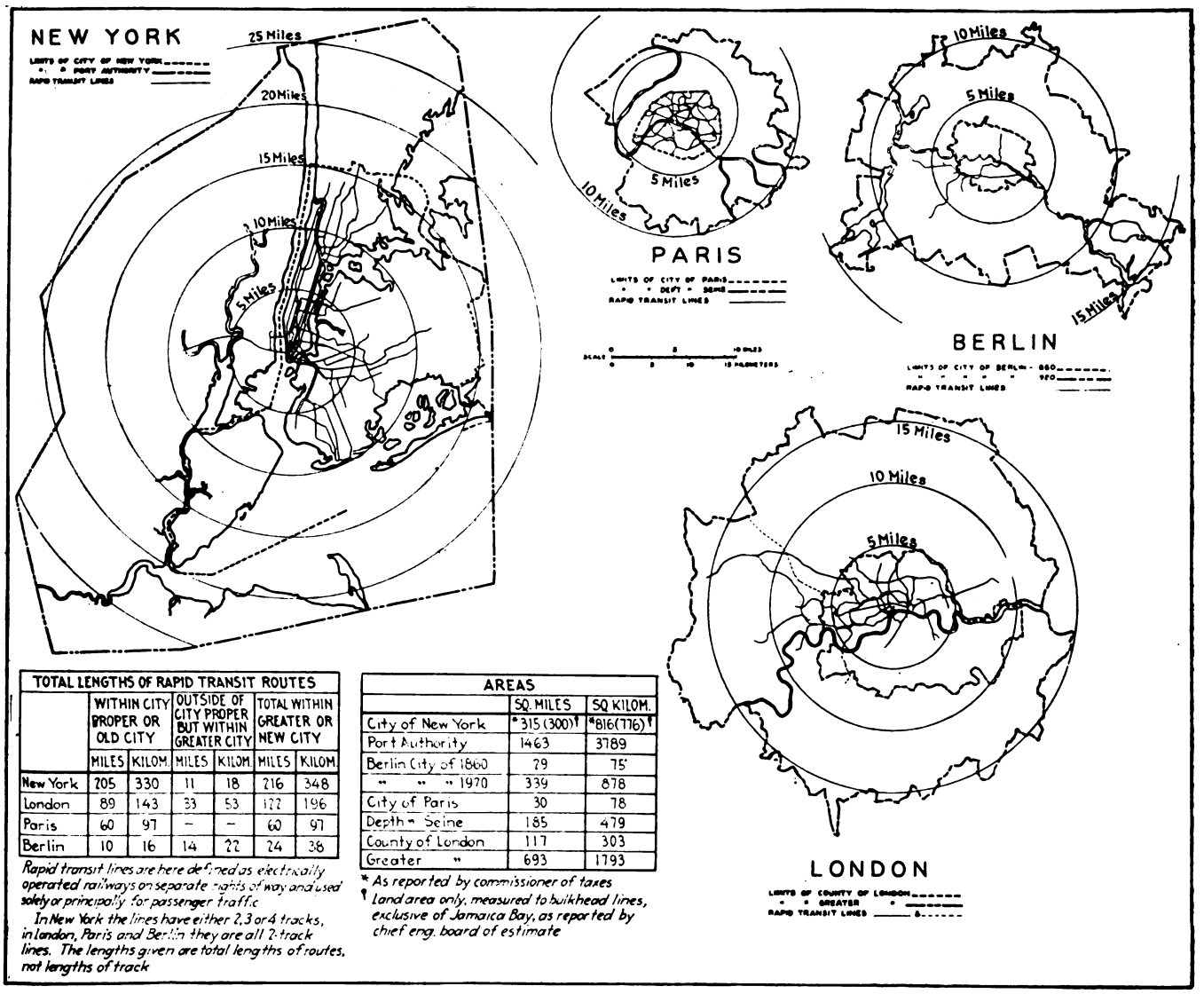
The population of municipal New York was 5,620,000 in 1920; London, 4,483,000 in 1921, 80 per cent of New York; Paris, 2,906,000, 52 per cent of New York, and Berlin, estimated at 2,200,000, or 40 per cent of New York. The population of Greater New York is estimated at 8,000,000; Greater London, 7,476,000; Greater Paris, 4,500,000, and Greater Berlin, 3,804,000.

Types of Facilities—Traffic

There are three general types of municipal facilities in use in New York, London, Paris and Berlin. These are (1) the rapid transit lines, operating either underground, overhead, or along railroad rights-of-way, (2) the trolley or tramway lines and (3) the autobus lines. Then there is still a fourth class of facility, the suburban service over the steam trunk-line railroads. This service will be dealt with separately.

The best measure of the importance of any particular type of facility is the traffic which it develops. Table I gives the traffic on the various types of municipal facilities in the four cities being considered.

The figures in this table do not include any steam railroad suburban traffic, nor are they intended to include any transit traffic in the extra areas of the several cities. They are only approximate figures for the cities themselves, that is, the municipal areas. They are only approximate for the reason that in London, Paris and Berlin the transit lines serving the municipal areas usually, in varying degrees, extend out into and serve in part the extra areas, so that the figures as they are available apply rather to the greater cities



TOTAL LENGTHS OF RAPID TRANSIT ROUTES

	WITHIN CITY PROPER OR OLD CITY		OUTSIDE OF CITY PROPER BUT WITHIN GREATER CITY		TOTAL WITHIN GREATER OR NEW CITY	
	MILES	KILOM.	MILES	KILOM.	MILES	KILOM.
New York	205	330	11	18	216	348
London	89	143	33	53	122	196
Paris	60	97	–	–	60	97
Berlin	10	16	14	22	24	38

Rapid transit lines are here defined as electrically operated railways on separate rights of way and used solely or principally for passenger traffic

In New York the lines have either 2, 3 or 4 tracks, in London, Paris and Berlin they are all 2-track lines. The lengths given are total lengths of routes, not lengths of track

AREAS

	SQ. MILES	SQ. KILOM.
City of New York	*315 (300)†	*816 (776)†
Port Authority	1463	3789
Berlin City of 1860	79	75
" " " 1920	339	878
City of Paris	30	78
Depth = Seine	185	479
County of London	117	303
Greater "	693	1793

* As reported by commissioner of taxes

† Land area only, measured to bulkhead lines, exclusive of Jamaica Bay, as reported by chief eng. board of estimate

Map of the Cities Considered, Drawn to the Same Scale and Showing Rapid Transit Lines

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than to the municipal areas. The municipal area figures have been deduced, therefore, from these general statistics, and while they are only very approximate, they are believed to represent a better comparison between the conditions in the several cities than can be obtained in any other way.

Instead of the figures given in Table I, if all of the transit traffic were included for the several metropolitan areas, the numbers with the percentages of distribution of the traffic would be as in Table II.

No figures are available for Greater New York since Greater New York includes the traffic figures for several counties in New York State and New Jersey, outside of the city, in which counties are included a number of cities of considerable size. The statistical information with respect to the transit facilities in this extra area not being available, the statistics for greater New York City cannot be compiled. The figures in Table II not only include the traffic on the rapid transit and tramway lines in the extra areas of the several cities, but they also include the approximate steam railroad suburban traffic. It is not intended to enlarge upon the suburban transit conditions at this time. Additional information from abroad is awaited before doing this. But generally it appears that the steam railroad traffic in Berlin is more important than that in any of the other cities. This Berlin traffic is the traffic that is carried on the Stadt-Bahn and Ring-Bahn systems, which are steam lines operated by the state, and over which the suburban railroads deliver their traffic into the heart of Berlin. This is one of the outstanding features of the Berlin transit system, and it will be considered more fully at another time.

Riding Habit

Based on the separation out of the municipal traffic for the municipal areas, it appears that London has the greatest number of rides per capita per year, 484, as compared with 435 for New York, 395 for Paris and 214 for Berlin.

If the total traffic (including the steam railroad traffic) and the greater city area are considered, then the rides per capita become 382 for Greater London, 357 for Greater Paris and 372 for Greater Berlin. There is no corresponding figure for Greater New York, but for New York City the figure is 454 rides per capita.

The fact that the riding habit in London is greater than in New York is a surprise. The figure for New York has heretofore been compared with that for Greater London—that is, New York's 435 compared with Greater London's 382.

Tramways

In Berlin the tramway system is relatively more important than in New York, London or Paris. This does not mean that the tramways in Berlin carried more passengers than in these other cities. The traffic in Berlin is only a little more than one-third of that carried in New York, about one-half of that carried in London, and only about the same as that in Paris. But 83 per cent of the total municipal traffic is tramway traffic. If the total traffic (including the steam railroad traffic) in Greater Berlin is considered, the tramways carried about 47 per cent of the total. Therefore, the tramways are the most important transit element in Berlin. In New York, London and Paris the tramways are about of equal importance in the transit scheme. In all three of these latter cities about one-third of the traffic is carried on the tramway lines. Curiously enough, the tramway system of Paris carries the long-haul traffic from central Paris to points outside of the fortifications in extra Paris. In others words, the tramways, instead of the subway lines, are used for long-haul business in Paris.

In Berlin the tramways operate over the entire city and out into the greater city. In New York they operate throughout the entire city. But in London and in Paris there are small areas in the business center from which the tramway lines are excluded. In London this area is about 3 square miles, about 2 miles long by 1½ miles wide, and it is about the equivalent of Manhattan below Eighth Street. In Paris the area is only about three-fourths of a square mile in area, 1 mile long by ¾ mile wide, or only about one-fourth of the area in London. It is contended that in the business center, where the vehicular congestion is relatively very great, the tramway lines cause a serious interference with traffic. It was stated in Paris that the tendency was to exclude the tramways more and more from the center of the city, in order to relieve the traffic congestion on the streets. This is a principle with which I agree.

TABLE II—TOTAL FARE PASSENGERS IN MILLIONS, AND PERCENTAGES OF TOTAL TRAFFIC

	Municipal New York	Greater London	Greater Paris	Greater Berlin
Rapid transit	1,451— 56%	588— 21%	529— 33%	96— 7%
Trolleys or tramways	978— 38%	1,009— 35%	613— 38%	669— 47%
Buses	51— 2%	932— 33%	246— 15%	21— 2%
Steam railroad suburban	106— 4%	324— 11%	218— 14%	630— 44%
Totals	2,586—100%	2,853—100%	1,606—100%	1,416—100%

All of the tramways in Berlin have the overhead trolley, whereas in all of the other cities both underground and overhead trolleys are in use.

The tramway cars used in London are the exception as to type. They are all double-deck cars, and most of them with the upper deck closed in. All the tramway cars throughout England and Scotland run to this double-deck type. In contrast with this type, the single-deck type is used in New York, Paris and Berlin. The advantage of the double-deck type is that it enables a car to be developed with a maximum seating capacity and minimum weight of car per seat—even less weight than our one-man cars.

The use of trail cars in Europe, where the single-deck cars are in vogue, is very much more common than with us. Peak loads are taken care of by trains of surface cars, and trains with as many as three cars have often been noted.

The double-deck car is a very desirable type of car. It is a wonder that the type has not been utilized in this country. They have not been used in New York City because of the difficulty in developing a double-deck car that would travel under the elevated lines, where the clearance is limited.

Buses

The importance of buses as a transit element is recognized in London and Paris, whereas, by contrast, their use is negligible in New York and Berlin. The bus system in London carries the largest number of passengers. The annual traffic amounts to 932,000,000 passengers. This is nearly four times as many as are carried in Paris, more than eighteen times as many as in New York, and more than forty-four times as many

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as in Berlin. In London, 43 per cent of the total municipal traffic is carried on the buses. The bus system renders an excellent and most convenient service. It is the outstanding transit element in London. Because of the convenience of the facilities and of the cheap short-haul fares, it is believed that the bus lines create their own traffic; that is, if the bus operation were stopped, possibly only a small part of the traffic would flow to the other transit lines, particularly when these lines are subway and elevated lines. The London bus system is the only transit facility which serves all of London. Only parts of the city are served by the tramways and by the rapid transit lines.

In the type of bus used, Paris is the exception. Its buses are all single deck, whereas in New York, London and Berlin they are all double deck of the same general type—that is with uncovered upper decks. Paris is developing a six-wheel bus which will carry forty-eight passengers—forty sitting and eight standing, but this is a very long bus and takes up a great deal of room in the street, although it is easily manipulated through the traffic by reason of the six-wheel design. The double-deck bus is preferable. It develops the maximum seating capacity for the minimum space occupied in the street.

Rapid Transit Lines

New York has a larger rapid transit traffic than London, Paris and Berlin all together. Fifty-nine per cent of all of the transit traffic is carried on the rapid transit lines. The rapid transit lines—or subway and elevated lines—are by far the most important of all the transit facilities of New York City. In Paris also, the rapid transit lines are the most important transit element. But the New York rapid transit system carries nearly three times as many passengers as are carried on the Paris system. The Paris and London systems carry about the same number of passengers, but the rapid transit system of London is the least important transit factor. In Berlin the rapid transit facilities are relatively unimportant. New York carries about twenty-four times as many passengers as are carried on the Berlin system.

New York, Paris and Berlin all have a shallow type of subway construction, and all have elevated lines. London, on the other hand, has no elevated lines. Although it has some shallow underground construction, its underground lines are mostly deep-level tube lines, from 20 to 193 ft. below the surface. London also has rapid transit lines constructed on the ordinary steam railroad rights-of-way; that is, so-called surface lines running in cut and on embankment. The sub-surface conditions in London—the London clay—has favored the construction of its deep tube lines; but these deep tubes do not furnish as convenient transit facilities as the shallow subways. Short stairways provide access to the shallow subway lines, whereas elevators or escalators are necessary in the case of the deep level lines. The time consumed in traveling from the surface to the station platform on the London underground system greatly detracts from its convenience. All of these lines are two-track lines. No great effort has been made to make the structure ornamental, although on the newer lines the stations are plainly finished in tile. The stations are approximately 3,200 ft. apart on the average, about 50 per cent greater distance apart than the average stations in New York.

The exceptional feature of the New York rapid transit system is its four-track express lines. The systems in London, Paris and Berlin are all two-track lines, and provide for no express operation except such as can be obtained by skipping stations when the intervals between the trains will permit it.

In London, the Inner Circle Loop is the most interesting feature of its rapid transit system. Most of the tube lines operate independently. That is, the trains operating on each particular line do not operate on the tracks of any other line; but the Metropolitan District and the Metropolitan companies operate a joint service on a circular route known as the Inner Circle. The route is irregularly elliptical, about 5 miles long by 2 miles wide at its widest portion. Neither Paris nor Berlin has a circular route of just this kind. Paris has two circular lines but no routes which operate completely around these circles, and Berlin has one, a steam line, but two routes operate a shuttle service over it. So the Inner Circle route is a route peculiar to London alone. The through routing of rapid transit trains over the steam railroad lines and then over the rapid transit tracks is another interesting feature of the London rapid transit system.

The Paris subway system is not really a rapid transit system in the sense of providing quick transit for long rides. It is made up of short independent routes which intersect and afford a free transfer to each other, thereby providing a convenient and relatively short-haul underground transit system. It is a short-haul system because the longest ride from the center does not exceed the distance from City Hall in Manhattan to Forty-second Street. The Paris subway system is admirable for its purpose.

The feature of the Berlin rapid transit system, or subway and elevated system, is the large amount of shuttle service that is operated. Practically 50 per cent of the total route mileage is served by shuttle trains only. The service probably accommodates the traffic or the needs of the community, otherwise the public would not permit it to continue. The rapid transit lines in Berlin are all two-track lines, as in London and Paris. Stations are about 2,500 ft. apart.

The maximum train length in Paris is five cars. In London and Berlin it is six cars, except that there are a few eight-car trains in London. In New York it is ten cars. So that the rapid transit systems abroad are only utilized to about half of their potential capacity gaged by what we do in New York.

We need in New York a circular route similar to the Inner Circle Loop in London to articulate our radial lines together. With the completion of the proposed Brooklyn crosstown line such a route will be obtained. We also need to profit by the idea of direct routing which obtains in the Paris subway system, and not continue the policy of routing too many different kinds of trains over the same tracks. That is, we should not require trains to interchange from one line to another. Instead, we should require the passengers to change or transfer.

Efficiency of Transit Developments

On the theory that every citizen should not be more than ½ mile away from a rapid transit line, or ¼ mile from a surface line, wherever he may live, to be conveniently served by such facilities, New York requires about 500 route-miles of rapid transit lines and about 1,000 route-miles of tramway and bus lines together. It has 205 rapid transit route-miles and 637 surface line route-miles—mostly trolley lines, but a few bus

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lines—in other words, New York's rapid transit system has been developed to only about 41 per cent efficiency and its surface system to only about 65 per cent efficiency.

From the same convenience standpoint, municipal London should have 185 route-miles of rapid transit lines instead of the 89 now serving it. Or its rapid transit facilities have been developed to about 48 per cent of its requirements. The surface facilities conveniently to serve London should amount to about 370 route-miles. It has 408 route-miles of tramway and bus lines all together, which means that its surface system is 10 per cent more than it requires from a convenience standpoint.

Paris only needed about 50 route-miles of rapid transit lines conveniently to serve its area. It has 63 route-miles or 26 per cent more than it needed. In the case of the surface system, it needed about 100 route-miles of tramway and bus lines. It has 259 route-miles, or it has 159 per cent more surface facilities than required.

Berlin theoretically requires 45 route-miles of rapid transit lines and has 10. So it only has been developed to 24 per cent of its requirements. It needs 90 route-miles of surface lines and has 125 route-miles, so it has 37 per cent more surface facilities than it requires, all from a convenience standpoint.

The convenience standpoint is the first requirement to be satisfied. But later on the capacity requirement must be satisfied also. As the population of a city increases, the capacity requirement becomes the factor controlling its transit development. For example, capacity instead of convenience now controls the transit requirements in Paris on both its surface and rapid transit systems. In New York, the transit requirements in the central part of the city are determined by capacity. In the outlying sections, we have not arrived anywhere near a convenience standard of development up to the present time.

Maps and Direction Signs

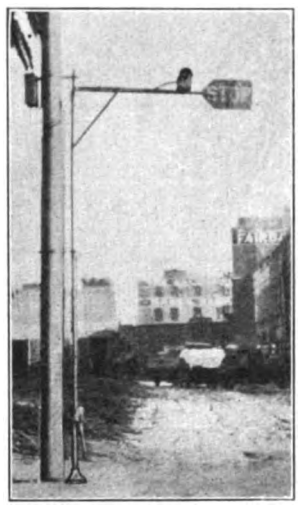
In London and Paris a great many maps and direction signs are used with good results. This information is placed on the station platforms of the rapid transit lines and also in the cars, and it is placed in the cars of the tramway lines and in the buses. In London small pocket maps giving detailed information about the rapid transit lines and tramway lines and bus lines are furnished freely to all passengers who request them. In Paris the same kind of maps are furnished for the tramway lines and the bus lines. In London and Paris, in providing information to the passengers, the management seems to start with the theory that the passengers know absolutely nothing about the transit systems, and the maps and signs and other information are prepared and located accordingly. This is particularly the case in Paris, where it is almost impossible for a passenger to go astray, whether he knows the language or not. This is what makes the Paris subway system the most convenient subway system in existence from a passenger standpoint. In New York, on the other hand, the management seems to start with the theory that the passengers know all about the transit system, and only such information is furnished the passengers as cannot be avoided.

The railways in New York could greatly benefit the public by adopting the policy of giving information to the passengers, in vogue in London and Paris. In other words, we can sell the transit service to the public as they do—to advantage.

Except on the Fifth Avenue bus line, all transit facilities in New York, the subway, elevated and trolley lines, furnish an all-night service. On the other hand, in London and Paris, the transit lines only operate about nineteen or twenty hours. Service is suspended on all the transit lines from shortly after midnight until the workers begin to travel in the early morning. What would happen if we should suspend the all-night service in New York?

Crossing Signal for Infrequently Used Spur Track

AT ONE POINT on San Pedro Street in Los Angeles a steam railroad spur track crosses the double-track interurban line of the Pacific Electric Railway. Heretofore the city has required a safety stop to be made at this crossing by the interurban cars, but permission was recently granted for the discontinuance of this stop if a gate was provided. The spur, however, is located in an alley much used by motor trucks in delivering and receiving products to and from establishments located along it. A gate, therefore, without proper flagging would have hampered the movements of the trucks. A signal device was therefore designed, constructed in the engineering department's signal shop and installed to furnish the desired protection without hampering trucking movements. One of the company's ordinary standard switch stands, with lock, was utilized, the stand being anchored to bolts set in the curb and the sidewalk. The stand was extended by means of a pipe to a height of about 15 ft. and held in a vertical position by means of bearings clamped to a steel trolley pole. Near the upper end a bracket-supported arm about 6 ft. long was attached to carry the signal.



Simple Signal Device Safeguards Operation at Infrequently Used Railroad Spur Crossing

For day indication a large red sign with the warning "Stop" lettered on it was fastened to one end of the arm, and a 220-volt carbon-filament lamp, carried in a metal shield, was mounted on the arm for night indication. The lamp was placed between two red lenses. A 1,000-ohm resistance tube was connected in series with the 220-volt lamp to permit it to be used on the trolley circuit. This tube was placed in a box supported on the pole. The clearance under the stop current is about 14 ft.

The usual position of the signal is across the alley, as shown in the illustration. It sets in this position while interurban trains are being operated over the railroad crossing, but when the industrial spur is being operated by the railroad the signal is swung around and projects into San Pedro Street. It thus serves as a warning to interurban trains that switching is going on over the spur. The general construction of the signal is shown in the accompanying engraving.

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New Cars for East Boston Tunnel

Boston Elevated Railway Develops Car for Rapid Transit Service, Weighing with Motor Equipment Only About 1,000 Lb. per Passenger Seat or 250 Lb. per Passenger on the Basis of Total Rated Carrying Capacity

THE Boston Elevated Railway supplies transportation between Boston and East Boston through a tunnel under a branch of the harbor at the point where the Charles River empties into it. The entire length of the tunnel from Bowdoin Square, the western or Boston terminal, to Maverick Square, the eastern or East Boston terminal, is 1.49 miles. Between these terminals there are three additional stations on the Boston side of the harbor. When this tunnel was first put into use it extended from Court underground station, on the Boston side, to Maverick Square on the East Boston side, where the cars came to the surface and continued on, over the several routes, to their destination. In later years the tunnel was extended, on the Boston end, to its present underground terminal at Bowdoin Square.

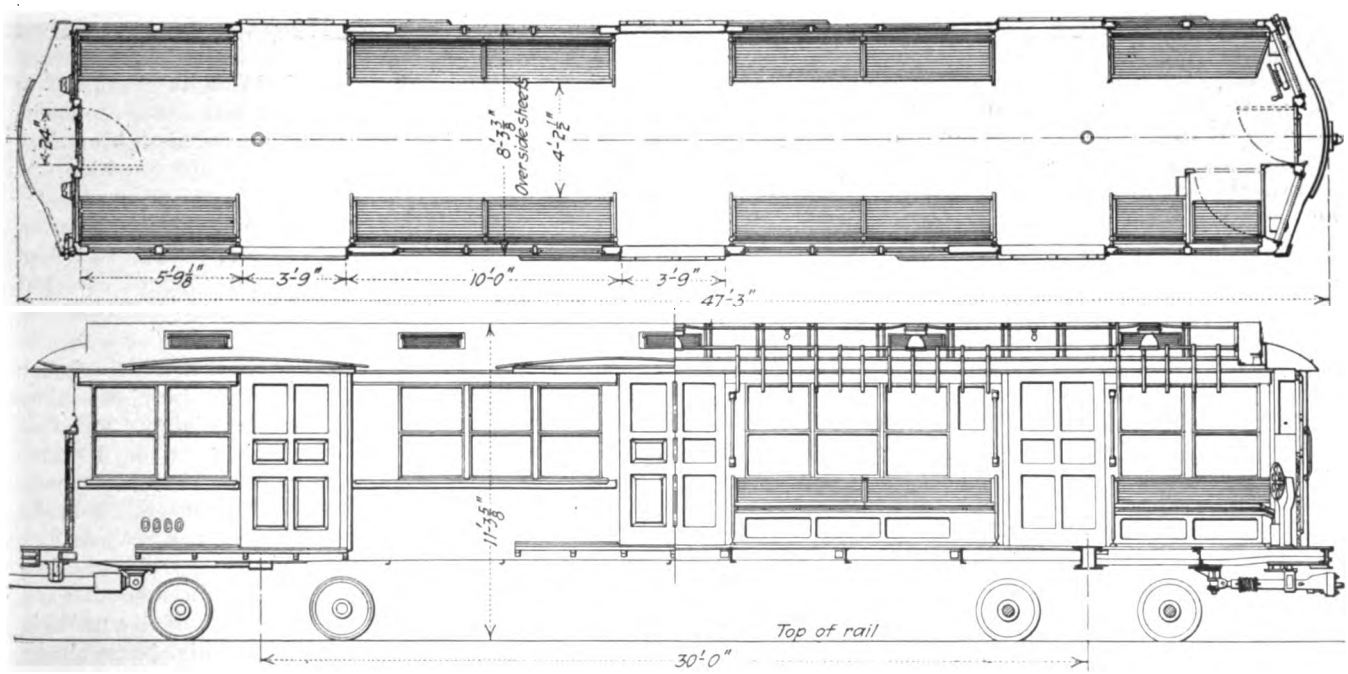
For a number of years single-car operation was maintained over this line, but as traffic increased two-car trains and ultimately three-car trains, consisting of center-entrance multiple-unit surface cars, were resorted to during the rush hours. This service is still in operation, but the capacity of the tunnel has been reached. Therefore, to take care of the constantly increasing population, the company has decided to substitute cars of the rapid transit type to be operated in trains, thus obtaining greater tunnel capacity, as well as greater capacity per car and per train, more rapid service and lower cost for platform labor per passenger. It was found to be impossible to use, for the tunnel service, the type of car used in the Cambridge Subway or on the company's elevated system, because of limitations in tunnel clearances, platform heights, etc. Consequently a new car was designed to be of all-steel construction with brass sashes.

At the present time an underground station is in process of construction at Maverick Square, into which, when completed, the surface cars serving the East Boston district will enter and discharge passengers onto a platform, from the opposite side of which the passengers will board the rapid transit trains and continue through the tunnel to the several stations on the Boston side of the harbor. After discharging passengers the surface cars will be operated, empty, around a loop to a loading platform, where they will receive passengers from the rapid transit trains and then continue out to the surface and over their several routes to their destination.

As the new tunnel cars will never inter-couple with any other type of car on the system, the railway had great latitude in the design of the car and its equipment, although it was limited as to length, height and width of car. Under these conditions a car has been designed which will provide for forty-four seated passengers and

STATISTICS FOR EAST BOSTON TUNNEL CARS

Length over all	47 ft. 3 in.
Width over all	8 ft. 3⅛ in.
Height from top of rail to top of roof	11 ft. 3⅛ in.
Width outside sills	8 ft. 3⅛ in.
Width over all	8 ft. 7 in.
Width of side doors	3 ft. 9 in.
Diameter of wheels	26 in.
Seated passengers (with cab open)	42
Seated passengers (with cab closed)	44
Standing passengers (with cab open)	134
Standing passengers (with cab closed)	136
Sashes	Brass
Roof	Monitor arch
Ventilators	Perry
Flooring	"Truss-Plate" with mastic coating
Electric door engines	Consolidated Car Heating Co.
Speed control brake	Westinghouse Traction Brake Co.
Motors	4 GE-247
Controller	G.E. P.C.-5
Car straps	Rico
Manufacturers	Pullman Co.
Number of cars	40



Cars Being Built for the East Boston Tunnel Service of the Boston Elevated Railway

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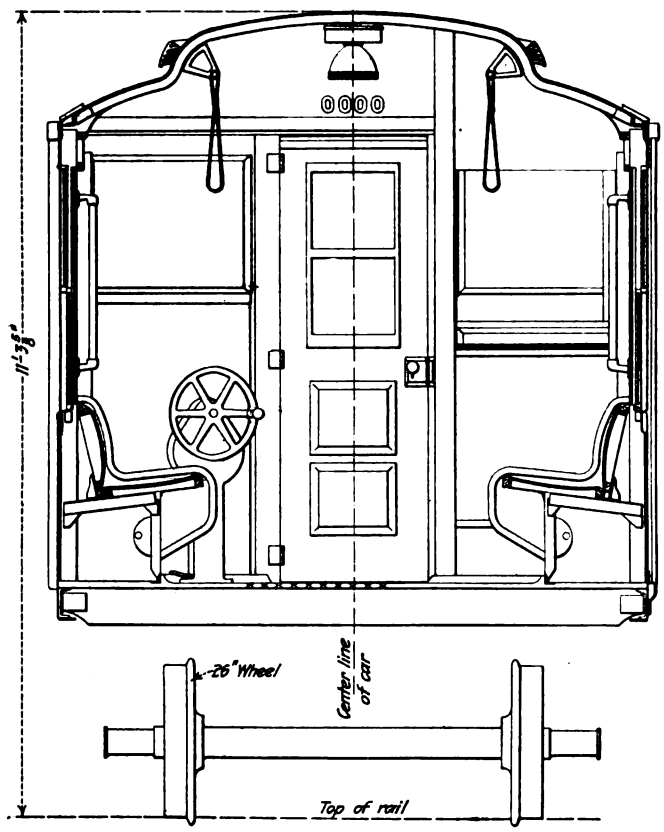
136 standing passengers in all but the forward car in the train. This car, on account of the cab being occupied by the motorman, will have two less seated passengers and standing area for two less passengers than given above. The total passenger capacity in the first case will be 180 per car and in the second 176, and has been obtained with an estimated weight on the rail of 44,000 lb. per car.

It has been found by the engineers of the railway that a reduction in car-body weight means an equal or greater possible weight reduction in truck, motor and other equipment, as their experience indicates that with every 1,000 lb. added to the car body, about 1,200 lb.



Cross-Section of East Boston Car at Motorman's Cab End

must be added to the truck and equipment. This ratio is not always correct for the reason that there is considerable difference in the steps of standard motor capacities.

In the study of the design of this car it was evident that if sufficient weight could be eliminated in the body and its equipment, a smaller capacity, and consequently a lighter motor, with a proportionate saving in trucks, air brake and control equipment weights, could be used. With this in view the idea of operating two cars, semi-permanently connected together, as a single unit, was evolved. This arrangement, it will be seen, requires an operating cab on the ends only of the two-car unit, eliminating the necessity of a cab in each end of each car, saving the weight of the material entering into the construction of the cab, also the weight of one set of air brake, control, and miscellaneous cab apparatus with its piping, wiring, etc. The estimated saving in the above arrangement is approximately 1,200 lb. per car.

With the two-car unit arrangement a train will consist of two, four or six cars. Each unit will be controlled by a single guard as on the present rapid transit cars.

A considerable reduction in weight has been obtained by the use of what is known as "truss-plate" flooring. This consists of two steel plates, each having depressions regularly spaced. The plates are placed together so that the convex surfaces of the depressions come in contact and are then spot-welded, resulting in a single "truss-plate" of ⅛-in. thickness and an insulating air space between the plates of approximately ⅛ in. The "truss-plate" will be covered with a mastic floor compound to a thickness of ⅜ in. The total weight of this floor will be approximately 4 lb. per sq.ft., whereas the flooring in the present rapid transit cars in Boston weighs from 9 to 14 lb. per sq.ft.

A further reduction in weight was obtained by the use of copper-covered, soft pine or balsam wood doors, arranged to slide on the exterior of the car, thus eliminating the double wall at door pockets, and reducing the thickness of the side posts and walls of the car. The weight of the doors is 50 per cent less than that of the doors on the latest Boston rapid transit cars.

One of the interesting features of this car is that each side door will have its own motor-driven actuating mechanism, which will be placed under the seat inside of car and will have a shaft extending through the side of the car to which the door-actuating lever is attached. These mechanisms will be controlled from the guard's position, between the two cars, by means of a controlling switch for each door mechanism. Whereas no saving in weight is expected from this feature, it is believed it will be less necessary to keep heat on cars, when stored in the open in cold weather, which the Boston men consider necessary with pneumatic door-operating mechanism, to prevent sluggish action.

Some question has been raised as to the possibility of keeping the outside doors weathertight, but from the experience the railway has had for several years on its surface cars, the engineers have no fear from this feature, in the event that, at a later date, the service will be extended and the cars operated on the surface.

On account of limited height of the tunnel, it was found necessary to make the distance from the rail to the top of car floor somewhat less than on the present rapid transit cars. This in turn necessitated the use of a 26-in. diameter wheel in place of 31-in. and 34-in. wheels at present used on rapid transit cars. Some saving in weight is thus made.

Another reduction in weight is brought about in the drawbar equipment in that the link or drawbar, connecting the two cars of each unit, is somewhat lighter than the regular drawbar with its electric couplers which will be used at the ends of each unit.

Each car will be equipped with swinging end doors, thus eliminating the weight of the door pocket partition, located as usual in the rapid transit type of car, but these will not be used by passengers, except in case of emergency.

These cars will be equipped with the Westinghouse variable load brake, which has recently been described in these pages. In tunnel service the distance apart at which the blocks can be set depends upon the distance in which cars can be stopped, so that there is special reason in the East Boston cars for an automatic brake which will increase or decrease the braking pressure according to the increase or decrease of the load, thus always providing minimum stopping distance.

The cars are lighted with a single row of five units in the center of the ceiling and each electrolier has a shade. There is also provision for emergency lighting.

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Buses Could Not Fill Place of Street Cars in New York City*

The Bus Is Not Well Adapted to Mass Transportation Because of Its Small Overload Capacity—The Cost of Bus Operation per Passenger, Exclusive of Pavement Wear, Is Higher Than That of the Street Car—Data on Speed Are Also Given

By John A. Beeler
Consulting Engineer, New York

IN ANY consideration of the possibility of supplanting the present street-car service in New York City with an equivalent bus service, the principal factors are the following: (1) Adequacy, (2) first cost, (3) cost of operation, (4) effects on public.

It is necessary to consider adequacy on an all-year basis. No one would think of operating open street cars through the winter, and similarly the double-deck open-top type of bus employed on Fifth Avenue cannot be depended on for its full seating capacity in mass transportation throughout the year. Observations at Thirty-third, Forty-second and Fifty-seventh Streets of the number of passengers and seats of the Fifth Avenue buses in each direction between 7 a.m. and 7 p.m., taken Dec. 15, 1921, show only a small percentage of seats occupied. At Fifty-seventh Street, the maximum load point, during the evening rush hour when the city's transportation systems are taxed to the utmost, only 65 per cent of the available seats on the outbound buses are occupied. The observations were taken on a fine clear day with an average temperature of 26 deg. F.

To inclose the upper deck of this type of bus would render the vehicle topheavy and increase the liability to accident. It would also reduce the clearance beneath the Elevated and other overhead obstructions. The single-deck type, seating approximately thirty passengers, seems best adapted to the general requirements in New York City.

The bus presents certain opportunities for obtaining greater mobility of service than the street car. It can load at the curb, and in blockades or breakdowns can run around the obstruction. It can be short-lined readily at any desired point and entirely rerouted on short notice in emergencies.

In capacity, however, the bus is less elastic than the street car, a factor of great importance in handling rush-hour crowds. Operating over steel rails in a fixed path, the latter is not only capable of smoother operation but can with safety and economy be built larger. The bus, weaving in and out of traffic and operating over pavements, the best of which have irregularities, is subject to lurching and abrupt movements that should limit its capacity to one passenger per seat. The average car can provide readily for as many as four standing passengers to each five seated during the maximum load period, and there is flexibility in the application of such a standard.

When the rush-hour demands are greatly in excess of the base, as in all large cities, this difference of capacities puts a considerable handicap on the bus, and undoubtedly has much to do with the fact that no important city as yet is served solely by buses. Where they are used in conjunction with other transportation means it is noticeable that the rush demands on the latter must take care of the passengers who cannot be accommodated by the buses.

The surface lines in Manhattan now operate during the base 561 cars with an average seating capacity of 42, and in the rush periods of 1,002 cars. To carry the same number of passengers on the basis of service stated above would require 786 buses in the base and 2,538 during rush hours. To allow for repairs, etc., 15 per cent should be added, bringing the total buses required up to 2,919. The surface car traffic of all lines in New York City is about 2½ times that of the Manhattan lines. Applying this factor 7,297 buses would be required to handle the traffic now carried on the surface lines in the city. Based on the above estimate the outlay for the installation of a complete bus system, including garage and shop facilities, would be, at the rate of $7,500 per bus, $54,727,500.

The car lines are already in use, and the tracks are in the streets. They have a value which is being determined by the commission. To remove them and restore the paving of the streets will cost millions of dollars. While it does not directly affect this estimate, the question remains as to who would bear the cost of such a change. Undoubtedly it would be borne by the public in one form or another.

Looked at in a broad way, the cost of service includes the total expenditure, whether paid directly by the operating company or indirectly by the public. Although the bus system has the smaller installation cost, the major portion of the difference is that the railway must provide and maintain its roadbed, track and paving. With buses the expense for these items is, as a rule, borne by the taxpayers; but it is none the less an important item in the cost of the service and for a true comparison must be included. Another important factor in determining the cost of service is the relative life of plant and equipment. The bus has a life of one-third that of a street car, or even less.

For the purpose of determining as accurately as may be the cost of bus operation the available statistics from operation of buses in New York, London, Chicago, Detroit and other localities have been analyzed. They are presented on a bus-mile basis in Table I. In this comparison only the two-man type of operation will be considered, for where the one-man bus is applicable the one-man car can be used equally well. Table I shows that the total cost of service, averaged from the American companies operating two-man buses, is 41.5 cents per bus-mile, exclusive of wear and tear on paving.†

*Abstract of report to New York Transit Commission.

†In the *Atlantic Monthly* for August, 1921, this item is estimated by Philip Cabot to be about 10 cents per ton-mile.

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TABLE I—COMPARATIVE BUS OPERATING COSTS—CENTS PER BUS-MILE

	Fifth Ave. Coach Co., N. Y. C. *	London General Omnibus Co. *	Detroit Motor Bus Co. *	Chicago Motor Bus Co. *	Goodyear Heights Motor Bus Line	Municipal Ry. Buses, San Francisco	Connecticut Valley St. Ry. Buses	Winnipeg Electric Ry. Buses	Baltimore Transit Co.	Motor Transit Co., Los Angeles	Western Motor Transp. Co., Oakland	Tacoma-Olympia Stage Line	Wabington (D. C.) Rapid Transit Co.
Number of buses	271	.....	28	40	12	5	3	7	20	.....	.....	7	14
Tires	0.98	.....	.....	.....	5.10	5.50	3.00	1.48	.....	3.06	3.50	1.82	1.72
Repairs	4.61	10.40	2.71	10.46	7.40	6.53	.....	4.73	6.50	3.83	4.70	0.43	1.10
Gas and oil	.....	.....	.....	3.97	5.80	5.14	3.88	5.90	.....	2.63	3.00	2.36	2.67
Conducting transportation	23.23	12.90	24.94	14.81	10.21	6.75	8.53	8.12	15.90	3.77	3.50	3.98	6.23
Traffic	0.16	.....	0.35	.....	.....	.....	.....	.....	.....	.....	.....	.....	0.36
General and miscellaneous	1.62	2.10	4.14	5.42	.....	.....	.....	0.47	3.54	6.93	3.00	2.78	2.97
Injuries and damages	1.35	.....	0.91	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Insurance	.....	.....	.....	.....	1.31	0.28	1.13	1.03	.....	.....	1.00	0.57	0.99
Maintenance and supplies	1.17	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	0.40
Road expense	.....	11.70	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Rent	.....	.....	.....	.....	0.42	.....	.....	0.53	.....	.....	1.50	.....	0.48
Total expense (operating)	33.12	37.30	33.05	34.66	30.24	24.20	16.54	22.26	25.94	20.22	20.20	11.94	16.92
Taxes	4.66	.....	b0.16	2.43	.....	.....	0.40	0.23	1.39	.....	.....	0.15	0.28
Depreciation	a2.42	1.70	3.90	3.20	5.62	1.72	8.00	2.28	6.59	.....	3.00	4.30	2.61
Fixed charges	0.97	0.61	0.39	1.39	1.26	.....	0.89	0.91	3.86	.....	.....	1.03	0.35
Total cost per bus-mile	41.17	39.61	37.50	41.68	37.12	25.92	25.83	25.68	37.78	.....	.....	17.42	20.18

* Two-man operation.
a Additional depreciation in adjustment account.
b Does not include taxes.

In New York the cost of street-car operation is exceptionally high. The adoption of modern and efficient methods of operation should reduce this materially. An average of the cost of service, including taxes and interest, for street railways in the United States, as shown in Table II, is 45.7 cents per car-mile.

The greater capacity of the street car makes each car-mile operated in base hour service equivalent to 1.4 bus-miles, and each rush hour car-mile equivalent to 2.53 bus-miles, making a weighted average of 1.81 bus-miles to each car-mile over the day. One car-mile costing 45.7 cents is, therefore, the equivalent of 1.81 bus-miles costing 75.1 cents. Hence the cost of bus service, not including the indirect costs mentioned above, is approximately 65 per cent greater than the average cost of street railway service.

Effects on the Public

A seat per passenger at all times is an attractive feature of bus service except that it sometimes involves waiting. To secure efficient operation it is necessary to fill all the seats during periods of heavy traffic. Consequently at such times there must be a surplus of passengers waiting, reservoir-like, along the route to do this.

In other ways the relative merits of the bus and street-car service depend largely on the territory served. In sparsely settled sections the smaller capacity of the bus is no disadvantage and may even result in greater frequency of service. In many localities, especially where car lines as yet do not exist, the bus may be much more economical on account of the smaller investment.

In congested districts frequency of headway presents a different problem. Concentration of passengers is here advantageous. For instance, in the heaviest half hour of the afternoon eighty-eight buses on Fifth Avenue passed Fifty-seventh Street northbound carrying 2,828 passengers. This was at the rate of nearly three buses per minute with an average load of thirty-two passengers. With the same number of street cars 6,688 passengers could have been carried. To accommodate this latter number on buses more than seven per minute would be necessary.

At present the buses on Fifth Avenue represent 15 per cent of the total number of vehicles in the street. On account of their size and frequency of stops they are responsible for a great deal more than 15 per cent of the congestion, however. To increase the rate to seven buses per minute would, with the traffic interferences at intersecting streets, cause an intolerable congestion. Indeed, it is highly questionable if they could receive and discharge their passengers and move through the streets.

In referring to Fifth Avenue it is for the purpose of illustration only. Upon it operates America's largest bus line. The double-deck type of bus used there is admirably suited to the unusual traffic demands, which are largely a combination of travel for shopping and sight-seeing in fair weather, though hauling many regular patrons to and from business.

Other Statistics in Mr. Beeler's Report

In addition to the tables shown, Mr. Beeler's report contained a number of other tables. One showed that at Fifth Avenue and Fifty-seventh Street on Dec. 15, 1921, from 7 a.m. to 7 p.m. from 7 to 25 per cent of the total vehicular traffic on Fifth Avenue is buses, the

TABLE II—COMPOSITE OPERATING REPORT OF FIFTY-TWO AMERICAN CITY STREET RAILWAYS, SIX MONTHS ENDED JUNE 30, 1921

Item	Cents Per Car-Mile
Operating revenue	46.5
Operating expenses	35.0
Taxes	3.2
Interest and other revenue deductions	7.5
Total cost	45.7

TABLE III—CHICAGO BUS SPEED DATA

Observations of Chicago Motor Bus Company's buses between north terminals and downtown return streets, made Oct. 19 and 20, 1921.

Hours	8.11 bus-hours
Mileage	86.66
Stops	284
Time of stops	3,335 seconds
Average running speed	10.70 m.p.h.
Average number of stops	3.28 per mile
Average time per stop	11.74 seconds

TABLE IV—COMPARATIVE STREET CAR SPEEDS

	Speed M.P.H.
Pittsburgh	9.42
Buffalo	9.95
Cincinnati	9.95
Philadelphia (Surface Lines)	10.00
Milwaukee	10.12
Detroit	10.13
San Francisco (United Railroads)	10.19
Washington, D. C.	10.21
Boston (Surface Lines)	10.50
Cleveland	10.52
Chicago	10.64
In Loop District	6.21
Outside of Loop District	11.63
St. Louis	10.90

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average for the full twelve-hour period being 15 per cent.

Another table showed the average speed of the Fifth Avenue buses in various sections along the route and for different periods of the day. To one familiar with the territory, the speed attained in the different sections is comparable with the congestion encountered. The speed between Washington Square and Twenty-third Street averaged between 7.5 and 8 m.p.h.; in the section between Thirty-first and Forty-second Streets it was less than 4.5 m.p.h.; between Forty-second and Fifty-seventh Streets, it varied from 6.9 m.p.h. in the morning rush to 4.9 m.p.h. in the evening rush. The speed north of Fifty-seventh Street is greater than in any other section. This territory is very favorable for fast operation, there being long distances with few or no intersecting street crossings.

Another table showed the speeds of Fifth Avenue buses for the various routes at different periods of the day, the average for the system being 8.37 m.p.h.

There were several tables of speeds of buses operated by the Chicago Motor Bus Company. In the Chicago Loop District the average over various periods of the day was 5.81 m.p.h. Outside the Loop District the average speed throughout the day was 11.87 m.p.h. In this section, however, the stops average only 2.5 per mile, and much of the territory is through parks and boulevards where there are few intersecting streets. A composite of this information is given in Table III. In this connection it is interesting to note that the average speed of all the Chicago surface cars, as shown in Table IV, is 10.64 m.p.h. or practically the same as for the buses, while that of lines operating in sections similar to the bus territory is very much higher.

Another table compares the speeds of the buses operated in New York and in Chicago. The general average of 8.37 in New York is comparable to 10.70 in Chicago. The difference in speed is 2.33 m.p.h., or 28 per cent faster in Chicago.

Table IV compares the speed, between terminals, attained by the surface street cars in twelve of the largest cities in the United States. All of these speeds apply only to cars operated in city service. In several cities where a company operates both city and interurban service, the interurban cars have been omitted.

According to another table the number of buses per hour operated by the Fifth Avenue Coach Company below Fifty-seventh Street during the mid-day is increased only 80 per cent during the rush hours. The table also shows that to care for the company's proportional amount of the rush-hour traffic, as would be necessary were the buses to supplant the street car system, the number of buses operated in the rush hour would have to be 223 per cent more than during the base hour service.

According to another table on Fifth Avenue bus service, between 8:15 and 9:15 a.m. at Fifty-seventh Street, only 52 per cent of the seats are filled. The all-day average shows the proportion of seats occupied to be 37 per cent at Fifty-seventh Street, 35 per cent at Forty-second Street, and 21 per cent at Thirty-third Street. The general average at these locations shows that 31 per cent of the seats furnished are occupied, which means an average load at these points of 15 passengers per bus. In northbound traffic the average percentage of seats occupied between 7 a.m. and 7 p.m. was 25 at Thirty-third Street, 35 at Forty-second Street, and 33 at Fifty-seventh Street. The general average of these locations is 31 per cent or the same as that southbound. Between 5:15 and 6:15 p.m., the hour of heaviest traffic northbound, 176 buses carried 5,580 passengers at Fifty-seventh Street. This is about the number that the subway carries in seven minutes on one track and at a much higher speed. Other tables give estimates of the cost of bus and electric car operation as contributed to the ELECTRIC RAILWAY JOURNAL by Messrs. Thirlwall, Simmon, Jackson and Stocks.

The Readers' Forum

European and American Trackwork Practice Compared

EDGAR ALLEN & COMPANY, LTD.
Imperial Steel Works, Tramway Department
SHEFFIELD, ENGLAND, Dec. 11, 1922.

To the Editors:

As I looked over recent issues of the ELECTRIC RAILWAY JOURNAL, which are always interesting, several of the articles suggested comment, which may be of interest to you. I noticed in particular the following:

In your issue of Sept. 16 there was an article on the relaying of rails in Washington, in which attention was drawn to a novel feature, namely, the pre-welding of six or seven rails together before they were put into place. This certainly has never been done over here, where space is a greater consideration than in Washington, due to the character of our streets, which do not lend themselves to much of this work. In the same issue is an article on the new British standard rail, which is a fair résumé of the specifications. The writer of the article, however, is in error when he states that a ¼-in. space is left between the joints. He gives a diagram which refers to the No. 9 rail for open track. It certainly would have been better had a diagram been given in the specifications for paved tracks, as any one may easily fall into the same error.

The article on French rail sections, in the same issue, is an interesting résumé regarding French standard rails with flat treads, as abstracted from M. Gagné's paper published in full in the *Industrie des Tramways*. Your critique, further, gives details of special manganese rails for curves as used in Paris. There is no doubt that long experience has proved the value of the manganese-steel curve, but the question of first cost prevents its adoption in many cases. English engineers are divided on this matter. Some adopt manganese rail on curves, using the same sections for both rails, there being very little raised-groove rails used in this country except on junction work. Separate guards are largely used here, and if they are properly fitted and of a suitable type, the maintenance costs are not materially increased and are trifling compared with the advantages gained.

Various types of separate guards are used, including flat bars of ordinary steel and manganese bars of varying depths, but the most efficient has been found to be the Holt patent guard rail rolled in manganese steel. Actual experience has proved that this guard rail will outlive the ordinary rail without having to be turned, and as this section is reversible there is practically unlimited life. This guard saves the use of manganese rail for one rail, thus materially reducing the first cost and adding 70 to 100 per cent extra life to both rails,

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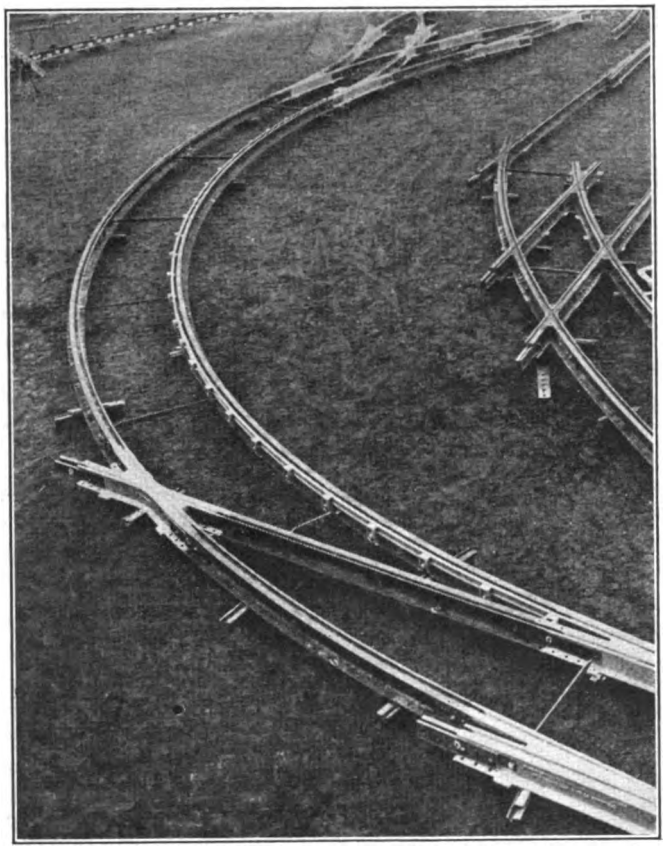
as the guard rail will delay very considerably the erosion on the running edge of the rail.

With regard to switches, double tongue points are chiefly used on the Continent, while in this country the double tongue point runs a race with switch and mate. Tramway engineers are divided as to the relative advantages of these.

The article by Charles S. Holcomb in the issue for Sept. 23 is very comprehensive and will repay careful study by all interested in this subject. It suggests comparisons with certain features of English track as follows:

1. Referring to Mr. Holcomb's Fig. 2, page 446, the



Layout of Special Trackwork, Laid with Holt Guard Rolled in Manganese Steel

9-in. rail is never used here, but the guard shown in this figure was used for a time. However, the Board of Trade refused permission for the raised lip to be used in the streets and several jobs had to be altered.

2. The tie bars used in England are 2 in. x $\frac{7}{16}$ in. and 2 in. x $\frac{1}{2}$ in. as compared with the 2-in. x $\frac{5}{16}$-in. bars used in Chicago.

3. The worn sections of rails, shown on page 449, are comparable with results in England, but No. 9 is a marvelous section to have carried traffic up to that stage. No doubt the extra metal under the back of the head was of material assistance.

4. The table of life for special trackwork, on page 451, clearly gives first place to type B, solid manganese, when the contributory remarks are taken into consideration. Recently I came across a case where a solid manganese junction was laid in 1908, the layout being altered in 1913 when C type was laid, with the result that the layout would represent half B and half C. The whole junction is now to be relaid, which proves that type B is much the better type for junctions where there is much traffic.

5. As to flange-bearing trackwork, there is no doubt that many of the original plates of the type used in the C construction were too short, as indicated by this article. The general practice "on this side," when British standard rails having a groove depth of $1\frac{1}{8}$ in. are used, is to raise the center at intersections to a depth of $\frac{1}{2}$ in., thus leaving $\frac{5}{8}$ in. for the slope. According to the angle of the crossing, this runs from one in fifteen to one in twenty-four.

FRED BLAND,
Member Engineering Standards Committee and Light Railway & Tramway Association, and Fellow of the Permanent Way Institute.

Specifying the Sizes of Stranded Conductors

THE OKONITE COMPANY

NEW YORK, N. Y., Jan. 3, 1923.

To the Editors:

Referring to the editorial in the issue of the ELECTRIC RAILWAY JOURNAL for Dec. 23, 1922, entitled "How Shall Stranded Wire or Cable Be Specified," please note the following:

It is an almost universal practice for engineers when calling for solid copper wires from the manufacturer to designate the size according to the American wire gage. In ordering stranded conductors, however, two methods have come into use.

In one, the number of strands is specified of such size as to equal a standard-gage size or a round number circ.mil. For example, "No. 8 A.W.G. stranded" or No. 0000 A.W.G., nineteen strands," or "500,000 circ.mil, sixty-one strands."

It is well to note that the first type of designation is the most common; i.e., no attempt is made to state either the size or number of strands.

In the other method a number of strands is specified each of a standard-gage size. For example, "nineteen strands of No. 25 A.W.G." or "ninety-one strands of No. 8 A.W.G."

The objections to the first method are numerous, but the main objection is that it requires the wire drawer to carry not only all the dies necessary for all the standard A.W.G. sizes, but in addition a much larger number for wire used in stranded conductors. It requires the insulated-wire manufacturer who does not draw wire to carry a very large and inactive stock of copper wire.

If the second method is standardized, it will naturally reduce the number of dies and stock of wires and will result in quicker deliveries, as the manufacturer will not have to wait for special copper to be drawn.

FRANCIS J. WHITE,
Electrical Engineer.

An Automobile with Slat Seats!

NEW YORK, Jan. 10, 1923.

To the Editors:

How the automotive world would marvel if some maker of pneumatically-cushioned automobiles were to try to sell a vehicle with slat seats. Indeed, the possibility is simply inconceivable. Why is it, then, that electric railways operating with steel wheels on steel rails still order cars with slat seats? Sometimes the idea is varied by using a solid shaped seat with rattan covering. The belief in that case seems to be that if the eye is deceived, perhaps the buttocks may be deceived, too!

We have heard the arguments for the slat seat many, many times over. It is cheaper. It is more durable. It is less subject to abuse. I admit it is everything

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except more comfortable for the person who pays to sit on it. In an age when the poorest man in America knows what it is to ride on padded cushions, we cannot afford to treat the passenger this way. We must give him a cushion seat, and so far as is compatible with easy movement of passengers we should also give him a transverse seat. No person would dream of buying a slat-seated vehicle for his own riding. So why purchase one for riding by people who must be persuaded to use it?

Far out toward the setting sun is a rising railway manager who recently said to his staff in a discussion concerning future cars and motor coaches: "Boys, the vehicles we buy must be good enough for any and all of us to ride in. If they are not going to be good enough for us, they are not going to be good enough for the people from whom we get our bread and butter." These thoughts are commended to the slat-seat advocate who rides in a limousine himself but forgets there are some 10,000,000 upholstered automobiles now and many, many more to come to fit almost any street car passenger's purse. "CRITIC."

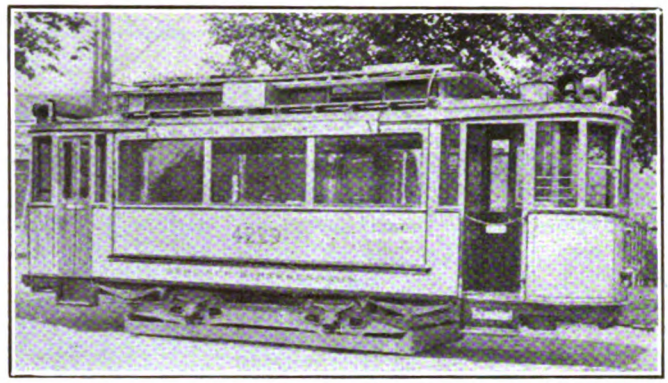
[Editorial comment on this letter appears on page 70.]

One-Man Cars in Germany

THE one-man principle of car operation is extending, though slowly, in Europe. An account of the one-man cars in Arnhem, Holland, was printed in the issue of this paper for Dec. 2. London and Amsterdam have each one or more cars on trial. At least two cities in Germany, Berlin and Dresden, have one-man cars. In each of these cases, the cars were not built for one-man operation. They are of the single-truck type and rather short, and no changes have been made in them other than to close the rear door.

A side view and nearer platform view of one of the Berlin cars are published on this page. The notice on the step, freely translated, means "Let Passengers Leave the Car First." The small card at the immediate left of the entrance says "Have your ticket or fare ready; money will not be changed." The large sign at the left of the entrance, shown in the general side view, says that the car is a one-man car.

The Notice at the Left Declares that Passengers Will Not Be Allowed to Board This One-Man Car Unless They Have the Exact Change



In Berlin Some of These Cars Are Being Run with One Man

The same fare system is followed as formerly, the motorman punching the tickets which he gives the passengers as a receipt for payments made.

The Dresden car arrangement is much the same as that at Berlin, an old car being converted into one-man operation simply by closing the rear doors.

The fare in Berlin, at last report, had been increased to 30 marks. This, at pre-war exchange, would be $7.20. At 0.0125 cents per mark, 30 marks would amount to less than half a cent, or to be exact 0.375 cent.

New Zealand Railway Being Electrified

A SECTION of the Midland Railway, South Island, New Zealand, is being electrified on the direct current system at 1,500 volts. The section is through the Arthur's Pass, which, as explained in a recent article in the *Tramway & Railway World*, connects the sections separated by the Southern Alps. The section is about 8½ miles long, 5 miles being in tunnels, and the average gradient is about 3 per cent. The electrified section will form a connecting link between the eastern and western railway systems. For the present five main-line locomotives will be required, but as the traffic increases it is expected that eight will eventually be needed. The same type of locomotive will be used for passenger and freight trains. These are of 680-hp., one-hour rating, this power being furnished by four motors on two articulated trucks.

Among the salient features of the locomotives, which were built by the English Electric Company, are these: Speed at full load, one-hour rating, 18 m.p.h.; control of the cam shaft type; brakes of four types—rheostatic, Westinghouse automatic air, Westinghouse straight air and hand. The rheostatic brake was adopted in preference to the regenerative brake because the operating conditions are such that there would not always be a load sufficient to absorb the output of a train which was regenerating.

A storage-battery locomotive is also being supplied for switching service and for use in inspection of overhead line equipment. This locomotive has 176 hp. capacity at the one-hour rating. It is furnished with a battery of 216 cells, having a total ampere-hour capacity of 83,600 at a five-hour rate of discharge. A battery similar to that on the locomotive is carried on a tender.

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Association News & Discussions

Appointments by National Safety Council

THE National Safety Council, electric railway section, has appointed Guy R. Radley, Milwaukee Electric Railway & Light Company, chairman of its membership committee. The other members are Charles B. Scott, Bureau of Safety, Chicago; A. W. Koehler, New York State Railways, Rochester; V. J. Waltz, Community Traction Company, Toledo; H. N. Withers, Galveston-Houston Electric Railway, and E. E. Thornton, San Francisco Oakland Terminal Railways. John H. Truett, United Railways & Electric Company, Baltimore, is chairman this year of the electric railway section, and Melvin W. Bridges, Chicago Elevated Railways, is secretary. The National Safety Council recently issued a special bulletin for posting in cars warning children against coasting on a street which crosses a trolley line.

A.I.E.E. Midwinter Convention

THE American Institute of Electrical Engineers will hold its midwinter convention in New York City, Feb. 14 to 17. Among the addresses and papers of interest in the electric railway field are the following:

"Observations on Electric Railway Practice," by W. B. Potter, General Electric Company. This will be given at a joint session Wednesday evening, Feb. 14, with the Chicago section, held by means of telephone connection and loud speaking telephone. Mr. Potter will speak in New York.

"Automatic Train Control Problems," by E. J. Blake, Gould Coupler Company, Depew, N. Y.

"Application and Economics of Automatic Railway Substations," by L. D. Bale, Cleveland (Ohio) Railway.

"Single-Phase Regeneration for Series Commutator Motors," by L. J. Hibbard, Westinghouse Electric & Manufacturing Company.

On Saturday morning, Feb. 17, there will be visits to local power stations, the McGraw-Hill Company building, and other points of interest in New York City.

Program New York Association

THE New York Electric Railway Association, as announced in these columns before, will meet at the Hotel Commodore, New York City, at 10 a.m. on Jan. 25. The program has been tentatively arranged, and will include the following: Walter Jackson, fare and bus consultant, will present a paper on the selling principles of the weekly pass. This subject will be discussed by S. W. Greenland, vice-president and general manager Indiana Service Corporation, Fort Wayne, Ind., and W. H. Boyce, general manager Beaver Valley Traction Company, New Brighton, Pa., followed by general discussion. L. M. Clark, vice-president Railway Improvement Company, will present a paper on the lubrication of railway motors, which will be discussed by E. A. Murphy, general manager United Traction Company of Albany, and L. J. Davis, electrical and mechanical engineer Brooklyn City Railroad Company.

There will be a buffet luncheon at noon, and in the afternoon D. C. Fenner, chairman of the Motor Vehicle Conference Committee, a joint organization of several associations in the automotive field, will present a paper on the fundamental principles of state motor vehicle common carrier regulation. There will also be a paper on insulation of catenary and other power and railway systems by Arthur O. Austin, chief engineer of the Ohio Insulator Company, Barberton, Ohio, accompanied by stereopticon slides.

The annual banquet will be at the Commodore at 6:30 p.m. and among the speakers will be the inimitable Will Rogers, who will tell the railway men how to run a railway. Other speakers will be announced later.

American Association News

Plans for the Midyear Conference

J. N. SHANNAHAN, chairman of the meetings and subjects committee of the American Association, has announced that the program for the midyear conference at Washington on Feb. 16 is rapidly assuming final form. The committee this year has decided to confine the two sessions to one subject each. At the morning session the general subject will be "Electric Railway Regulation." The principal address will be given by the Hon. Dwight N. Lewis of the Iowa Board of Railroad Commissioners and president of the National Association of Railway and Utilities Commissioners. At the afternoon session the general subject will be "Electric Railway Taxation," consideration being given to special imposts and taxes as well as general taxes. Senator F. N. Davenport, chairman of the New York legislative committee on taxation, will make the principal address on this subject.

At each session it is planned to have three or four railway men and commissioners lead the discussion with remarks which they may have prepared in advance, the meetings then to be thrown open for general discussion.

The dinner will be held Friday evening at the New Willard Hotel, where the business sessions will also be held. Elaborate plans are made for entertainment at the dinner and among the principal speakers will be the Hon. Albert Bacon Fall, Secretary of the Interior, and former Vice-President Thomas Riley Marshall, now a member of the United States Coal Commission.

Technical Points in Connection with the Approaching Rail-Joint Tests

INTERESTING correspondence is being conducted in connection with the details of the tests on rail joints which are to be made soon under the auspices of the committee on welded rail joints. This is the committee which is functioning under the American Bureau of Welding and the work of which is being financed by the American Electric Railway Association.

It is the desire of the committee that general discussion of its plans be conducted at once so that the committee may have the benefit of expert opinion before final details of the testing machines and testing procedure are decided upon. Below is given an abstract of some of the recent letters which have passed back and forth, and comments upon the points raised in these letters or upon any points which ought to be considered will be welcomed by the committee. Communications should be addressed to the secretary, W. Spraragen, 29 West Thirty-ninth Street, New York City.

Some weeks ago Dr. G. K. Burgess, chief of the division of metallurgy, United States Bureau of Standards, wrote to E. M. T. Ryder, Third Avenue Railway System, New York, raising several questions. For example, he asked: "If the welds are made by the companies and shipped to the bureau*, are they to be made on straight or curved lengths?" In reply Mr. Ryder said that they should be of the correct radius and ready to install in the rotary test machine, for if the joints were shipped straight they would have to be curved on the ground by one of the Washington railway companies. This would be difficult to do with joints having joint plates 2 ft. or more in length, and such bending of completed joints might introduce additional stresses which would affect the behavior of the joints under tests. As under actual track conditions joints are installed on curved tracks after the rail has been curved, it is desirable to follow the same

*It is planned to conduct the testing work in Washington on the grounds of the Bureau of Standards.

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practice with joints which are to be tested.

The above implies that the tested rails should be curved by the rail manufacturer before they are shipped to the railway which makes up the joints. The former is better equipped to do the bending than the railway.

In Mr. Ryder's opinion the curvature would not extend through the joints but, as in practical trackwork, the curvature would be carried up to a point just outside the joint plate, the rail being kinked at this point slightly more than is theoretically necessary in order to give a straight chord in the curve across the joint for about 2½ ft. This would not affect the gage of the track materially.

Mr. Ryder expressed the personal opinion that it will be desirable to operate the rotary testing machine with the flanges of the truck wheels turned off. This is partly to avoid complicating the joint testing with flange wear on the joints, and partly to simplify the aligning of the track on the machine.

After the preliminary tests to determine the state of the art are completed, in Mr. Ryder's opinion it will probably be advisable with certain types of joints to have them made up in Washington. This will somewhat simplify the procedure, as some of the joints can be made up in place on the track of the rotary machine. With some types of joints, however, this will not be possible as they must be made where the equipment necessary for their construction is available.

Dr. Burgess also raised the question: "Can it be considered that a welded joint made in a short-radius-curvature rail will represent fairly the service that would be expected from a weld made on a tangent piece?" In Mr. Ryder's opinion it will, although in the case of individual joints there might be some variation. On the whole the differences will not be great enough to affect the value of the tests.

Mr. Ryder's Reply Discussed

Mr. Ryder's reply to Dr. Burgess' questions was sent to the members of the committee. The substance of some of the replies is as follows:

Prof. D. D. Ewing, Purdue University, agreed that the joints should be shipped to the bureau curved to the correct radius and ready for installation. He suggested that many of the objections to making the joints in the shops might be obviated by setting up a dummy track in which the conditions of abutting rail joints, under compression or tightly closed if closure only is desirable, might be easily obtained. He approved the use of flangeless wheels. He also raised a question as to the type of substructure upon which the test track is to be located, suggesting that if flexible substructure is used it may be difficult to keep the running track in correct position. On the other hand, if the track is rigidly mounted on concrete foundation the results may be different from what would be obtained in operation on standard track. However, in his opinion, joints that will stand up well in tests on the proposed machine will also stand up well in service.

W. W. Wysor, United Railways & Electric Company of Baltimore, Md., expressed the belief that the entire rail length, including the joint, should be made to as nearly true radius as possible, and he sees no difficulty about curving the joint as well as the balance of the rail. With skill in the use of the bending ram, curving the rail gradually, it is possible to curve it so nearly to the proper radius that for all practical purposes the radius will be true. In order to effect the curving of the rail through the joint, the rail should first be curved to the true radius and then sawed at the point where it is desired to make the joint. The extreme ends of the rail, which cannot be curved, should be discarded. Joint plates should also be curved to proper radius by using the previously curved rail as a template. The curving of the joints could probably be facilitated by having them curved in long lengths, before cutting to the proper length for joints. All portions of the track in which the test joints are located should be equidistant from the center of the machine to avoid lurch of the trucks in passing over the joint.

According to Mr. Wysor, it is not necessary that the joints be made in the track, as track conditions can be reproduced for all practical purposes in the yard. The rail ends can be given the necessary compression by the use of drift pins driven in the holes, or by means of buttresses and wedges.

W. F. Graves, Montreal Tramways, thought that for comparative purposes it will be all right to weld the joints in a curve of the radius required by the testing machine, although in practice joints in curves are not usually welded because the rails have to be renewed more frequently on curves than on straight track. The rail should be curved to the proper radius by the steel companies furnishing them, and extreme care should be taken in butting the ends tightly together. To minimize distortion in welding the plates should be curved to the radius of the rail.

Howard H. George, Public Service Railway, writing in regard to the Lorain bar-weld type of joint, said that with this it will be necessary to curve the rails before the joints are made. It would be entirely impracticable to bend them uniformly after the joints have been welded, besides which stresses due to the bending would be set up in the rails. The manufacturers should curve the rails because most railway properties are not equipped with power-driven rail-bending machines, but depend on the "Jim Crow" type of bender, or some form of hydraulic bender.

H. M. Steward, Boston Elevated Railway, expressed the opinion that the rails should be curved and shipped to Washington; that at localities where the joints are to be made the rail should be cut with a saw; that the ends of the rail cut square by the manufacturer should be cut off and discarded; that the test joints should be made at Washington; that the test joints should be made by men in the employ of the companies submitting the joints and not by welders secured for the purpose, and that the joints or bars used should be curved as well as the rails.

H. H. Findley, Omaha & Council Bluffs Street Railway, pointed out that the rail should not be stressed laterally by bending after welding. Where practicable, rail should be bent, sawed and welded where the curve is perfect. The joints tested in a curve of 40-ft. radius should represent fairly the conditions met in tangent track, although the comparatively stiff construction of a curve precludes the possibility of much lateral deflection of the rail. With all types of rail, although to different degrees, lateral stresses must be provided against. Arc-welded joints must make provision for these. Laboratory tests of the "rotary type" would appear to favor the joints. Vertical load and impact tests will be of great value. However, the wheel conditions on the machine should be as nearly like those produced in actual traffic as possible. The wheel flanges might be allowed to crowd the joints part of the time, if practicable, so as to duplicate the conditions met in operation.

Heavy Traction Men Confer

IN THE absence of Chairman Sidney Withington, J. C. Davidson, vice-chairman of the Engineering Association committee on heavy electric traction, presided at a meeting of that committee held in New York City on Dec. 29. Besides Mr. Davidson, the following were present: H. F. Brown, New Haven, Conn. (for Mr. Withington); A. H. Armstrong, Schenectady, N. Y.; J. M. Bosenbury, Peoria, Ill.; H. W. Cope, East Pittsburgh, Pa.; Norman Litchfield, New York City; D. J. Locke, Worcester, Mass. (for A. S. Richey), and L. S. Wells, New York City.

It was decided to endeavor to revise and amplify the bibliography of heavy traction prepared two years ago. Electric locomotives weighing less than 80 tons will be included, but the line will be drawn to exclude those not equipped to handle interchange service with the steam roads according to A. R. A. requirements. Messrs. Armstrong and Cope will undertake to collect the new data, including available information on foreign installations.

The subject of branch-line electrification was defined to include only those not a part of an electrified railroad. Information as to self-propelled cars and storage-battery switching locomotives will be included.

Members of the committee were asked to review the heavy traction committee work of the four years preceding and be prepared to report at the next meeting, to be held possibly in Washington preceding or following the midyear meeting. They will also come prepared to discuss the standards, if any, which are suitable for submission to the American Engineering Standards Committee.

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Maintenance of Equipment

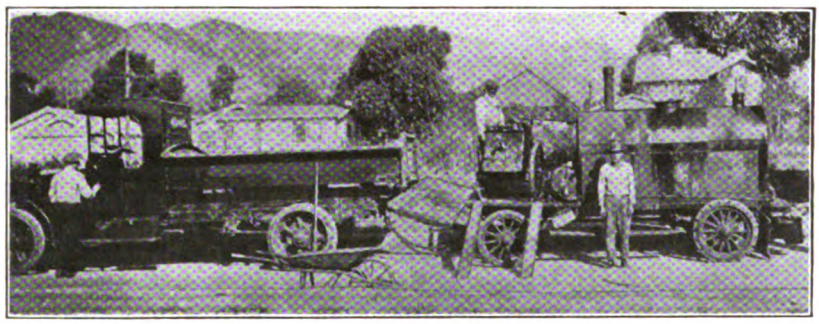
Road Oil Tank and Kettle

By Clifford A. Elliott
Engineering Department, Pacific Electric Railway, Los Angeles

THE Pacific Electric Railway of Los Angeles has more than 1,000 road crossings on its lines and the large number of automobiles and trucks in southern California cause heavy wear on these crossings.

In the past it has been difficult to keep these crossings as well maintained as was desired because the equipment used and method of repair followed made it impossible to handle the work with sufficient dispatch. Where the pavement at the crossing was oil macadam the material thought to be needed was mixed up at the engineering department's paving plant and moved to the job by either freight train or a special-work motor car. In other cases the required amount of ¾-in. crushed rock and heated roadway oil were taken to the job by truck, and laborers tamped the crushed rock in place and poured the necessary oil on it from the oil truck. When delays from traffic or other sources interfered with the work, this plan proved uneconomical. Finally it was decided to provide first-class equipment to handle this specialized type of track maintenance work.

A 600-gal. boiler for heating the oil before it is applied to the crushed rock was obtained and was mounted on a 3½-ton chassis, 14 ft. long. A specially-arranged firebox was provided under this boiler. In front of this tank on the chassis is a fuel oil tank of 30-gal. capacity, connected by a small fuel-oil feed pipe to an oil burner in the firebox under the large tank. The fuel oil used is coal oil and runs under a pressure of 15 lb. to the burner. A special type of burner was constructed in the engineering department's paving plant shop.



At Left, Oil Heater and Dump Truck Ready to Move to Another Job. At Right, Filling a Bucket from the Tank

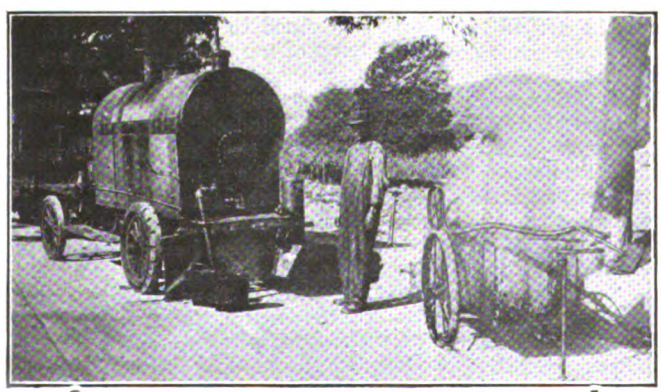
How the Oil Is Prepared and Applied

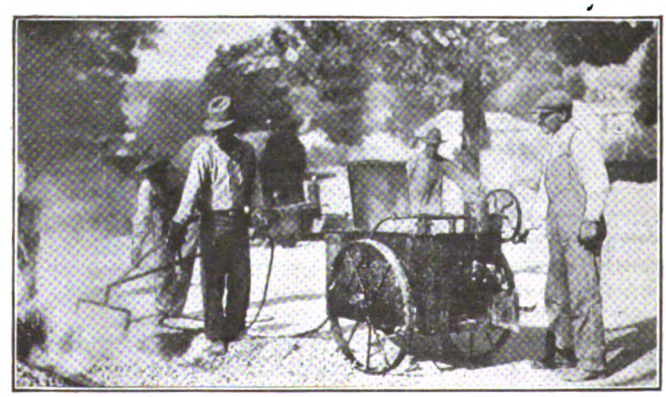
The air pressure is obtained for the fuel tank from a Yankee hand pump located adjacent to the fuel tank. The pressure gage on this tank reads up to 100 lb. Thirty to 40 lb. of air have to be pumped up in the tank every three hours.

On the rear of the equipment is a 6-gal. capacity tank with needle regulating valve, gage and pump complete for supplying the water that is fed into the oil burner with the fuel oil to generate the necessary steam and provide the required flame for heating the oil in the large tank. The water is conveyed from the pressure tank through 5 ft. of hollow wire, and one filling of water takes care of eight hours' work. On the rear of the equipment also are the feed or check valves for regulating the flow of fuel and water. The oil is heated to 250 deg. F. before it is applied to the crushed rock.

Leading from the rear of the boiler are valves and flow pipes to admit the heated oil into hand pouring buckets or to convey it by pipe connection, when desired, into a 50-gal. hand pump kettle, mounted on wheels. When the heated oil is in the kettle it is kept at its original heat by a firebox in which coal or wood is burned.

When the kettle is not in use or it





Oil Heating Tank at Left, Kettle at Right. The Oil Is Kept Heated in the Kettle and Sprayed Under Pressure

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Far Better Penetration Is Secured than When the Oil Is Poured from Buckets by Hand

is being moved from job to job, it is stored on the front platform of the tank truck. One of the accompanying views shows the kettle being lifted down from the platform to be put at work. This kettle, besides being equipped with a pressure pump, has 20 ft. of ¾-in hose with a check valve near the operating end, so that the operator can regulate the flow of oil as the oil is carried out through a three-point sprayer to the crushed rock.

Water is applied to the rail by a laborer before the oil is spread to keep the oil from adhering to the rail.

Spray Method of Spreading Oil Is Best

The present method of spreading the oil is far superior to the old method of pouring it on the crushed rock from hand buckets, because the new method results in greater penetration of the oil into the crushed rock, which is thoroughly spread and tamped or rolled before the oil is applied. The new method also gives more uniform and quicker distribution of the oil. Finally, the oil always goes on at the desired temperature, an important factor in obtaining the desired degree of penetration.

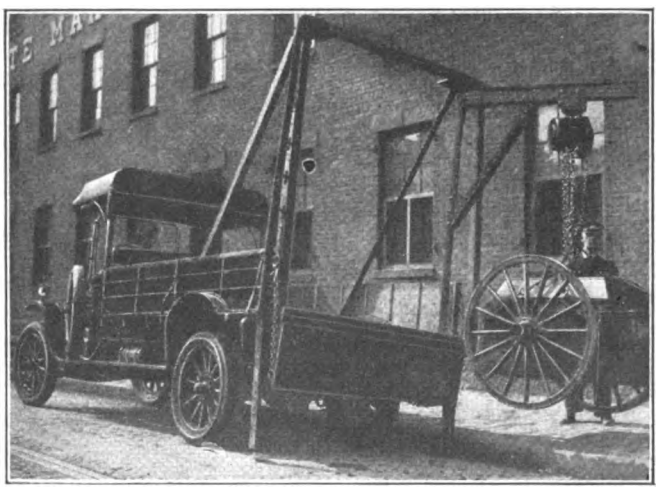
The burner consumes 1 gal. of fuel oil for a continuous period of three hours to obtain the desired first heat, and ½ gal. per hour is consumed thereafter. The oil heating outfit is transported from job to job by being coupled onto one of the engineering department's 3½-ton dump trucks. There are two such trucks in the service of the engineering department. Each carries the necessary crushed rock and tools for road crossing repair along with the oil heating and distributing equipment. The equipment permits a gang to do sometimes as much as four times the work accomplished by the old method.

Equipment Used in Boston for Transporting Arc-Welding Apparatus

THE Boston Elevated Railway has long been interested in the several uses to which welding and grinding equipment may be put in connection with track maintenance. As is well known, the arc-weld rail joint has been extensively used on new track construction in Boston for several years. In consequence a considerable amount of welding and grinding equipment has been accumulated and the problem of how to obtain the utmost use from the apparatus was solved by the use of automobiles for transportation of the welding and grinding machinery. This work is under the direction of H. M. Steward, superintendent of maintenance.

Three 2-ton White trucks are used for this service. Each truck is equipped with a small jib crane suitably braced, to which is hung a 1½-ton chain hoist. As will be seen from the accompanying illustration, the boom of the crane swings about and by means of the chain hoist the driver of the truck and one helper are able to handle the heaviest portable apparatus that is used either for welding or grinding. The truck platforms are 10 ft. long and 5 ft. 6 in. wide with the crane mounted at the rear. There is a canopy protection over the driver's seat.

It is stated that the three trucks handle all of the welding and grinding apparatus in use during the busiest season, when eight arc-welding machines and six grinding machines are in operation, with thirty-four men employed in the welding work. In addition to transporting the welding and grinding apparatus, these trucks are used to a large extent for general miscellaneous work in the maintenance department.



Handling Welding Equipment in Boston

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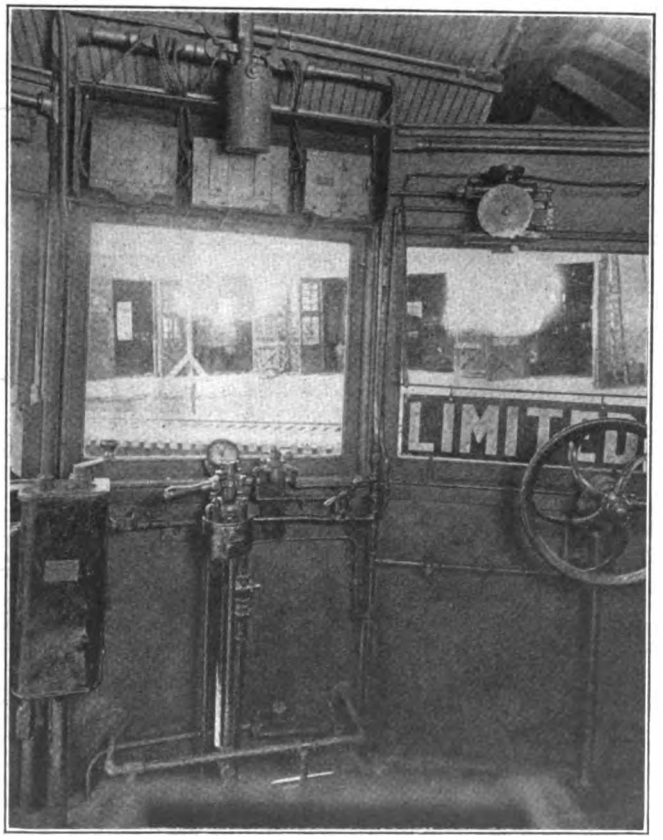
New Equipment Available

Automatic Crossing Whistle

AN ACCOMPANYING illustration shows the equipment recently brought out by the National Safety Devices Company, Waterloo, Iowa, for blowing the necessary number and length of blasts on an interurban car as it approaches a highway crossing. The device consists essentially of two horizontal cylinders, a vertical cylinder, a circular steel plate with projecting teeth and an operating valve or valves, the three cylinders forming a single casting. When the operating valve is depressed, air is admitted to the lower horizontal cylinder, causing the movement of a piston rod, which by means of a connecting rod rotates the circular plate through an angle of about 90 deg. As soon as the operating valve is released, the air pressure in the lower cylinder is also released, and a powerful spring housed in the vertical cylinder causes the plate to revolve, a uniform speed of rotation being secured by suitable governor. As the plate revolves back to its normal position, the projecting teeth on its periphery engage a lever, the movement of which alternately opens and closes a valve admitting air to the upper cylinder, the valve being open when the teeth engage the lever and close when they do not. The admission of air to the upper cylinder forces out a piston rod and thus by means of suitable connections pulls the whistle cord and blows the whistle.

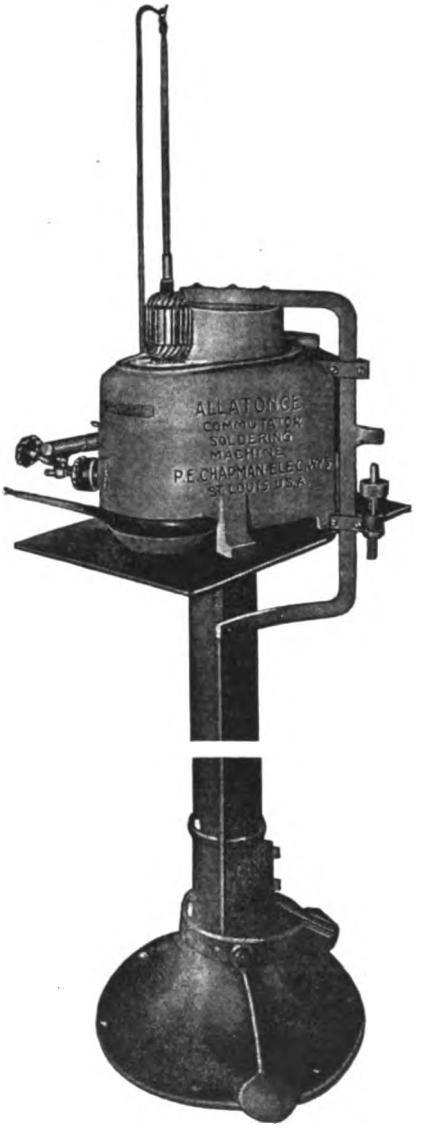
The width of the teeth and the spaces between them therefore govern the length of the blasts of the whistle and the intervals between the blasts. The upper cylinder is connected to an air pipe leading to the bell ringer, so that the admission of air to this cylinder also rings the bell. When air is admitted to the lower cylinder and the circular plate is first revolved, a swinging arm permits the projecting teeth to pass by without moving the lever or blowing the whistle.



Whistling Device Applied to the Front of an Interurban Car

Rapid Soldering of Commutator Leads

THE accompanying illustration shows a form of machine for soldering commutators being placed on the market by the P. E. Chapman Electrical Works, St. Louis, Mo. The machine provides for soldering the leads in the commutator head by immersion all at one time. Provision is made by which the commutator, shaft and ring insulation are protected. The solder is automatically cleaned of dross, as it is raised to the height of the joints by depressing the treadle. Gas burners, protective jackets, vent collar, pedestal, etc., are included in the machine. Two sizes are being marketed; one provides for commutators up to 2 in. in diameter, and the other is for commutators from 2 to 4 in. in diameter. This latter size should be of use to electric railways in connection with the soldering of air compressor leads.



Commutator Soldering Machine

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The News of the Industry

Extra Compensation

Employees of San Diego Property Will Benefit in New Co-operative Plan—Welfare Work Outlined

As an incentive to employees to keep down the number of accidents, build up a friendlier relationship with the public and eliminate errors on the employees' reports the San Diego (Calif.) Electric Railway put into effect on Jan. 1 a plan whereby the men will have an opportunity to earn an additional $5 each month.

Claus Spreckels, general manager, sent a letter to the employees outlining the requirements for the extra compensation. A clean record for each of the following items during a month entitles the employee to $1.

(a) Having no accidents for which you are responsible.
(b) Not getting reported for discourtesy.
(c) Having no errors on mileage cards.
(d) General appearance.
(e) Miscellaneous, including passing up passengers, laxity in calling streets and oversleeping.

One of the advantages from the carman's point of view is that he doesn't have to be perfect in all five respects each time in order to participate in the award. In order to participate the men must work the full month with a layoff allowance of not more than two days. In other words, the employee must work twenty-nine days out of a thirty-one-day month.

In addition to the co-operation plan General Manager Spreckels has sent a letter to the employees reminding them of the services performed by the company's welfare department, which has been in operation about six months.

The welfare department, entirely distinct from the San Diego Electric Railway Employees' Benefit Association, is in no manner supported by employees. In outlining the benefits Mr. Spreckels states that every form of medical and surgical attention which it is possible to render in the offices of the department is free of all charge except that the employee to whom this assistance is given is required to reimburse the director for the actual cost of medicine and materials used. The purpose of the letter was to acquaint the large number of employees and their families who are not aware of the welfare work with the opportunity for assistance which is being offered by the railway company.

Steam and Electric Collide

Two passengers were killed and nineteen injured at Vancouver, B. C., at 10.20 p. m. on Dec. 26, when a Great Northern freight train backed into a street car of the British Columbia Electric Railway on a level crossing at Venables Street. The street car, which was filled with passengers, came to a stop at the crossing as required. A Great Northern locomotive was pushing a train of seventeen box cars, a brakeman proceeding ahead. At the crossing, the brakeman gave the train the signal to proceed and this signal was read by the motorman as intended for him. When the street car was half way over the crossing, the leading box car hit it, pushing it over the track against a pole which tore through the car, wrecking it.

The electric railway was the senior road and had the right-of-way. The steam railway was required to come to a full stop before crossing and to have a man proceed ahead of its trains. Steam railway company officials say that the regulations were complied with and the street railway says that its instructions to its men carried out the orders of the railway commission. An investigation is to be held by the city authorities after the inquest.

Critic of Detroit Lines Rapped

Ross Schram, assistant general manager of the Department of Street Railways at Detroit, Mich., does not think much of "The Truth About Detroit's Car Lines," a series of articles contributed by R. R. Batson to the *Evening World* of New York. Mr. Schram says in the Detroit *News* for Jan. 4 that although the articles are supposed to be authoritative Mr. Batson spent just thirty minutes with members of the street railway department staff and twenty minutes with Mr. Couzens.

Mr. Schram also quotes from the letter of the American Electric Railway Association, to the effect that a reprint of the articles is being issued by the Committee of One Hundred. After referring to that body by saying that its chief function was to induce the United States Chamber of Commerce to bring pressure to bear on the Secretary of Commerce and thus on Mr. Wilson when President to appoint the Federal Electric Railways Commission, Mr. Schram says:

Mr. Batson's six articles made three criticisms of the D. S. R. One was that we were not taking care of depreciation. Acting Mayor John C. Lodge answered that last week. A second was that we are not setting aside proper damage reserves. We are doing just what the Detroit United Railway did in handling its damage claims, and to date only 6 per cent of our reserve has been paid out for damages.

His third criticism was that we would not be able to reduce fares. We are spending money to improve service, which is what the citizens want. That criticism sounds odd, in the face of the recommendation made by the Federal Electric Railways Commission that fares on all privately owned lines be boosted.

If each of the 1,300 members of the association takes out 10,000 copies of the booklet "The Truth About Detroit Car Lines" there will be 13,000,000 of them in circulation, all knocking our lines. That this will be done is not inconceivable. There is every indication that the anti-M. O. propaganda of the public utility interests is commencing to be released.

Legislative Lineup

Members of Committees Announced Concerned with Consideration of Utility Measures—New Bills Appear

Legislative consideration of matters relating to public service, which means the regulation of railroads, street railroads, gas and electric roads, telephone and telegraph lines, express companies, steam companies, certain bus transportation companies and, as a matter of fact, all matters subject to such law, devolves in the Senate of the State of New York upon the public service committee and in the Assembly upon the judiciary committee.

For this reason, with a Democratic administration elected, and a program announced by the administration of radical proposals in the way of public service regulation, coupled with the fact that the Assembly or lower house of the Legislature remains Republican, an analysis of the legislative committees as appointed by the President pro tem. of the Senate and Speaker of the Assembly are of interest.

On the Senate public service committee there are fourteen members, and there are eight new members on this committee this year. Senator Twomey, a pharmacist of Kings County, with seven years previous legislative experience, is named chairman this year to succeed Knight, Republican, who was chairman last year, while Knight is still retained on the committee.

Senator Salvatore A. Cotillo of New York, a lawyer, is a new member of the committee and a Democrat.

Senator Lacey, listed as a merchant and representing an Erie County district, is another new member of the committee. Mr. Lacey is a Democrat.

Senator Russell, a lawyer from Kings County, Democrat, is a new member.

Senator Farrell, from Brooklyn, a manufacturer and a legislator of years of experience, is another member.

Senator Sheridan, a lawyer of New York City, who succeeded Martin McCue to office and who is Democratic in politics, is also present.

Senator Carroll, a Democratic manufacturer of Kings and a veteran member of the Legislature, has also been named.

Senator Kavanaugh, banker of Waterford, Saratoga County, and Republican, succeeds himself.

Senator Hewitt, farmer from Cayuga County and chairman of the Senate committee on finance, is another new member.

Senator Lusk, Republican and lawyer from Cortland County, majority leader last year and a member of last year's committee, is another member.

Senator Downing, an accountant of New York City; Senator Dunnigan of the Bronx, an architect, and Senator Walker of New York, the present

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majority leader, all Democrats, constitute the balance of this committee.

In the Assembly matters relating to public service are referred to the judiciary committee, all of the members of which are lawyers and thus it is perhaps that only on the Senate side of the New York State Legislature do matters relating to this subject obtain a human consideration.

On the Assembly judiciary committee Jenks of Broome, Republican, succeeds Rowe of Erie. It was the Jenks public service bills which started the controversy regarding present day ideas of regulation of public utilities and Mr. Jenks is a man of wonderful perception and a lawyer of no mean repute.

This committee has thirteen members and its make-up stands the same as last year, nine Republicans and four Democrats. There are six changes on this committee this year.

The Democratic members are Cuvillier and McKee of New York, who served on the committee last year, and Cosgrove of Richmond and O'Connor of New York, new members on the committee but both recognized lawyers of standing and of previous legislative experience.

The Republican members outside of the chairman are Ullman of New York, Moran of Lewis, Barnes of Oswego and Dunmore of Oneida County, who have seen previous service with Shonk of Westchester, Benson of Onondaga and Johnson of Chautauqua.

Upon the judiciary committee of the Assembly will depend the reporting out of all matters of administrative interest relating to public service matters.

Bills Appear Reflecting Governor's Recommendations

Four bills carrying out various sections of Governor Smith's recommendations for control of public utilities have been introduced. None of them is an administration measure, but they may receive the official label if they pass muster on tests as to their constitutionality. Three of the bills were introduced by Senator Lacey of Buffalo. They permit cities to regulate and reduce rates of transit companies operating wholly or partly within their limits; permit cities to license or to operate bus lines; give cities power to make rulings as to service to be furnished by transportation companies, so as to prevent overcrowding.

New Jersey Commissioners Report

The New Jersey Board of Public Utility Commissioners in its annual report to the Governor has recommended an amendment to the present public service law of New Jersey providing that when the commissioners have made a determination as to rates for a public utility, such order shall not be stayed except by order of three Supreme Court justices and that no order of the commissioners shall be reviewed by less than three justices of the Supreme Court. In case the order should be set aside by the three justices, the commissioners ask that proceedings be remitted to the board for a rehearing to fix just and reasonable rates in accordance with ruling of the court.

Recommends Establishment of Transportation District

Legislation is recommended by the Massachusetts Department of Public Utilities creating the Metropolitan Transportation District to acquire the property of the Eastern Massachusetts Street Railway Company in Boston, Chelsea, Everett, Malden and Revere and to lease this property to the Boston Elevated Railway on a rental basis similar to that by which the Commonwealth leased the Cambridge tunnel to the Elevated, so that the bulk of the cost would be transferred to the car rider.

The transportation district is to include also all the other Metropolitan cities and towns situated on the Boston Elevated system, which would thereby gain directly the advantage of a single fare to Revere Beach.

The trustees of the Elevated are reported by the commission to be substantially in favor of the plan. The trustees of the Eastern Massachusetts protest against it on the ground that it dismembers their system, and owing to legal difficulties they maintain that if the plan is to be put into execution it should be through the process of the right of eminent domain.

A bill has been drafted by the Department of Public Utilities, however, calculated to carry the plan into effect.

Regarding the situation to the South of Boston, involving the street railway service between Boston and Hyde Park, the Department of Public Utilities finds that the city of Boston has it in its hands to solve that problem. The department was asked by the Legislature to decide what a fair valuation and a fair rental would be if the Eastern Massachusetts Street Railway lines in Hyde Park were to be leased to the Boston Elevated. The department assumes, as the elevated trustees argue, that if the property is to be taken over by the Elevated only one line, that through Hyde Park Avenue to Cleary Square in Hyde Park, should be operated by the Elevated on the straight single fare. If the other lines are to be operated by the Elevated the terms and the fares shall be left to the Elevated trustees.

The department fixes $225,676 as the proper value of the lines which should be turned over to the elevated, but this does not include the power house which has been idle since 1920. If that power house were to be included, though it probably never more will be used in connection with the operation of the service, it should be valued at its salvage value of $34,000 plus an amortization charge of $31,000, making a total of $65,000. The original investment was $206,000.

As to rental the department recommends that it should be 5 per cent of the valuation, the lessee to maintain the property in fair operating condition and assume the burden of all taxes on the property.

Employees Indicted

Federal Investigation Results in Charges Against Former International Railway Employees

Robert C. Lacey, State Senator from the Forty-ninth district and chairman of the board of arbitration of the Central Labor Council of Buffalo, and twelve striking employees of the International Railway Company, Buffalo, N. Y., members of the Amalgamated Association, are under indictment by the United States Grand Jury charged with various Federal offenses in connection with the dynamiting of the Buffalo-Niagara Falls high-speed electric train on the International Railway's interurban line Aug. 17.

The indictment and arrest of the men comes as a result of a Federal investigation into the series of dynamiting outrages on the local and interurban lines of the International since the outbreak of the strike July 1, 1922. Co-operating with the Federal authorities were operatives from several national detective agencies employed by the railway company. The International has offered a reward of $100,000 for information leading to the arrest and conviction of those responsible for the dynamiting outrages.

The prisoners were indicted on the charge of conspiracy to restrain interstate and foreign commerce because the three-car electric train that was dynamited near the Buffalo city line carried more than fifty excursionists who had through tickets from Baltimore and Philadelphia to Niagara Falls. To interfere with the transportation of these passengers is violation of a Federal law. None of the passengers was killed, but all were injured and the cars were wrecked.

A large delegation of Buffalo labor men who called upon Governor Smith early in the week urged a State investigation into the strike of trainmen and other employees of the International.

Outer Belt-Project Revived

A charter has been granted at Topeka to the Missouri and Kansas Railway & Terminal Company, a $1,000,000 corporation. Application for the charter was made by five men of Greater Kansas City. The men who applied for the charter are C. N. Prouty, cashier of the Exchange State Bank; W. E. Barnhart, an official of the Union Land Company; A. L. Berger, Kansas City, Kan., attorney, and Adolph Meyer and J. E. Rockwell, connected with the Joseph Heim interests in Kansas City. Included in the rights granted in the charter are the bridging of the Missouri and Kaw Rivers; railroad connection with every railroad in Kansas City, and the development of two new industrial centers. The charter shows 10 miles of right-of-way by the new company, eight in Kansas City, Kan., and two in North Kansas City. The plan for carrying out the construction of the new line was dealt with at length in the ELECTRIC RAILWAY JOURNAL for Aug. 5, 1922, page 208.

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New York Commissions Report to State

Interesting Comment Contained in the Reports of the Transit and Service Commissions—Plea Made for Retention of Commission Form of Regulation

BOTH the New York Transit Commission and the Public Service Commission reported on Jan. 8 to the Legislature on their activities for the year 1922. The Public Service Commission has jurisdiction throughout the State, except over traction matters in New York City. The summaries of these bodies are formidable documents. One contains about 30,000 words and the other about 25,000 words.

It will be recalled that the Transit Commission was charged by the Legislature of 1921 with carrying on work on the plan of readjustment and reorganization of the street railway systems in New York. This was in addition to its other activities. The functions of the commission as fixed by the Legislature of 1921 are threefold. It is charged with the supervision and regulation of all transit companies operating within the city of New York, functions previously subject to the Public Service Commission for the First District. It is vested, also, with the powers previously exercised by the Transit Construction Commissioner in the matter of the construction of new subways and other necessary transportation facilities; and, finally, with the preparation of the plan for readjustment covering both the affairs and the operations of the companies, as well as their relationship to the city of New York.

VALUATION COMPLETED, BUT NOT REVISED

In connection with the plan of readjustment and reorganization of the systems of New York City, the commission says that the valuation of the properties of the existing railway companies designed for inclusion has been completed, except for necessary revision, and will shortly be ready for incorporation in the forms of contract which the commission is authorized to prepare and to submit to the city authorities and the companies. An outline of the proposed plan of readjustment was incorporated in the report made by the commission to the Legislature a year ago. Further discussion of it in its present stage, and of the valuations, the commission will, however, reserve for a special report to be submitted to the Legislature, together with certain recommendations, at an early date.

The commission, during the year 1922, in pursuance of these various powers, devoted itself chiefly to the following undertakings:

1. A complete investigation, public in character, of the service, management and financial status of all of the companies coming within its jurisdiction, rapid transit and surface—and including buses—conducted in its behalf by former Supreme Court Justice Shearn, as special counsel.
2. The issuance of comprehensive service orders requiring substantial increases in the number of trains and cars operated upon the subway and other lines of the Interborough and Brooklyn Rapid Transit companies.
3. The completion of the necessary construction work upon subway lines included within the dual contracts of 1913, and still unfinished.
4. The formulation of plans for the immediate construction of new subways calculated to expand and relieve the existing system, at a construction cost of $218,000 000.
5. The immediate financial reorganization of the Interborough Company, with particular reference to its relationship to the Manhattan elevated properties, a reorganization under which the fixed annual charges of the company have been greatly reduced, and the means provided not only for financing improved service, but for adding materially to the company's car and power equipment.
6. The study of plans for the better handling of the suburban passenger traffic now entering the city, and carried very largely, after transfer within the city, on the rapid transit lines.

The commission explains that confronted with the fact that the rapid transit system, even with the great gains in mileage made under the dual contracts of 1913, is already inadequate, and that no provision has as yet been made for additional lines to meet the vastly greater demands of the future, it set out to secure at least the maximum present service that can be given upon the existing lines. It says that what has been gained in the way of better service by no means meets the need of the city or of the traveling public; but the companies have been brought to a point where they are at least providing approximately the full amount of rush hour service the present tracks will carry, and as complete a quota of additional non-rush hour service as the funds at their command will permit.

The commission says that without the plan of preliminary reorganization of the Interborough company, which the commission encouraged, and which was worked out largely along lines that it had prescribed, the funds necessary to finance even the partial measures of relief for which the orders call would not have been forthcoming. The operating companies, as a method of relief, preferred a higher fare. The commission, however, in a series of conferences occurring shortly after its appointment, made it clear to the companies, as well as to the committees representing various groups of security holders, that it had no increase of fare in view. The only formal request for an increase following these conferences occurred in March, 1922, when the Interborough company petitioned for the right to increase its rate. That petition was denied under circumstances set forth by the commission at length and it has not been since renewed. Instead, the officers of the company, at the instance and under the guidance of Judge Julius M. Mayer of the United States Circuit Court, and in conjunction with representatives both of the Interborough securities and of the stockholders of the Manhattan Company, turned their attention to the plan that has since been adopted. The fixed annual rental of $4,200,000 paid for years from the joint Interborough revenues to the holders of Manhattan stock, whether earned or not, has been cancelled, and provision made for the acceptance of a reduced annual rental, to be paid only when earned. Any future dividends earned on the Interborough stock are to be limited to 7 per cent annually; and during the next five years none is to be paid at all. So far as the Interborough Company is concerned, the $114,000,000 of "water" in the shape of previously existing securities of the Interborough Consolidated Corporation—the former "Inter-Met" holding company — have been absolutely wiped out, and the Interborough returned to its own independent status. Through the readjustment of security issues and the deferment of certain sinking fund charges, $15,000,000 has been realized to pay for improvements, and the general situation of the Interborough properties has so improved that the danger of receivership that has been hanging over them for months past has practically disappeared.

The work of the commission on the completion of the construction of lines of the Dual System called for by the contracts negotiated with the city in 1913, not yet finished—as well as that upon the imperatively needed new lines —would have met with greater progress had it not been for the consistently hostile attitude of the Board of Estimate and Apportionment, and its repeated refusal of co-operation.

CITY REFUSES TO CO-OPERATE

The commission was obliged to report to the Legislature, as it did a year ago, that the continued lack of co-operation on the part of the municipal authorities of the city of New York who are charged by law with certain joint duties with the commission in respect to rapid transit construction and administration, has in fact continued to be general in character. The result naturally has been serious interference with the efforts of the commission to afford the people of the city the transit relief to which clearly they are entitled.

The commission then goes with considerable detail into all its various activities, principal among them the ones just mentioned. Of its comment on the financial status of the companies under its jurisdiction and the progress under the rapid transit construction contract it is proposed to deal in a later issue. It points out the important features of the recent investigation of the operation of buses under the auspices of the city and in conlusion says:

> The commission is prepared to take whatever steps may be necessary to correct these conditions and to legalize and regulate all desirable bus operation within the city, which incidentally will place some proper share of the expense of the upkeep of the streets upon the bus owners. The general subject will continue to receive its attention.

The Public Service Commission in referring to the operation of the electric railroads outside of New York city, says that for the year 1919 the loss for electric railroads as a whole was $2,998,520, for 1920 $2,879,590, while 1921 gives an increase in this loss of more than $1,600,000 as compared

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with the loss for the preceding year. The loss for 1921 was $4,533,411. The number of passengers carried during the year 1921 was almost 100,000,000 fewer than the number of passengers carried during 1920. The number of passengers carried during 1920 was 743,233,247, during 1921 the number was 643,870,858. The total dividends paid during the year 1921 by all electric railroads in the State was $419,659. This would represent a return of 6 per cent on an investment of only $7,000,000, as compared with the book values of these plants as reported to the commission, and in many instances fixed by this and prior commissions in rate and capitalization proceedings, amounting to approximately $250,000,000.

COMMENT ON SERVICE-AT-COST GRANTS

The commission refers at length to the increase in the use of the one-man car and to the efforts that have been made to improve the car and its equipment. Reports filed with the commission, and its own investigations, show that the operation of one-man cars has resulted in a decrease in the number of boarding and alighting accidents. This is due to the supervision which the motorman has over this factor, as well as to the fact that in the majority of the cars in use provision is made to prevent the starting of the car until the door is closed.

On the matter of service-at-cost contracts the commission says:

One of the amendments made to the public service commission law at the legislative session of 1922 had to do with street railroad corporations (chapter 582, laws of 1922) by defining a service-at-cost contract and granting to this commission the power of approval of such contracts. A service-at-cost contract is defined in the law as "an agreement between a municipal corporation and a street surface railroad corporation, providing generally for operation of a street surface railroad wholly or partly within the limits of such municipal corporation, with a rate of fare directly or indirectly dependent upon the excess of revenues after deductions for operating expenses, maintenance, taxes, allowances for renewal and depreciation and a return on the value of the property used and useful in the service rendered."

All municipal corporations having a population of less than 1,000,000 inhabitants according to the last Federal census and street surface railroads now existing or which may hereafter exist are authorized and empowered to enter into service-at-cost contracts.

During the year 1922 the commission, pursuant to such statute, has considered one application for the approval of a service-at-cost contract. The application was made by the city of Rochester for the approval of a contract entered into between the city and the New York State Railways on June 16, 1920. The request of the city was joined in by the company. Certain objections were made to the granting of approval of this contract by the commission. These objections were heard and briefs were received from the various parties.

The contract submitted was one within the provisions of chapter 582. It provided generally for the operation of the street surface railroad in Rochester at a rate of fare dependent upon the excess of revenues after deduction for operating expenses, maintenance, taxes, allowances for renewal and depreciation and a return on the property used and useful in the service rendered. It gave to the city of Rochester, to a very large extent, control of the management of the railway property through directory powers. By its terms and provisions the city acquired substantially all privileges and rights which go with municipal ownership for the consideration of an assured return to the company upon the value of its property used in service. The contract covered very broadly the entire matter of street railway operation and management.

The commission found that in all respects and in all regards, if it granted approval to the contract in question, the commission would maintain its jurisdiction and exercise its regulatory powers over all matters of extensions, service, safety of appliances and equipment, improvements, facilities, capitalization and accounting, propriety of regulations, practices, etc., as fully and completely as theretofore; that upon the complaint of the municipality or the railway company or any citizen, or upon its own initiative, it might institute a hearing and make its determination thereon, and that any and all acts of the commissioner or the company under the contract in these regards would be subject to its review.

The rates under the contract are flexible, depending for any given period upon the relation of revenues to expenditures. The commission through the retention of its supervisory powers over the accounting methods of the company and the power thereby to control charges to fixed capital and operating expenses, thus retains the power to insist at all times on a rate which shall accord with the exact intent of the statute and the contract. The right of renewal of the contract was given solely to the city. After a consideration of all the facts, the commission determined that the Rochester contract provided a reasonable, lawful and proper arrangement for the operation of the street railway system in that city, and approval of the contract was granted.

CHANGES IN FARES IN NEW YORK STATE SINCE 1918

Item	1918 Cities	1918 Per Cent of Total	1919 Cities	1919 Per Cent of Total	1920 Cities	1920 Per Cent of Total	1921 Cities	1921 Per Cent of Total	1922 Cities	1922 Per Cent of Total
5 cents	33	58	26	46	19	33	16	28	15	26
6 cents	20	35	23	39	5	8	9	16	5	8
7 cents	4	7	6	11	24	43	16	28	24	43
8 cents	..	...	2	4	9	16	16	28	13	23
Total	57	100	57	100	57	100	57	100	57	100

A statement was included in the commission's summary showing changes in the rates of fare since 1918.

In its report the Public Service Commission declares it of vast importance to the public welfare and comfort of the people that the public utilities over which the commission has jurisdiction should remain under the close observation of the State Government and that ample power of regulation should at all times be vested in some adequate governmental agency. The report says:

The establishment of a single regulatory commission by the Legislature of 1921 in place of two commissions, centered responsibility for regulation of utility operations. The centering of responsibility for the regulation of all utilities of a like character was an act of wisdom and has been amply justified by the results of the work of the commission during the year just closed. The actual experience of this commission warrants the making of this statement to the Legislature.

Home Rule Agitation Renewed

Only a Few of Governors' Messages Deal with Regulatory Matters—Growing Menace of Inordinate Expenditure of Public Money Realized—Opinions on Blue Sky Differ

LEGISLATIVE sessions are being held this winter and spring in nearly all the states. Of the messages of the Governors so far received only a few deal with the public utility regulatory matters. As indicated in the ELECTRIC RAILWAY JOURNAL for Jan. 6 Governor Smith of New York has come out for home rule in New York City and for elective home rule on the part of the other cities of the State if they so decide. He states the case for municipal ownership of public utilities and says that municipalities should be permitted to purchase, build, own or operate utilities when they determine this to be in their interests. He also says that cities should be free to adopt any form of conveyance suitable to their needs, whether it be railroads or omnibuses. He reiterates the fact, of which sight is often lost, that New York City now owns railroads and operates ferry boats and says that he is simply asking for an extension of this principle to all other utilities and for all other cities.

The recommendations of Governor Len Small of Illinois are along somewhat similar lines. After reviewing what he considers the most important work of the Illinois Commerce Commission for the year he renews the recommendation made in his inaugural message and on subsequent occasions, that a well-considered plan of peoples' ownership and operation of street car lines at a 5-cent fare be enacted. He says that the carrying out of such a program would afford an opportunity to the public to decide by their own vote whether or not they desire to adopt a system of local transportation whereby they may be empowered to own and operate their street car lines and establish the rate of fare. Governor Jonathan M. Davis of Kansas, the successor to Governor Allen, is another chief executive who believes that much more satisfactory control of public utilities could be had by returning to local municipalities full control over their local utilities. He says that the public utility commission has failed to reduce and keep down charges to the users of public utility service. Governor Charles W. Bryan of Nebraska recommends a general statute giving all cities, towns and villages the authority to acquire, establish and operate municipal water plants, light plants, gas plants, etc., with money to be provided by taxation. He says that public utilities and common carriers should be taxed on their rate making valuation.

On one thing all the Governors are agreed. It is that the burden of taxation has become a very serious problem. In this connection the warning of Governor Percival P. Baxter of Maine is typical of most of the others. He says that it requires little imagination to plan new methods of taxation, but that the expenditure of moneys already available should receive attention. He

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recommends that during the early weeks of the session the members of the Legislature take daily exercises in saying "No" in order to fortify themselves against the pressure for the appropriation of money that is bound to be exerted upon them during the closing days. Governor Baxter refuses to become frightened. He sees in the discovery by the Federal Congress of so-called blocs only old friends with new names. He says that bloc is only another name for old time log rolling. Maine may always be counted on to treat its public utility companies fairly and the right to expect these companies to do the same by the people. Of the Blue Sky law he says that during 1922 new promotions with a capital totaling $104,000,000 were refused admission to the State. According to him this law has been very ably administered.

Opinions Differ on "Blue Sky" Legislation

In striking contrast to this is the comment of Governor Davis of Kansas to the effect that the operation of the Blue Sky department in that State has been very unsatisfactory, many times operating exactly opposite to the plain intent of the law. He recommends the enactment of a law with a heavy penalty forbidding a company from selling stock by advertising that it has been permitted to do so by the Blue Sky department. He would allow stocks to be sold only when full par value is paid in cash and requiring the examination of books before a certificate of authority is issued. It will be recalled that Kansas was the first state to enact so-called Blue Sky legislation and that similar measures in other states took the Kansas statute as a model.

One of the important matters before the people of Kansas at the election in November, it will be recalled, was the question of the activities of the Court of Industrial Relations. As Governor Davis sees it the trouble with the Court of Industrial Relations Law and its administration is that it seems not to have engaged the mutual confidence and support of both employer and employee. It does not deny the right to quit work; only the right to conspire to do so. Since the employer is one person only, and the employees are many persons, this restriction, the new Governor says, does not apply equally to both sides of the controversy. He says:

> The so-called court cannot enforce its decrees save through the civil courts, nor could it be properly clothed with power to do so. It is not a court, and the Legislature could not create a court in this manner. Followed to the ultimate conclusion, the principles involved in the attempt to regulate waste and conditions and activities through this so-called court, would involve the State in the regulation of all business and produce state socialism, a result not at all to be desired. The declared intent and purpose of this law was to prevent strikes and lockouts. Against lockouts it has proved entirely futile. It can, therefore, reasonably be said that the law has failed in its expressed purpose, and that the so-called court has failed to function and has proved to be entirely too expensive.

In consequence Governor Davis recommends that the law be repealed, and that there be enacted in its stead a law creating the office of industrial commissioner, consisting of one commissioner to be appointed by the Governor, with the consent of the Senate. He says there should be conferred on this commissioner power to enable him to look after the conditions and needs of industry and labor in the State, with authority to make investigations and hold hearings, and bring together employer and employee in mutual understanding and agreement.

In connection with the messages of the Governors to the Legislatures it is interesting to note that recommendations are contained in the messages of the Public Service Commissions of New York, New Jersey and Massachusetts in their reports for the year 1922. The plea of the New York commission is that the regulatory idea of the state commission be not abandoned, the recommendation of the New Jersey commission concerns the limitation of the right of appeal from rate-making decisions of the commission, and suggestions of the Massachusetts Commission concerns the board policies of future administration. All of these suggestions are referred to elsewhere in this issue.

You Don't Have to Park This Car

The Birmingham Railway, Light & Power Company has seized upon the public approval of the new parking laws put into operation by the city commission to put out the following advertisement:

"Ride the street cars. You don't have to park this car."

It is the first time the company ever advertised for passengers.

News Notes

Examination Announced.—The United States Civil Service Commission has announced open competitive examinations for mechanical and electrical engineers. Receipt of applications will close on Feb. 6, 1923.

Provides for Insurance.—The Northwestern Ohio Railway & Power Company, Oak Harbor, Ohio, will provide group insurance for the 140 employees. They will be insured for amounts from $500 to $2,500, according to length of service.

Trolley la! Trolley le! — According to Watts Watt Bill Strandborg, publicity agent of the Portland Railway, Light & Power Company, Portland, Ore., has some ideas on what Christmas Carols should be. A fitting one is Trolley la! Trolley le!

Wages Reduced. — The St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo., has reduced the wages of its railway employees 3, 4 and 5 cents an hour, effective Jan. 1. The cut will average from $100 to $150 annually for each employee.

Interurban Lines May Be Extended.— One result of the merger of public utility interests in the section of Wisconsin around Manitowoc may be the early planning for extension of the Milwaukee Northern Railway north from Sheboygan to complete a loop in that section of the State.

Equality in Taxation Urged.—Among the recommendations contained in the biennial report of the Utah State Board of Equalization, submitted to Governor Mabey, is one which calls for the assessment of stage and truck lines upon the same general basis which governs the assessment of railroads. The elimination of tax inequality is urged.

Improve for Busy Season.—Preparations are being made by the Jamestown, Westfield & Northwestern Railroad, Chautauqua Traction line and the Chautauqua Lake Navigation Company for an unusually busy season along Chautauqua Lake, N. Y. Excursion arrangements are being made and track and station improvements are being effected.

Uniform Accounting System Adopted.—Trolley lines in Minnesota have accepted the uniform system of accounting as provided by the State Railroad & Warehouse Commission in accordance with the session laws of 1921. The railways had a meeting in the commission office on the subject following a call issued a week previously. There was no opposition.

Wages Adjusted.—The Potomac Public Service Company, Hagerstown, Md., has made a number of adjustments in the wage scales of the various departments of the company, with a view to equalizing conditions among its employees. The employees most generally affected are those in the transportation department. The increases there range from 3 per cent to 10 per cent. These adjustments became effective on Jan. 1.

Tunnel to Connect Queens and Jersey.—The Bergen, Harlem, Queens Association has been formed looking toward legislation which will authorize the construction of a tunnel under 125th Street New York City. The scheme is to connect Queens with North New Jersey. Several years ago this proposition was launched but was dropped because of the high cost in the wartime period. The estimated cost will be $75,000,000.

Dinner and Dance for Employees.—More than 200 employees of the San Diego (Calif.) Electric Railway were the company's guests at a dinner and dance Dec. 29. The affair was held at The Barn, a country resort near San Diego, and the company's big Fageol and Republic motor coaches were used to transport the guests. Besides all the employees of the company who were not on active duty, the guests included the members of the Silver Crescent Club, an organization of the women employees of the Spreckels companies. General Manager Claus Spreckels, following the custom of the company, presented a gold watch and fob each to Motorman George Ecker and Motorman Charles Beck, who have completed twenty years of service with the company. In his talk Manager Spreckels voiced gratification for the spirit of loyalty in the organization.

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Financial and Corporate

Sales to Customers Successful

$1,000,000 of Prior Preferred Stock Is Oversold Among Customers of United Light & Railways

Customer ownership, tried last year by the United Light & Railways Company, has more than proved its value. Not only was a block of $1,000,000 of prior preferred stock of the holding company sold on this plan, but this quota was oversubscribed by $200,000, states H. E. Weeks, manager of the securities department of the corporation.

During the latter part of March, 1922, the directors of the company authorized the sale of $1,000,000 of prior preferred stock to the customers of the company. It was the practice in selling the stock to do so almost entirely through the employees, the only exception being that in some of the larger localities a few paid salesmen were employed.

When it was decided to sell the $1,000,000 of stock between April 1 and Dec. 31 a definite quota was assigned to each of the sixteen companies operated by the United Light & Railways Company. During the period between April 1 and Aug. 31 the employees were not urged to sell the stock. Approximately $200,000 was sold during that period.

With the opening of fall, however, the effort was intensified, and during the month of September approximately $125,000 of stock was sold, while during October $250,000 in stock was disposed of. The results during the first few days of November were especially gratifying. Announcement had been made about Oct. 15 that the price of the stock would be advanced on Nov. 15 from par to $102 a share. This served as a stimulant to sales and there was sold in the first two weeks of November $625,000 of stock, or at the rate of $16,000,000 a year. The sales for the last six weeks totaled $875,000.

The United Light & Railways Company serves 600,000 people, but all of the territory embraced was not opened for sales during the entire period of the campaign. In Chattanooga the sale of stock did not begin until about two weeks before the closing of the campaign. That city was the only one which did not sell its quota. Although the Grand Rapids territory was opened about a month before the close of the campaign the quota was oversold by 140 per cent.

Cadillac, Mich., was also very late in getting started on its sale and had less than a month to sell its quota. Despite this, however, the allotment there was oversold. More than half of the stock was sold in territory known as Tri-City territory, which embraces the cities of Davenport, Rock Island and Moline. It is very significant that in the territory where industrial conditions were probably most depressed the greatest sales were made. The Peoples Power Company, which operates in Rock Island and Moline, where the great agricultural implement factories are located, sold approximately $300,000 of stock, although the implement factories are practically closed down. The quota assigned there was exceeded by about 80 per cent.

The splendid work done by the trainmen and other employees of the railway companies owned by the United Light & Railways Company was especially gratifying. During the campaign the percentage of ownership of stock by one railway company's trainmen was increased from 36 to 70 per cent. Another railway included in the system had almost 100 per cent of stock ownership.

During the year the company sold stock to 2,100 people and it has on its books today more than 4,600 stockholders in this issue in the communities in which it operates. These stockholders have all been acquired during the last two years. The average holding per stockholder is 4.6 shares.

The United Go-Getters club was organized in the fall of 1921. It sold more than $500,000 of stock at that time. Although the sale in 1922 was not handled entirely by the Go-Getters club on all of the properties, as part of the properties have no organized club, it is conceded that the work of the individual Go-Getters was largely responsible for the splendid results obtained.

Judge Suggests Property Be Bought

Judge J. M. Killits of the Toledo Federal Court has suggested that patrons buy the property of the Indiana, Columbus & Eastern Traction Company as a stepping-stone in the solution of the financial difficulties of the Lima-Defiance branch. Cars are still running on schedule and it is announced by officials that service will continue until further orders from Federal Court.

The possibility of operating gasoline-propelled cars is being investigated. C. G. Taylor, president of the American Railway Operating Company, Elyria, and A. D. Bowen, president of the American Railway Motor Car Company, conferred on Jan. 5 with President D. F. Openlander and Secretary R. W. Wortman of the Defiance Commerce Club.

A public meeting will be called to discuss the proposal. The American Railway Operating Company holds an option on the Indiana, Columbus & Eastern Traction Company, Lima-Defiance spur. The car which the American Operating Company would put in service is made in Elyria.

I. R. T. Reorganized

Chairman of the Executive Committee Makes Plea for Co-operation in Transit Program

The Interborough Rapid Transit Company, New York, N. Y., has now been entirely reorganized and a full meeting of the new board of directors was held on Jan. 9. The novel characteristic of that board is that it includes three members representing the public, named by the Transit Commission. At the conclusion of the meeting Col. Grayson M. P. Murphy, chairman of the executive committee of the railway, made a public statement to the effect that the new board starts with a clean slate, and with but one cardinal plank in its platform; namely, the determination to give the city of New York the best possible rapid transit and to co-operate with all public authorities and civic agencies to that end. He said that the new board is committed to a continuance of a 5-cent fare.

Colonel Grayson explained that to make such a policy possible has involved a complete wiping out of more than $114,000,000, par value, of securities of the Interborough-Consolidated Corporation. It has involved the reduction of the fixed 7 per cent rental imposed by the Manhattan (Elevated) Railway lease to a rental based upon earnings. It has involved the limitation of the dividends that can be paid on the stock of the Interborough Rapid Transit Company, so that there is no further risk of an excessive distribution of earnings. It has also involved provision of $10.500,000 new capital.

The consummation of this plan, said the Colonel, has finally averted a receivership, thus saving both the security holders and the public substantial losses and inconvenience. In conclusion Colonel Murphy said:

> We feel that all public authorities, persons and agencies, who have co-operated to avert the disintegration of the Interborough-Manhattan System and insure the continued operation of the subway and elevated lines as a single system with a five cent fare, should be heartily congratulated.
>
> The saving of the Interborough System from dissolution makes possible immediately the active co-operation by the company with all public authorities in working out plans to insure adequate transit.
>
> The Interborough Rapid Transit Company will bend its every effort to work with every public authority in seeking to obtain the rapid and convenient transportation which the people of this city so urgently need.
>
> I have been deeply impressed with the earnestness of Governor Smith's purpose to promote a solution of the local transit situation. I am equally certain that Mayor Hylan wishes to see this problem worked out effectively. The present management of this company has the same aim, and is unfettered by any obligations which will prevent its accomplishment.
>
> We venture to suggest that there has been too much working at cross purposes in the past, and that the time has now come when everybody concerned may devote whole-hearted efforts toward securing an amelioration of existing conditions and a definite plan to provide for the future.
>
> The problem is one of extreme difficulty and complexity, but public convenience is vitally at stake. We therefore invite public co-operation in our task. Its successful realization is of supreme importance to the health, comfort and happiness of the people of this city.

Reorganization details were published in the JOURNAL for Oct. 14 and 21.

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Abandonment Petition Filed

Petition for the abandonment of the Ithaca Short line, operated by the Central New York Southern Railroad, has been filed by the directors of the concern with the Public Service Commission at Albany.

The short line consists of 37 miles of main line between Auburn and Ithaca and 7 miles of side lines. Electric cars are operated to South Lansing from Ithaca and from there the service is by steam road. The property is valued at $1,135,000.

Payment of Tax Deferred Six Months

Six months' deferment of the $350,000 franchise tax which the Cincinnati (Ohio) Traction Company owes the city has been decided on by the street railway committee of the Council.

The city solicitor has been instructed to prepare an ordinance to be submitted to the Council authorizing the deferment of the franchise payment which became due Jan. 1. If the ordinance passes it will carry with it the automatic postponement of the payments of two previous franchise taxes for 1921 and 1922, the three amounting to $1,050,000. No attempt has been made by the city to collect these three franchise taxes and officials were confident that the deferment ordinance could be put through the Council without a "hitch."

That the committee representing the traction company and the committee representing the Cincinnati Street Railway are close to consummating an agreement was disclosed by Vice-Mayor Froome Morris during the meeting. This agreement will consist in the main of the scaling down of the capitalization of both traction companies, simplification of their organizations to enable the city to deal more efficiently with them, and a divorcement of outside interests from the traction company.

Mr. Morris put off making any formal statement about the details of the matter just at this time.

The franchise tax payment was postponed six months because it is believed the two traction companies will have their merger fully worked out within that time.

Will Auction Property. — A public auction sale of the carhouse properties of the New York City Railways will be held on Jan. 18 at 14 Vesey Street. The property is located at Thirty-third Street and Fourth Avenue. The sale was previously postponed.

Authorizes Issue. — San Francisco-Oakland Terminal Railways was authorized by the Railroad Commission to issue and sell at not less than 99 per cent of face value, plus accrued interest, $175,000 of ten-year 6 per cent serial equipment trust certificates for the purpose of paying in part the cost of fifteen new cars.

Court Directs Disposal of Funds.— In the foreclosure suit of the Central Trust Company of Illinois against the Springfield Terminal Railway & Power Company, Springfield, Ohio, United States District Judge John E. Slater at Cincinnati directed distribution of $78,230 of the funds in the hands of Receivers George Whysall and William S. Harman. This amount is said to exclude the costs of the court.

Eleven Months Statement Issued.— The Louisville (Ky.) Railway has issued a statement of the first eleven months operation of 1922, compared with the same period in 1921. The account shows that for the first eleven months of the year net income has mounted, and funds are in hand to cover payment of interest bonds, dividends on preferred stock and all but $111,963 of the $499,416 required for dividends on common stock.

Deficit Continues.—Operations of the Springfield (Ohio) Street Railway continue to show a deficit, according to the report of the company for the month of December, filed Jan. 5 with the city manager. The report shows that a loss of $2,345 was incurred during the month, not including the amount needed for accrual of funds to meet the dividends due on the preferred stock. The report showed that the company received a total gross revenue of $49,876 during the month.

Authorizes Franchise Abandonment. —Owing to lack of traffic the commission authorized the Peninsular Railway, San José, Calif., to abandon its franchise and remove its equipment in Bird Avenue, Coe Avenue and Lincoln Avenue between the intersection of Lincoln Avenue and Willow Street and to operate its cars between San José and Los Catos by way of Campbell over Willow Street and Delmas Avenue. The order requires that the consent of the local authorities must be obtained for the relinquishment of the street railway franchise.

Will Continue as Receiver.—Harrison B. Freeman has been authorized by a court order to continue for four months more as receiver for the Hartford & Springfield Street Railway, Warehouse Point, Conn. A financial statement for October shows receipts of $31,581 as against expenditures of $34,640. In the corresponding month of 1921 there was a net profit of $63. The payroll of car crews is shown to have been $1,414 less in 1922 than in 1921 due chiefly to the use of one-man cars, but passenger receipts declined by about $4,000.

Offer Mortgage Bonds.—J. C. Mackintosh & Company of Halifax are offering $1,500,000 of 6½ per cent first mortgage bonds, due 1952 of the Camaguey (Cuba) Electric Company. This company is acquiring the assets of another company of a similar name that has for sixteen years operated the railway, light and power business of Camaguey, a city of 48,000 people. The bonds are the first charge on assets of the company. Net earnings for three years have averaged $296,796, equivalent to three times interest charges on this issue.

Total Rides Increase. — Passenger revenues have decreased 9.3 per cent and total rides increased 16.1 per cent on the street cars of the Tacoma Railway & Power Company and the Pacific Traction Company through the operation of the dollar weekly pass system, according to the report of the companies to the Department of Public Works. The percentages are figured from the statement for November, 1922, as compared with the same month of 1921. A steady increase in passes sold is shown, with the result that 37.5 per cent of the passenger revenues and 48.5 per cent of the total rides are on the weekly pass.

City Bonds for Improvements Offered. —Bankers' Trust Company, the National City Company, Harris, Forbes & Company, First National Company of Detroit, Detroit Trust Company and Keane, Higbie & Company are all offering $20,163,000 of the city of Detroit 4¼ per cent and 4½ per cent bonds. The yield on the 4¼ per cent bonds ranges from 4.20 to 4.25 per cent, while that on the 4½ per cent bonds ranges from 4.20 to 4.30 per cent. These bonds, issued for sewer, water, street railway, lighting, bridge and various public improvements, are direct obligations of the city of Detroit, payable principal and interest from taxes against all the taxable property therein.

Abandonment Application Heard.—A hearing was recently held before the State Public Service Commission on the application of the Helena Light & Railway Company, Helena, Mont., to abandon service on its Kenwood and State Street trolley lines. The railway company was represented by its manager, A. E. Schultz, and M. S. Gunn, its attorney. Mr. Gunn contended that it was the duty of the commission to grant the petition for abandonment, if it found out that the lines were not being operated at a profit. Attorney General Rankin argued that no public utility should be permitted to construct lines which had encouraged home building and then later abandon the lines at its own free will. The commission has not yet arrived at any decision.

Stockholders Receive Message.—In a recent letter to stockholders Henry L. Doherty, president of the Cities Service Company, states that the board of directors feels satisfied that Congress will not impose any drastic legislation with respect to the taxation of surpluses. The directors declared the regular monthly dividends of one-half of 1 per cent on the preferred in cash, one-half of 1 per cent on the preferred "B" in cash and one-half of 1 per cent in cash scrip on the common and 1¼ per cent in stock scrip on the common stock, all payable Feb. 1 to holders of record Jan. 15. At a special meeting of stockholders of the Cities Service Company in Dover, Del., an increase in the authorized capital stock of the company from $100,000,000 to $400,000,000 was ratified.

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Traffic and Transportation

Recommendations on One-Man Cars Accepted

Three of the six recommendations of the Public Service Commission in its report of the investigation of the one-man car accident on Second Avenue, Albany, N. Y., in which fourteen persons were injured, have been adopted by the United Traction Company and are already in force. The others will be put into force immediately.

According to H. B. Weatherwax, vice-president of the company, the recommendations of the Public Service Commission are already in force, that:

1. Before a student is qualified to operate he must successfully demonstrate his ability to stop each type of car by hand brake, service application, emergency application and regeneration methods on the heaviest grade on which he may be required to operate.

2. That the company adopt a rule applicable to all lines requiring each car to be stopped at least once on each trip by use of the hand brakes.

3. That all operators be required to stand while operating cars on heavy grades.

The suggestions which Mr. Weatherwax says will be adopted at once are the following:

1. That students shall be required to pass a written examination before being accepted as trained operators.

2. That operators shall be examined in the rules and methods of operation at least once each six months.

3. That the foot valve method of operation be discontinued.

In commenting on this final recommendation Mr. Weatherwax said:

> The valves will be neutralized as rapidly as our shop force can do the work. While we have prohibited the use of the valve in crowded sections, it was, nevertheless, a great help in facilitating service in residential districts as it permitted the operator to make change and keep his car under way in perfect control, for by simply removing his foot from the valve the car would have been brought to a dead stop almost within its own length. We are going to ask our patrons to co-operate with us by having the exact fare ready to deposit in the box, or by the purchase of tokens. If a good percentage of them do this it will facilitate the service and will be a convenience to them, as the car will reach its destination much more rapidly and a better schedule will be had.

Rerouting Plan Satisfactory

When the city of Houston, Tex., through its Mayor, Oscar Holcombe, first proposed the rerouting of street cars so as to take the car lines off Main Street in the business district, the proposal was opposed by retail merchants along Main Street. It was with difficulty that the administration of Mayor Holcombe carried the plan and secured the removal of the cars from Main Street conditionally a little more than six months ago. Under a compromise then entered into the traction company built new lines on Travis and Fannin Streets, each one block removed and running parallel with Main Street and rerouted its cars for a period of one year, in the meantime covering the tracks on Main Street with a coating of tarvia so that they could be used again if the experiment should prove unsatisfactory. That the removal of the cars from Main Street has proved satisfactory is disclosed by a poll of Main Street retailers. A poll just taken shows fifty-two favor keeping street cars off Main Street, six want the cars returned, and four of them are noncommittal.

One-Way Traffic Test to Be Made

The Los Angeles Traffic Commission will make a trial test of one-way traffic for the purpose of determining the effectiveness of one-way vehicular traffic as well as to relieve congestion at Third and Hill Streets, in Los Angeles. It was stated in the JOURNAL that the trial test had been made, but the commission announces that it has been unable to find the opportunity to put the proposed plan to a test.

Bus Line Planned by Municipal Railway

After agitation for a motor bus line along the San Francisco waterfront that culminated in a public discussion on Jan. 3, members of the Board of Supervisors of San Francisco announced that steps would be taken at once to establish such a service. The proposed route is to be about 3½ miles long, following the Embarcadero past the Ferry Building to a northerly terminal at the foot of Hyde Street, which is also the terminal of the Golden Gate Ferry. The construction of an electric railway over this route is said to be impracticable because about fifty crossovers would be required where spurs of the Belt Line Railroad would have to be crossed.

The plan is to give a ten-minute service for a 5-cent fare during most of the day and twenty-minute service up to midnight. Five buses in service with one spare would probably be required. Decision has not yet been made as to the type of bus, but one-man twenty-five passenger cars are believed to be favored.

The city engineer has consistently opposed the establishment of this waterfront service on the ground that it would not pay. His department estimates the cost of maintaining this service at about $250 a day, which would far exceed the revenue, it is believed. A net loss of $15,000 to $30,000 a year is predicted even after receiving the $50 a day subsidy offered by the State Board of Harbor Commissioners. In making this offer the Harbor Commission points out that there is urgent need of service to the piers which is not now provided.

Cut in Railway Fare Not Necessary

According to a recent decision of the Public Utilities Commission of Maine, the Cumberland County Power & Light Company, Portland, Me., is charging reasonable fares in Portland. The decision dismisses a complaint which urged a reduction in fare on the ground that the financial situation of the railroad department of the Cumberland property had of late been considerably changed.

The present fare charges, which were established by order of the commission in July, 1920, are 8-cent base ticket fare for a single ride and a 2½-cent base ticket zone charge, with a cash fare of 10 cents. In its findings the commission states that after a study of the financial results of the operation of the road during the period from 1912 to 1922, it was learned that during five of the eleven years included the railroad division had failed to earn a sufficient amount to pay the operating and fixed charges and the agreed dividend. During six of the eleven years included the railroad division had earned the operating expenses and fixed charges and somewhat more than a sufficient amount to pay the agreed dividend. During two of the years, 1918 and 1920, the railroad division failed to earn enough to cover operating expenses and fixed charges.

Further, the commission said that although some decrease had been made in the cost of wages during the last two years, no change in the net revenues of the railroad department sufficient to justify a reduction in fares had been disclosed by the evidence offered at the hearing in this case. Rather was the commission of the opinion that a reduction of even one-half cent in the present fares would result in a failure on the part of the company to earn sufficient to pay its operating expenses, fixed charges and dividends, if not in an actual deficit.

Company Must Explain Non-Restoration of Service

The South Carolina Gas & Electric Company, Spartanburg, S. C., operator of the local railway, has been summoned to appear before the Supreme Court of the State of Columbia on Jan. 30 to show cause why passenger and freight service should not be restored and full operation of the railway in Spartanburg and interurban lines be resumed. T. P. Cothran, Greenville, a justice of the Supreme Court, issued the order. Petition for mandamus was filed with Justice Cothran by the city of Spartanburg. Railway service was suspended Dec. 30 and has not since been resumed. Suspension was brought about, it is said, because the earnings of the railway lines of the company, which was lately reorganized after being in the hands of a receiver, are not sufficient to meet the expenses of its car service. The company sought to replace railway service on some of the streets by operating buses. The city would not agree to this and the suspension of all traffic followed.

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Metal Tokens to Be Used.—The Connecticut Valley Street Railway, Greenfield, Mass., has discontinued the use of ticket books and has substituted metal tokens sold at thirteen for 50 cents, two of the tokens being collected for each fare. This allows the patron a saving of 30 cents on each dollar expended.

Five-Cent Fare in Effect.—Carfare reduction to 5 cents on the lines of the Puget Sound Power & Light Company, Bellingham, Wash., offered by that company, has been approved by the Department of Public Works at Olympia, and will become effective for ninety days, or until March 18, 1923. The fare takes the form of twenty tickets for $1.

May Effect Postal Arrangements.—Postal agents have been at Norwalk, Ohio, to see if mail can be carried to advantage between Norwalk and Willard in the gasoline cars being operated over the Norwalk-Shelby Railway. These towns are only 18 miles apart, but much of the mail dispatched at Norwalk for Willard is sent about 130 miles out of the way through the city of Toledo.

Discuss Five-cent Fare.—At a recent hearing in Charleston, S. C., the question of reducing fares on the lines of the Charleston Consolidated Railway & Lighting Company was discussed. The present fare is 7 cents. Advocates of the 5-cent fare claim that the company's operating expenses are lower now than when the higher fare was granted by the City Council.

Fare Increased Three Cents.—The Public Service Commission has authorized the Peekskill Lighting & Railroad Company, Peekskill, N. Y., to increase its fare from 7 cents to 10 cents. In the decision Commissioner Semple wrote that if an increase in fare resulted in a refusal to ride then the road would have to go out of business and the community would have no railroad at all.

Seeks Retention of Six-Cent Fare.—The Binghamton (N. Y.) Railway has made a request to the Common Council for a continuation of the 6-cent fare. The 6-cent fare agreement expires on Jan. 15 and if not renewed the 5-cent fare will again go into effect. The fare extension was discussed at a recent conference at which were present the Mayor, corporation counsel and the receiver of the company.

Allows Ten-Cent Rate.—The Black River (N. Y.) Traction Company is permitted to charge a 10-cent rate for carrying passengers from any point in Watertown to Brownville, according to a recent dismissal by the Public Service Commission of a complaint against that rate. The 10-cent rate was being charged under a tariff filed in February. The complaint sought a reduced round trip fare of 15 cents.

Buses Received. — The Springfield (Mass.) Street Railway has received the first of two motor buses to be used as a temporary means of transporting passengers across the new Hampden County Memorial Bridge connecting Springfield with West Springfield. It is a Selden bus with a Kuhlmann body and seats thirty persons. It is of the pay-as-you-enter type. The buses will be painted yellow, to match the railway company's cars.

Book Reviews

Commercial "Baedeker" of Latin America

Commercial Travelers' Guide to Latin America. Bureau of Foreign and Domestic Commerce, Department of Commerce, Washington, D. C. Published by Superintendent of Documents, Government Printing Office, Washington, D. C.

The new edition is almost a new work, representing a complete rearrangement of data, the addition of a large quantity of new details and a considerable improvement in the quality of most of the sections. A new bibliography is included. The edition also contains a number of new paragraphs submitted by scores of commercial travelers who had been asked to check up the old edition.

The new edition contains forty maps, especially drawn for it. It is published in regular standard guide-book form, including thin paper, flexible covers and a special differentiation of typography. The book may be fitly described as the commercial "Baedeker" of Latin America. It contains 734 pages, with such details as steamship lines and railroads, time tables and connections, road routes, hotels and rates, taxes on travelers and restrictions, duties on samples and advertising matter, etc. The book can be obtained from the Superintendent of Documents at a nominal price.

Coal-Tar and Water-Gas-Tar Creosotes, Their Properties and Methods of Testing

By Ernest Bateman, chemist in forest products. Professional Paper — Bulletin 1,036 United States Department of Agriculture. Government Printing Office, Washington, D. C.

At the Dec. 19 meeting of the Engineering Association committee on wood preservation this new publication covering the methods followed, and results obtained in important research work on creosotes was highly commended.

Power Commission Issues Report

Second Annual Report of Federal Power Commission, Washington, D. C.

In its second annual report, the Federal Power Commission states that as the report went to press the grand total of applications for permits and licenses received had been 357, involving in excess of 21,100,000 hp. Nearly one-half of the aggregate horsepower is represented by applications upon the St. Lawrence, Columbia and Colorado Rivers, upon which in general action has been suspended, due to the unsettled status of water-power privileges on these rivers.

The report states that the chief purpose in the creation of the commission was to secure a common policy and a single executive agency in water-power administration. This purpose, however, has not been accomplished. Other agencies have been required to continue their independent activities, and these activities are not controlled by a common plan and are not subject to a common direction. Amendment of the act creating the commission is needed.

Among the permits authorized is one for the Washington Water Power Company on the Columbia River, involving 153,400 hp. capacity; another is for the Portland Railway, Light & Power Company, on the Clackamas River, involving 88,600 hp. The latter company was granted a license on the same river, involving 30,000 hp.

Of the applications referred to above as having been received by the commission, a number covered installations already made and in operation.

Twelfth Annual Report of Director of Bureau of Mines

Government Printing Office, Washington, 1922

This report covers the fiscal year ending June 30, 1922. It is of interest to electric railway men principally on account of the sections dealing with coal.

Elementary Book on D. C. Machinery

Direct-Current Machinery. A text-book on the theory and performance of generators and motors. By Harold Pender, Ph. D., University of Pennsylvania. John Wiley & Sons, Inc., New York, N. Y. 314 pages. Illustrated.

In this introductory text on the subject covered by this title, the author has endeavored to explain the theory and general principles of operation of generators and motors without having design considerations primarily in mind. In his introduction he states that he does not consider design of machinery suitable for undergraduates, hence he has gone into the matter of design only to the extent necessary for the student to acquire a thorough knowledge of basic principles upon which design depends. While the topics are the same ones which are covered in many other texts, the treatment is original and interesting. It is almost non-mathematical in character, the formulas used being of simple nature. The book is mentioned in this column for the reason that it is of the kind that can be read with profit by electric railway electrical engineers who desire to keep up their "theory" and for other engineers outside of the electrical group who feel the need of knowing something of the "why" of the machines which they may have to handle.

Society for the Promotion of Engineering Education. Booklet containing information regarding the purpose and activities of the society, of which Dean F. L. Bishop, University of Pittsburgh, Pittsburgh, Pa., is secretary.

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Personal Items

Mr. Wheeler Goes Abroad

General Manager of Olean, Bradford & Salamanca Railway to Resume Construction Engineering Work

R. H. Wheeler has resigned as general manager of the Olean, Bradford & Salamanca Railway, Olean, N. Y., effective April 1, to take up work abroad managing a large engineering and construction project. Mr. Wheeler has been connected with the property at Olean since 1921 as operating manager of 100 miles of electric interurban railway operated at 600 volts d.c. The railway is essentially an electrically operated short line having rates and freight traffic connections with the trunk lines.

He came with the road as manager for the receiver of the Western New York & Pennsylvania Traction Company on Sept. 1, 1921, and general manager of the Olean, Bradford & Salamanca Railway on Oct. 1, 1921. Not only has he been successful in rehabilitating the physical property of the railway and in developing its earning power, particularly the freight earning power, but he has been eminently successful in bettering the relations of the road with its employees. The personnel has been greatly improved under his direction, and the esprit de corps built up to the point where competition has become keen among the rank and file in carrying out the details of the work of operating the road.

In working out successfully the problems that confronted him Mr. Wheeler brought to bear upon them a wealth of engineering knowledge and a broad human sympathy, the result of previous training in handling matters requiring the exercise of engineering skill and so-called human engineering. He was born on Jan. 29, 1888, and began his professional career as a bachelor of electrical and mechanical engineering as a test engineer with the General Electric Company. From 1911 to 1913 he was principal assistant engineer of the railway locomotive department of the General Electric Company in the design of railway locomotive and general steam railway electrification work. From 1913 to 1916 he was assistant electrical engineer of the Mount Royal Tunnel & Terminal Company, Montreal, P. Q., in charge of designing, testing and installing electricity on the Mount Royal terminal of the Canadian Northern at Montreal with full charge of 2,400-volt d.c., locomotive and multiple unit car design and operation. From 1916 to 1918 he was designing engineer for the Shawinigan Water & Power Company at Montreal, his work there including the installation of 3,300-volt alternating current on the Shawinigan Falls Terminal Railway, a switching property. During 1918 he was assistant manager of power apparatus department, U. S. Explosive Plant C, at New York City and Nitro, W. Va., for the war department. Next he was made traffic manager of the plant at Nitro for the Hercules Powder Company. Subsequently he became consulting expert for the powder company. From 1919 to 1921 Mr. Wheeler was assistant electrical engineer for Dwight P. Robinson & Company, New York, traveling abroad extensively where he examined and studied among other things all systems of electrification in Europe except in Russia.

Edward D. Merrill Resigns

Edward D. Merrill has resigned as assistant superintendent of transportation of the Philadelphia (Pa.) Rapid Transit Company. Mr. Merrill was graduated from the Massachusetts Institute of Technology in 1909. He was engaged with the Union Pacific Railroad as a civil engineer for several years and then entered the employ of the Puget Sound Traction, Light & Power Company, with which he remained from 1914 to 1918. He next became connected with the Milwaukee Electric Railway & Light Company with the title of assistant superintendent of transportation. He resigned from the company at Milwaukee to go to Philadelphia.

Mr. Turner Makes Detroit Survey

The Detroit Rapid Transit Commission has voted to employ Daniel L. Turner to make an immediate survey of rapid transit possibilities in that city. He will investigate the practicability of both subway and elevated systems for Detroit. It is estimated that the work will take about a year. The survey will also include a consideration of the suburban transit situation as regards the city of Detroit. Mr. Turner is chief consulting engineer of the New York Transit Commission. Members of the Detroit Rapid Transit Commission, which was created by former Mayor James Couzens shortly before he resigned, are Andrew H. Green, Jr., Clarence W. Hubbell, Willard Pope, Col. H. W. Alden and Col. Sidney D. Waldon. The Council has voted the commission $50,000 for preliminary expenses, and asked for a complete report within a year, together with definite recommendations to the voters by April, 1924.

Thomas D. Connell has resigned as secretary of the Fairmont Chamber of Commerce to accept a position with the Monongahela Power & Railway Company in charge of industrial matters in connection with the traffic department. Mr. Connell will be associated with C. H. Hardesty, head of the traffic department.

New Auditor of United Traction Company

The professional record of W. A. Blasing, appointed on Dec. 18 auditor of the United Traction Company with offices at Albany, is crowded with eventful activities ever since his entry into professional life in 1899. Mr. Blasing was born at St. Paul, Minn., in 1882. He was educated in the grammar and Mechanic Arts High School, being graduated from the latter in 1899. The same year Mr. Blasing entered the accounting department of the St. Paul, Minnesota & Omaha Railroad. After working in various branches of that department, in 1903 he entered the service of the Texas & Pacific Railway with headquarters at Dallas, Tex., in the capacity of statistician, from which position he was advanced to chief clerk to the auditor.

In 1909 Mr. Blasing became auditor of the Gulf, Texas & Western Railway with headquarters at Dallas, and remained in the service of that company until 1917, during which year he became general auditor of expenditures of the Illinois Central Railway with headquarters at Chicago. While in Chicago he served as chairman of the committee having in charge the investigations in connection with plant facilities and operations; chairman of the committee having charge of auditing of various parent bureaus in the central west and southern regions, and during his service with the Illinois Central compiled a formula to facilitate the determination of terminal costs which has become a standard.

On March 1, 1920, Mr. Blasing severed his connections with the Illinois Central and came with the Delaware & Hudson Railway as general assistant to the auditor, in charge of the claims against the United States Railway Administration covering transactions growing out of the period of federal control and remained in that capacity until Dec. 18, 1922, when he was named assistant secretary and auditor of the United Traction Company, the Hudson Valley and the Troy & New England Railroad.

Harry L. Harding has accepted a position in the securities department of Stone & Webster, Inc. Mr. Harding served seventeen years as assistant treasurer of the Houston (Tex.) Electric Company. A successor to him in that capacity with the Houston Electric Company has not yet been named.

L. L. Odell, former vice-president and general manager of the Empire State Railroad, Syracuse, N. Y., which was recently taken over by the Rochester & Eastern, has been named manager of the Central New York Southern Railroad with headquarters at Ithaca.

R. S. Hecht, president of the New Orleans Public Service, Inc., and president of the Hibernia Bank & Trust Company of New Orleans, has returned from a two months visit to South America. He has a favorable view of financial conditions south of the equator

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and recommends representatives of big American concerns to go to the leading South American republics to learn about these countries and their people.

William J. Hagenah, of the firm of Hagenah & Erickson, public utility engineers, Chicago, who, with a staff of engineers and accountants, has been engaged on public utility investigation work in South America, has returned to the United States. The work in question, which covered gas, tramway, telephone and electric light and power properties, extended over a period of one year and was undertaken for foreign banking interests.

W. W. Hawthorne was recently promoted to the post of assistant superintendent of transportation (south side) of the Chicago Elevated Railways. It was in 1898 that Mr. Hawthorne came to the Elevated following several years service on various steam lines as telegrapher. In February, 1903, after serving as guard, train clerk and trainman he became a dispatcher and four years later assistant trainmaster. In 1913 he took on the duties of trainmaster, which position he held until his recent appointment as assistant superintendent.

Obituary

Robert Enos Adreon

Robert Enos Adreon, president of the American Brake Company and acting Southwest district manager of the Westinghouse Traction Brake Company, died suddenly of apoplexy on Jan. 6. Mr. Adreon was born in St. Louis on Nov. 1, 1876, a son of the late E. L. Adreon, who also was president of the American Brake Company at the time of his death some years ago. He was graduated from Purdue University in 1902 with the degree of mechanical engineer. His first position was that of chief draughtsman with the Imperial Electric Light & Power Company, St. Louis. In 1903 he joined the Westinghouse Automatic Air & Steam Coupler Company, of which he subsequently became vice-president and general manager. In 1908 he resigned to enter the employ of Westinghouse, Church, Kerr & Company, contracting engineers. He was appointed assistant general manager of the American Brake Company in 1911, later becoming general manager, then vice-president and general manager, and on April 10, 1919, he was elected president and general manager.

Mr. Adreon was a director of the National Brake & Electric Company, Milwaukee; the Safety Car Devices, St. Louis; the Mercantile Trust Company, St. Louis, and the St. Louis Chamber of Commerce. He was a member of the board of managers of the Industrial Commission, St. Louis Y.M.C.A., the Air Brake Association, the Traveling Engineers' Association, St. Louis Engineers' and the St. Louis Railway and other clubs. Mr. Adreon is survived by his wife and three-year-old daughter.

Manufactures & the Markets

New of and for Manufacturers—Market and Trade Conditions
A Market Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Natal Contract to British

Material Under $20,000,000 African Contract Will Be Supplied by English and Affiliated Firms

British firms have secured important contracts in connection with the electrification on the main line of the Natal (South Africa) Railways from Glencoe to Pietermaritzburg. The distance is 170 miles. The total value of the contract is about £4,000,000. The firms include the Metropolitan-Vickers Electrical Company, C. A. Parsons & Company, Babcock & Wilcox, the British Thomson-Houston Company, the Telegraph Manufacturing Company, A. Reyrollo & Company, the South African General Electric Company, and Siemens Brothers & Company.

The Metropolitan-Vickers Company will build seventy-eight electric locomotives of the 0-4-4-0 type. Three locomotives coupled together (with multiple-unit control) will be capable of hauling a train weighing 1,800 short tons up a 1 per cent grade at 21 to 22 m.p.h., and on level tangent track at 36 m.p.h. The same three units are to be able to start the same weight of trains up the same gradient and attain a speed of 22 m.p.h. in three minutes. They are also to be capable of holding a train of 1,640 short tons on a falling gradient of one in fifty by regenerative action alone. The normal train will weigh about 1,430 short tons. The machines are to be of the double bogie articulated type. Each of the four motors employed is to be of 300 hp. Each locomotive will weigh about 65 long tons.

The English Electric Company is delivering to the Midland Railway of New Zealand five main line electric locomotives and one battery locomotive for shunting. The machines will be used on the Arthur's Pass section through the Southern Alps, which will connect the eastern and western railway systems on the South Island. This section is 8 miles long, 5 miles of which is in tunnel, and the gradient is one in thirty-three. The English Electric Company has a contract for the whole electrical equipment. Each locomotive will have four motors of 170 hp. each. One locomotive will be used in the case of passenger trains and two for freight trains. The speed is 18 m.p.h. In view of the heavy gradients there are four brakes, rheostatic, Westinghouse automatic, Westinghouse straight, and hand. The rheostatic has been adopted in preference to the regenerative brake, because the power house supplies the railway load only.

Metal, Coal and Material Prices

Metals—New York	Jan. 9, 1923
Copper, electrolytic, cents per lb.	14.50
Copper wire base, cents per lb.	16.75
Lead, cents per lb.	7.40
Zinc, cents per lb.	7.20
Tin, Straits, cents per lb.	38.25
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$8.375
Somerset mine run, Boston, net tons	5.375
Pittsburgh mine run, Pittsburgh, net tons	3.625
Franklin, Ill., screenings, Chicago, net tons	2.87
Central, Ill., screenings, Chicago, net tons	2.25
Kansas screenings, Kansas City, net tons	2.50
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.	6.50
Weatherproof wire base, N.Y., cents per lb.	16.50
Cement, Chicago net prices, without bags.	$2.05
Linseed oil (5-bbl. lots), N.Y., cents per gal.	93.00
White lead, (100-lb. keg), N.Y., cents per lb.	12.375
Turpentine, (bbl. lots), N.Y., per gal.	$1.54

A Double-Truck Motor Bus

A double-truck motor bus which is so designed as to comprise a good many of the best features of electric railway cars has been placed on the market by the American Motorway Equipment Company, New York. It is equipped with what the manufacturer terms standard street car type rigid trucks, front and rear, both of which are detachable for servicing. The manufacturer claims that the flexibility of axles is equal to any street or road conditions. The car has eight speeds forward, two in reverse, short turning radius and all eight wheels equipped with air brakes. The doors are operated by air and arranged for one-man operation with rear entrance having turnstile, and pay-as-you-exit at front. It is presented as a typical street car designed and built for organized street car interests.

Personnel Changes Announced

The Westinghouse Air Brake Company, Wilmerding, Pa., has announced these appointments in the eastern district:

E. W. Davis, heretofore stationed at New York as representative Westinghouse Traction Brake Company, is promoted to representative, Westinghouse Air Brake Company, and Westinghouse Traction Brake Company, in charge of the Boston office.

G. H. Martin, heretofore mechanical expert for the Westinghouse Traction Brake Company, is promoted to representative Westinghouse Air Brake Company and Westinghouse Traction Brake Company, with headquarters at Boston.

F. H. Whitney, heretofore representative of the Westinghouse Air Brake Company, has been promoted to export representative Westinghouse Air Brake Company and Westinghouse Traction Brake Company, at New York.

H. B. Gardner is appointed representative Westinghouse Air Brake Company, reporting to the New York office. Mr. Gardner was formerly connected with the Locomotive Stoker Company.

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Rolling Stock

Cincinnati & Dayton Traction Company, Hamilton, Ohio, has ordered four new one-man cars for use in the city of Hamilton. It is expected they will be in operation within three months.

Indianapolis, Ind.—Damage estimated at from $10,000 to $12,000 was caused by a recent fire in the carhouse of the Beech Grove Traction Company in a suburb of Indianapolis. One car was put out of service and probably damaged beyond repair. The others were operated without glass for a couple of days until temporary repairs could be made. The flames started in one of the one-man cars bought some months ago. Two other one-man cars were badly damaged, as were two of the older type of cars.

Track and Roadway

Salina (Kan.) Street Railway is relaying about 8,000 ft. new 80 lb. rails, with white oak ties.

Long Beach, L. I.—Tracks are being laid for a municipally owned trolley system to surround the entire island beginning at the railroad station and running parallel with the boardwalk.

Trenton & Mercer County Traction Corporation, Trenton, N. J., has been instructed by the Trenton City Commission to remove its switch on North Broad Street to a point further away from the center of the city.

Jamestown, Westfield & Northwestern Railroad, Jamestown, N. Y., is laying new 90-lb. rail from Jamestown to Mayville. This installation will greatly facilitate the hauling of freight.

Portland (Ore.) Railway, Light & Power Company will spend $5,000,000 in 1923 in improvements and extensions to its properties. About half of the sum will be applied toward construction of the great hydro-electric power generating plant on the Oak Grove tributary of the Clackamas River. Franklin T. Griffith, president of the company, who recently returned from the East, has made this announcement.

Power Houses, Shops and Buildings

Cleveland, Southwestern & Columbus Railway, Cleveland, Ohio has applied to the Bucyrus City Council for permission to build a freight station there.

Lake Shore Electric Railway, Cleveland, Ohio, will soon build a new depot for passengers and package business on its site at Main Street and McPherson Highway, Clyde, Ohio.

Salt Lake & Utah Railroad, Salt Lake City, Utah, will enlarge extensively its facilities at the site of the new steel mills between Provo and Springville, Utah. New tracks and sidings will be installed at the steel site to take care of increased traffic, freight and passenger, which necessarily will come with the beginning of construction work on the blast furnace and coke ovens of the Columbia Steel Corporation, which is expected to begin about March 1.

Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind., has been granted a certificate of convenience and necessity by the Indiana Public Service Commission for the development of the West Tenth Street power plant in Indianapolis, and for the construction of transmission and distribution lines in and outside of Indianapolis.

Trade Notes

A. E. Jones, sales engineer in the New York office of the Terry Steam Turbine Company, has accepted a position in a similar capacity with W. B. Connor, Inc., 90 West Street, New York City.

Standard Underground Cable Company, Westinghouse Building, Pittsburgh, Pa., announces that it moved the Boston sales office of the company on Jan. 1 from its former location in the Delta Building to 609 Unity Building, 185 Devonshire Street, Boston.

The Nichols-Lintern Company, Cleveland, Ohio, has equipped twelve new cars of the Indiana Service Corporation, Fort Wayne, Ind., with the latest Nichols-Lintern Company's safety signaling devices. Additional cars, equipped in the same way, are to be delivered in the near future.

Uehling Instrument Company, Paterson, N. J., has appointed the Mine & Smelter Supply Company of El Paso, Tex. as its exclusive representatives for CO_2 recording equipment and other power plant recording instruments in the States of Arizona and New Mexico and West Texas, as well as in the Republic of Mexico, north of Mexico City.

Ohmer Fare Register Company, Dayton, Ohio, has acquired the fare register and fare box business of the Dayton Fare Recorder Company and the Recording & Computing Machines Company of the same city. Included with this transfer is the business of the Sterling-Meaker Register Company and the New Haven Register Company, which was previously acquired by the Dayton Fare Recorder Company.

Combustion Engineering Corporation, New York, N. Y., has announced the acquisition of the Quinn Oil Burner & Torch Company. W. R. Quinn, former president of the Quinn Oil Burner & Torch Company, has become associated with Combustion Engineering Corporation as manager of its fuel oil department. The company says it is now prepared to furnish engineering service for the solution of any problems incident to the installation of this equipment.

Virginia Railway & Power Company, Richmond, Va., will install 300 Johnson fare boxes in Richmond, Portsmouth, Petersburg and Norfolk, Va., officials of the company have announced. The installation of these boxes will do away with the use of tickets on the system and means the installation of tokens, 500,000 of which have been ordered. The Johnson fare box has been in use in Norfolk, where seventy-five received a tryout, and proving satisfactory are to replace gradually the old fare box throughout the entire system.

Metal & Thermit Corporation, New York, N. Y., has equipped its Jersey City welding shop for making welds on lighter sections by means of the oxy-acetylene and electric processes. This is in addition to its present excellent facilities for undertaking thermit welding repairs. This service will be of particular value in cases where large production work is desired. The company is now in a position, therefore, to undertake prompt welding repairs or quantity manufacturing of all kinds for customers in the surrounding territory. Work can be called for and delivered by truck. This policy of equipping welding shops with the additional welding facilities, as described above will later be extended to the other welding plants of this company.

National Railway Appliance Company, New York, N. Y., announces its appointment as agent for the Turnstile Car Corporation and the E-Z Car Control Corporation. These companies manufacture the turnstile and the necessary control equipment to convert or build cars, particularly of the large double-truck type, into one-man equipment. Such equipment is now operating exclusively and successfully in Syracuse, Rochester, Schenectady, Toledo, etc. These cars have complete safety features and utilize ordinary standard type control and air brake apparatus previously in use. Any information or replies to inquiries will be gladly furnished from the above office of the National Railway Appliance Company, Grand Central Terminal, 452 Lexington Avenue, New York.

New Advertising Literature

Louis Allis Company, Milwaukee, Wis., has recently published a bulletin describing and giving full information with regard to the L-A, Type H. D. heavy duty motor.

Bridgeport (Conn.) Brass Company has issued a forty-seven-page illustrated booklet called "Brass Pipe and Piping." The pamphlet describes in detail when and how brass pipe should be used.

St. Louis (Mo.) Car Company has issued Catalogue No. 103. This is a sixteen-page illustrated booklet entitled "Safety Cars," which describes this type of car built by the St. Louis Car Company.

General Electric Company, Schenectady, N. Y., has issued an interesting anniversary number of *Schenectady Works News* under date of Dec. 8. It tells the history of the growth of the Schenectady works since its founding, thirty-six years ago.

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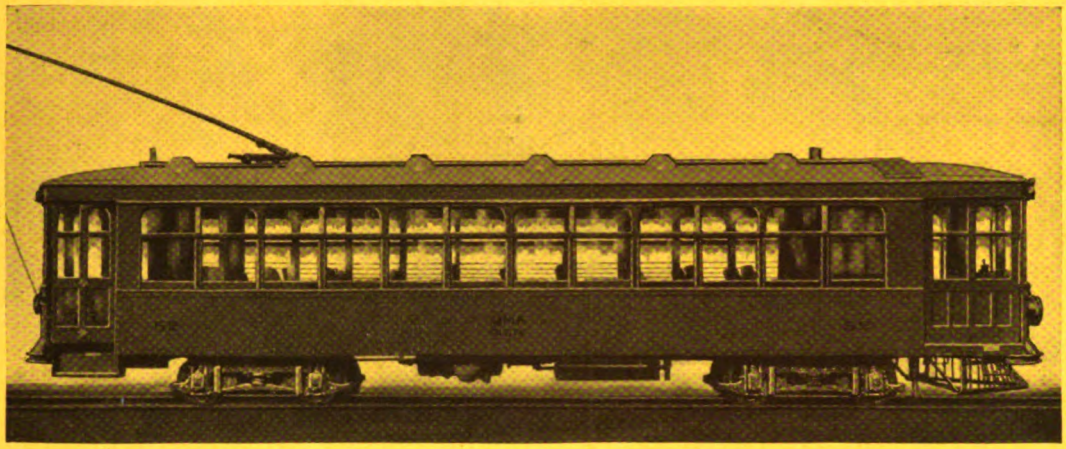

Western Ohio Railway's
New Light-Weight Interurban Cars A Success

Weigh only 33,000 lbs., and operate at speed of 45 M.P.H.

The Combination Passenger, Smoking and Baggage Cars, mounted on Brill Low-level Trucks No. 77-E, delivered to the Western Ohio Railway, Lima, by The G. C. Kuhlman Car Company five months ago, are meeting every requirement on this interurban line, where a speed of 45 M.P.H. is reached.

It is logical that in the development of light-weight cars for the higher-speed interurban lines the speed requirements have an important influence in determining the car weight, and the weight of 33,000 lb. for this equipment is remarkable when the speed requirements are considered.

This new type light-weight interurban car measures 45 ft. 0⅞ in. over bumpers; 8 ft. 8½ in. wide over all, and seats 48 passengers. The motor equipment consists of four (4) 35 hp. motors.

Riding comfort, so important in inter-city service in which riders travel long distances, is retained by the use of Brill Low-level No. 77-E Trucks, constructed with solid-forged sideframes and such comfort producing features as the Brill Bolster Guide, Graduated Spring System, and "Half-Ball" Brake Hangers.

Write for copy of Catalog No. 266

THE J. G. BRILL COMPANY
PHILADELPHIA, PA.

AMERICAN CAR CO. ST. LOUIS MO. — G.C. KUHLMAN CAR CO. CLEVELAND, OHIO. — WASON MANF'G CO. SPRINGFIELD, MASS.

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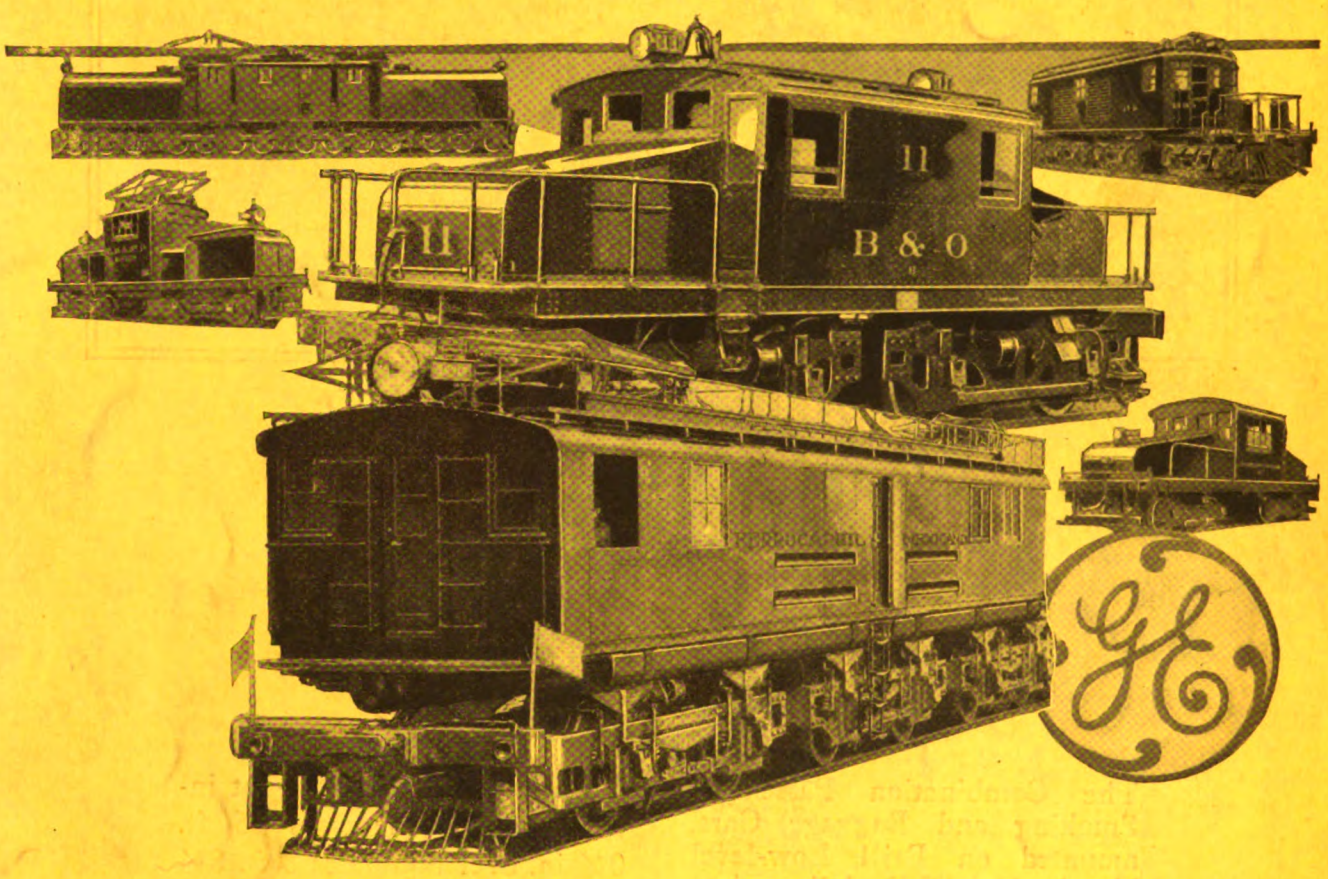
In 1923

More electric locomotives will be operated



More powerful—More efficient

Geographic and civic conditions continue to place limitations in the way of handling traffic, and electricity is providing the only practicable solution to the motive power problems involved.

The B. & O. R. R., the Pioneer G-E electrification and first trunk line railroad to electrify, is an example. And on this road 2200-ton trains, including a steam locomotive of approximately 230-tons, are now hauled on the maximum grade at nearly twice the speed obtained with Mallet steam locomotives. Two more 120-ton electric units are now under construction for this road.

With the return to normal or improved industrial conditions, the electric locomotive will be called upon more and more to add economy in operation and expedite traffic, especially on the more congested routes and sections with heavy grades.

MEMBER AERA

General Electric Company

General Office
Schenectady, N.Y.

Sales Offices in all large cities

25-197

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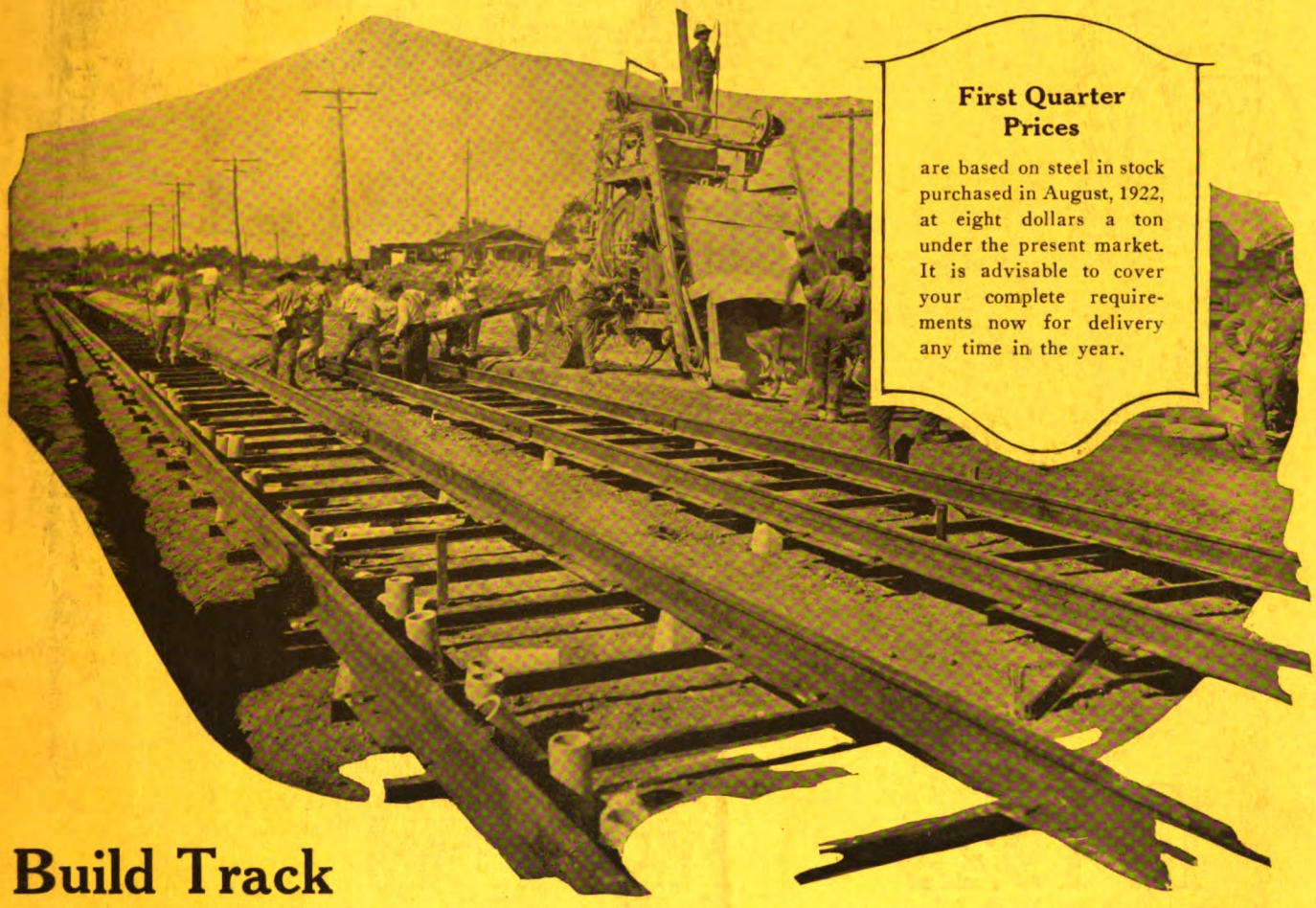
McGraw-Hill Company, Inc. MONTHLY MAINTENANCE ISSUE Twenty Cents per Copy

ELECTRIC RAILWAY JOURNAL

January 20, 1923



First Quarter Prices

are based on steel in stock purchased in August, 1922, at eight dollars a ton under the present market. It is advisable to cover your complete requirements now for delivery any time in the year.

Build Track That Has Been Tested in Service and Cost

When you consider 1923 track plans, there is a fund of information available that should not be overlooked.

It consists of the comment on steel tie track construction in the editorial pages of this and other papers and in the data collected by the 1922 Way Committee.

Back of this favorable comment on certain cases are hundreds of other hard-working installations, put down since 1910, that have never got their names in print—and, logically, back of all them is a proposition on cost and service that challenges the interest of any executive who is faced with paved work in 1923.

For your convenience we have had photostatic copies made of late articles on Steel Tie Construction, which will be mailed immediately on receipt of your request for information and prices.

THE INTERNATIONAL STEEL TIE CO., Cleveland, Ohio

Steel Twin Tie Track

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The Adaptability of Alternating Current for Electrification

New York, New Haven & Hartford R. R.
2400 HP., 181 Ton, 11,000 Volt, Single-Phase, Alternating Current, Single-Cab Locomotive. High Speed Passenger Service.

Today the heaviest Railroad Service in the United States is being handled by the Alternating-Current System.

Norfolk & Western Ry.
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In 1922

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ELECTRIC RAILWAY JOURNAL

Consolidation of Street Railway Journal and Electric Railway Review

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HENRY W. BLAKE and HARRY L. BROWN, *Editors*

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Are You Maintaining an Asylum for Antiquated Machinery?

EVEN a casual inspection of almost any electric railway shop will disclose the presence of some machines that ought to have been junked long ago. They are kept partly as a recognition of their excellent past record and partly because the wastefulness of continuing them in service indefinitely is not clearly recognized. The fact is that many machines, purchased for work which at the time they could do economically, are now entirely obsolete. An unprejudiced critic, coming on a property from the outside, could easily point out the offenders, if the local master mechanic is too close to the job to enable him to do so.

Great progress has been made within a few years in the design of machines for performing the routine and special operations which go into electric railway maintenance shop work. This is lost to the property which is still depending upon machinery purchased ten or twenty years ago. A profitable task for some one on most any property would be to make a study of the advances in this line that have been made. The exhibits held in connection with the electric railway and steam railroad conventions are of great value in this connection. A visit to a really up-to-date shop is always stimulating.

An effort will be made in the special monthly issues of the JOURNAL to direct attention to the best methods of performing all mechanical operations which are involved in maintenance work.

Modern Track and Line Maintenance Methods Involve the Use of Good Tools

THE danger of becoming a repository for obsolete machines is not confined to the shop, by any means. The same principle applies on the track and line. There is some kind of a machine, and in many cases there are several kinds, for the performance of every routine mechanical operation. Inventors and manufacturers have been stimulated lately to produce such machines in profusion on account of the high cost and scarcity of skilled labor. As R. H. Dalgleish wrote, in his "New Year's message" in the issue of this paper for Jan. 6, page 14: "The use of labor-saving tools has done more, in the engineering field, to increase output than anything else that I can recall." He had the track in mind particularly, but this statement is true throughout the whole range of maintenance work.

If one wishes to realize vividly the changes which have been going on in this line recently let him but contrast the present-day methods of cutting out worn rail, building up joints, eliminating rail corrugations and other irregularities, drilling rail, mixing concrete, tamping ties, replacing trolley wire, etc., with the procedure of only a few years ago. The result is amazing, and more amazing still is the slight investment cost involved in the machines that do this work as compared with the savings produced. The estimates of expenditure for 1923 which were published in this paper two weeks ago indicate a wonderfully active year in rehabilitation. It behooves the maintenance men to insure the maximum return on every dollar by judicious recommendations to the boss to purchase the labor-saving machines.

Carry the Question Mark in Your Mind During 1923

A QUERYING attitude on the part of any individual, and especially on the part of a man connected with a large organization like an electric railway, is something to be encouraged. It would be a good idea at this outset of a new year for every one of us to resolve that we will take this attitude toward all elements of our work in order that we may be sure that we are getting the best out of it.

Most of us seem to go on the assumption that because the things we are doing have been done that way for a considerable time with a fair degree of success, it is all right still to go along in the old ruts. It takes a jolt sometimes to make us change our ways or wonder if it is about time they were changed. This is perfectly natural. All human beings are characterized by mental inertia. We are not so much to be blamed for not being more alert as we are to be pitied. The alert fellows are the ones who are getting along, and the alert ones are those who are always asking questions.

The fellow who looks at every practice on his own property, in the light of what he learns is being done on other properties, with a question in his mind is not likely to go to sleep on his job. He will be getting up new schemes all the time, some of which will be worth while and will make real savings. It goes without saying that if a practice on one's own property is good, it will stand questioning; if it is not good, the sooner this fact is appreciated the better. Similarly, when some other company seems to have a practice that is getting results, it is a fair question whether that practice cannot be applied at home.

Now, it is not a wise plan to be always changing methods, just for the sake of having a change. Some people are restless and are not satisfied to go along in the old way even if they know it to be the best one. However, one can maintain a questioning attitude toward everything without being constantly in the process of change. Would it not be well during the coming year, even if it is a little late for New Year's resolutions, to determine definitely that nothing will be accepted as best just because it has been doing the work for a long time, but that everything will be weighed to determine the possibility of improvement?

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Drawing Ideas from the Shop Employees

MANY wide-awake companies spend considerable money in the quest of ideas by sending delegations to inspect other properties. It is usually a profitable investment, but too often the same open-minded spirit does not permeate the whole organization, and some heads of departments actually resent any approach by a subordinate who claims he has an improved method for accomplishing a given result.

This latter criticism does not apply to the master mechanic of a certain interurban who has been successful in encouraging very helpful suggestions from his shop foremen and other shop employees. This master mechanic, who believes that 90 per cent of his job is to get the best work possible from his employees, explained that one must ever be in a receptive frame of mind for shop kinks, suggestions, etc. When a scheme is recognized as useful, the man who suggested it should be helped in perfecting it. In other words, his interest must be held by allowing him to work the thing out to a success. A pride is thereby created and incentive is not dulled but sharpened. This master mechanic's advice, in short, was: "Don't suppress experimentation on the part of shopmen. Encourage inventiveness, but give the men all the credit for any successful development." The fruits of this policy were then demonstrated when various improvements and developments were described to the JOURNAL representative by those who had conceived and perfected the ideas.

Aside from value or usefulness of any article so developed, its originator feels a great confidence in his ability and is spurred on by any success, however small, to produce other time and labor saving methods or devices. Besides, more common ground and better understanding is established between the master mechanic and his men.

Figures that Don't Mean What They Say

IT HAS BEEN noticeable recently that whenever the cost of lubrication has been discussed attention has been focused chiefly on the cost of the oil used, plus, perhaps, the labor expense of its application. However, it must be remembered that the effectiveness of equipment lubrication, not its cost, is the factor controlling maintenance expenditures, and the amount of the latter is often increased by a decrease in the direct lubrication expense. A case is recalled where the president of a large railway noticed a statement made by the superintendent of equipment of a near-by property giving very low unit lubrication costs; in fact, about one-quarter of those of the large city system. Such a potential saving was considered worthy of investigation, but the answer turned out to be in the higher charges in the other important items largely controlled by the quality of rolling stock lubrication. In other words, the higher unit cost for lubrication on the larger property was more than justified by better performance.

On this basis, what are all the factors that enter into a comparison between two methods of lubrication or two kinds of lubricant? If the effectiveness of each is measured by service and low cost of all items affected by the quality of lubricants, should not these factors be included in a fair economic comparison? Cost of lubricant and labor to apply it, of rewinding armatures damaged because of burned-out bearings, of pull-ins, and bearing life, all on a mileage basis. These were included in the analysis made by those digging into the low figures in question, and they found a quadrupled expense for the lubrication cost alone was more than wiped out by the economies in other dependent items.

Stimulating Interest in Maintenance Work

KEEPING equipment going after it is built is not nearly as interesting as building it. Every one likes to see the results of his work, which is rather difficult to do when this work consists of such routine operations as repacking bearings with waste, adjusting brake rigging, slotting commutators, tightening track bolts, splicing trolley wire, etc. One bearing, brake rigging, commutator, track joint or trolley splice seems just like another. But there is a way to overcome the tendency toward monotony or disinterest on the part of the employees who do routine maintenance jobs. The work can be made interesting by letting the men know the results they are producing in comparison with other men on similar work.

The problem of stimulating interest differs with the size of the property. On a small railway the master mechanic, the line superintendent and the roadmaster know their men personally and can do a great deal without much organization if they want to. For example, on one property where about seventy-five cars are given light overhauls in a division shop, the master mechanic divides his cars into groups, assigning each to a crew for inspection and small repairs. Each month records are posted showing the pull-ins of the cars of each group and the kinds of defects which have been remedied. These indicate whether thorough inspection work is being done, and promote a spirit of team competition. In other words, the same idea which is back of a baseball team, impelling it to win, that is, the sporting instinct, is utilized to make interesting what might otherwise be humdrum effort.

Obviously, when men have a zest for their work they not only enjoy it but they do it better. This means not only reduced maintenance cost but, in the end, better jobs for the workers.

On large properties more organization is needed to accomplish results like those which are easier to get on small ones, but the same principles apply. The plan followed by steam railroads in recognizing good track maintenance work by sections has given excellent results. An award is taken as a great honor and the men on the "prize section" keep every traveler over it informed of the fact that he is having the privilege of riding on some high-grade track. Anything of this sort that will promote teamwork will bring good results, and the men will like it because it takes away something of the monotony of their tasks.

The large company has one advantage in that it is usually split up into operating lines, sections or divisions, with the carhouse as the operating center. A spirit of emulation can be easily developed by means of competition among these operating units, even if all are not favored with equally good equipment. Handicaps can be provided, if necessary, to equalize discrepancies in this direction.

But whether the company is large or small, it is "missing a big bet" if it is not stimulating its men to do their best by enlisting their interest.

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Maintaining Electric Railway Motors

Particular Care Should Be Used When Replacing Field Coils to Insure that They Are Connected Properly and that the Correct Polarity Is Obtained—Various Methods for Testing Are Given

By J. S. Dean
Engineering Department
Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa.

ALL railway operators are vitally interested in making a good showing in their record of car-miles per car failure, for on this basis the management, in a general way, is able to judge the condition of the equipment and the efficiency of the shop organization. There are a number of things which affect this record such as collisions, poor condition of track and overhead construction work, rough handling and abuse of equipment by trainmen, severe operating schedules, etc., which are beyond the control of the master mechanic who is responsible for the upkeep of the equipment, and these factors should be given some consideration in connection with a study of this question. On the other hand, if the equipment is left to run down by neglecting the details in connection with the electrical and mechanical repairs of the cars, there will be a noticeable increase in the number of car pull-ins with a consequent lowering of this record, to the discredit of the shop organization. With the thought in mind to assist operators in reducing their motor failures, which would in turn boost their record of car-miles per car failure, the following detail methods in connection with the upkeep and maintenance of railway motors are given for consideration:

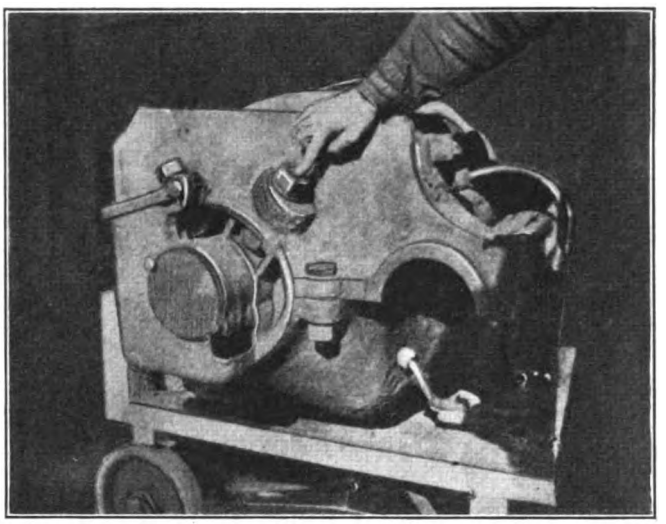
During the general overhauling period, when the field coils are taken out of the frame to be cleaned, redipped in insulating paint or varnish and baked, or when damaged coils are replaced, it is very important to have them put back in the frame properly, with the leads so connected as to give the correct relative polarity, to secure the required magnetic flux. If for any reason one or more of the main field coils be connected so that the current passes through in the wrong direction, this motor will run at a higher speed, and when put on the car will tend to "hog" the load and result in overheating the armature. Should one or more of the commutating-pole coils be connected in wrong, the motor will commutate poorly and tend to flashover from brush-holder to brush-holder or from brush-holder to ground.

In order to prevent wrong connections, when frames are being overhauled or repaired, and to aid the operating man in connecting field coils to give satisfactory operation, a standard winding diagram of the motor being repaired should be obtained from the motor manufacturer and used as a guide in connecting the field coils.

Precautions in Replacing Field Coils

The following points are well worth following while overhauling or repairing field windings:

1. Coils and frames should be cleaned and painted.
2. Coils should be placed on poles properly.
3. Coils should be spring supported and, where necessary, backed up by washers of either metal or fibrous material well painted.
4. In replacing coils, the spring and washers should be taped temporarily to the coil to keep them from working out of place and from getting in between the pole and pole seat when assembled.
5. The surface of the pole and pole seat should be cleaned to insure a good close fit when the bolts are drawn up tightly.
6. The pole should never be pounded into place with a sledge, but a block of wood or a piece of soft metal, such as copper, should be used.
7. Pole bolts should be drawn up tightly and lock washers placed under each nut. White lead should be applied over the nuts after tightening to prevent entrance of water.
8. The assembled pole should be sounded by using a small hammer, to insure that it is drawn up tightly.



Westinghouse 101 Motor Modified to Take 101-B-2 Housings Using Two Radial Through-Bolts

9. Connections should be made as shown on the manufacturer's winding diagram.
10. The polarity of the assembled field coils should be checked carefully.
11. The connections between the coils with cable leads should be made by butting the ends together and then covering the joint with a copper sleeve and soldering well.
12. When the coils have terminals, the ends of the cable connected to the terminal should have a metal sleeve soldered to the wire. This in turn should be held in the terminal by screws securely tightened and locked.
13. The ends of the cables connected to the brush-holders should be provided with metal sleeves or terminals, securely clamped and locked to the brush-holder casting.
14. All wiring around the frame should be securely anchored to the frame and tied down to prevent vibration and to keep the insulation from being rubbed or cut by parts of the rotating armature.
15. Individual coils should be dipped and baked. To secure the best results, dip and bake the entire frame after the coils are in place and all connections are made.
16. The motor leads where they come out of the frame should be well protected by insulating bushings.
17. It is considered the best practice in connection with all modern railway motors and it is recommended for old motors to use cables coming out of the body of the coils instead of heavy brass terminals, to make the wiring connections around the frame. The main objection to the use of terminals is that they are more likely to break off, due

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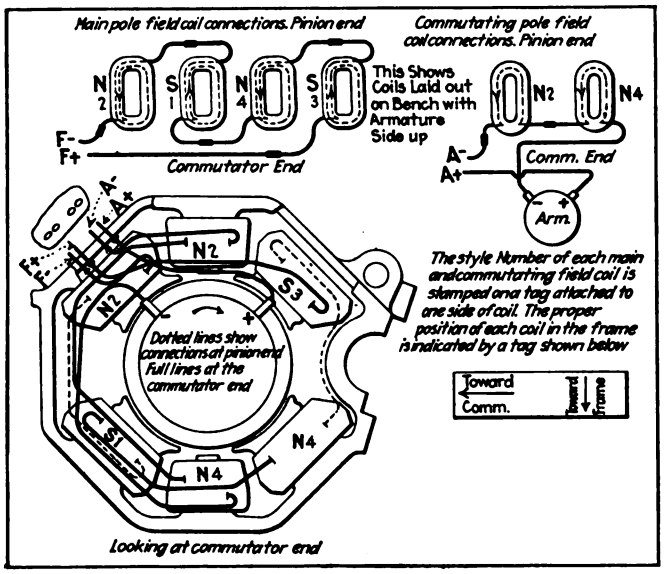

Fig. 1—Typical Field Winding Diagram for Railway Motor

to vibration, or to develop a loose connection and burn off the lead. Another disadvantage is the difficulty of properly insulating the terminals after the connections are made.

The object of testing the polarity of field coils is to determine whether the main and commutating-pole field coils are properly connected. This test should be made whenever field coils are replaced, because coils are sometimes placed over the poles of the frame inverted or reversed, and wrong connections thus made show up in faulty operation of the motor. This test will show up conditions which might cause an armature to run hot due to an unbalanced magnetic field circuit caused by a reversed main field coil. It will also indicate conditions which might cause poor commutation and flashing in a commutating-pole motor because of a reversed commutating coil.

The testing circuit should be arranged as shown in Figs. 2 and 3. At least five or six sets of heaters or frames of resistors should be put in the circuit at first. If a readable deflection on the polarity indicator is not obtained, part of the grids should be omitted to increase the current. If one is available, an ammeter in the circuit will indicate whether the current is large enough to be liable to cause any damage to the windings or to connections.

A very satisfactory polarity indicator can be made from a piece of steel banding wire about 3 in. long, with one end bent over about ¼ in. to distinguish it. This should be suspended at the middle by a short thread. When this is first used it should be held at the pole for at least one minute, when it will become magnetized, and it is then ready for use.

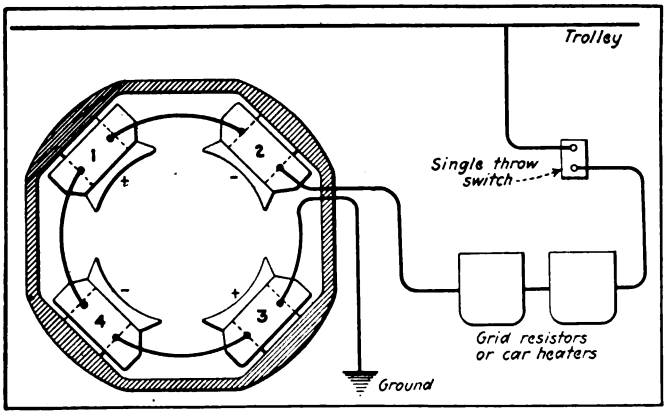

Fig. 2—Diagram of Connections for Polarity Test of Main Field Coils on Non-Commutating-Pole Motor

Method of Testing for Polarity

The motor can be either on the trucks or out on the floor. It can have the armature in or out of the frame and, if a split-frame motor, it can be open or closed. With the coils all connected in series and the two field leads connected to the test circuit, as shown in Fig. 2, the switch is closed and current passes through the field coils, if they are connected properly. By holding the polarity indicator close to the ends of the coil, or to the pole stud bolts on the outside of the frame, the polarity indicator will reverse at alternate poles. Thus if No. 1 pole attracts the positive end of the polarity indicator, No. 2 should attract the negative end, No. 3 the positive end and No. 4 the negative end. If these conditions are not obtained the field winding connections should be changed.

If the frame to be tested has commutating poles, two separate tests should be made, one on the main field coils as previously described, and the other on the commutating-pole coils. This latter is made in the same manner, with connections as shown in Fig. 3. In this case only one of the motor leads (the negative armature lead) can be used, as the other lead from the commutating coils goes to one of the brush-holders. Four-pole railway motors with only two commutating coils, which are located directly opposite each other, also four-pole motors with three commutating coils, are tested in the same manner. In the case of the two-pole machine the polarity of both coils should be the same, while in the three-pole machine the two coils on diametrically opposite poles should be of the same polarity, while the intervening coil should have the opposite polarity.

In making the test the pivoted compass should be held in a horizontal position; or if a suspended polarity indicator is used this should be held by the free end of the suspension thread. All coils should be tested for polarity at the same end. Results should never be considered final until they have been checked the second time, as there is a possibility of the needle of the indicator having its polarity reversed. It is not necessary that a certain pole have a definite polarity (either positive or negative), but it is essential that the polarity of adjacent poles be different.

In the case of a commutating-pole machine, it is important to have the proper relation of polarity between the main and commutating field poles. To check this the negative armature lead of the motor should be connected to the positive field lead, the positive armature lead to the trolley side of the test circuit, and the negative field lead to the ground side of the test circuit. If the armature is in the frame and the brushes are making contact on the commutator, current will flow through all the windings. If the armature is not in the frame, then it will be necessary to short-circuit the brush-holders. With these conditions, the polarity of a main pole should be the same as the polarity of the commutating pole next to it in a clockwise direction when facing the commutator end of the motor.

When the two halves of a split-frame motor are bolted together for the machining of the housing fit, a liner of sheet steel about 0.017 in. thick should be placed at the split to insure a good clamping action on the housing when the two halves of the motor frames are bolted

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together. During the overhauling period, or when motor troubles have developed and frames are opened up to take out the armatures, there is a possible chance of losing this clamping action in reassembling due to one or more of the following reasons: (a) Frame bolts not drawn up tight; (b) lock washers left off; (c) a poor grade of bolt used which will stretch; (d) dirt at the split of the motor frame.

Motors operating under the above conditions, due to the pounding action of the armature and hammer blows in passing over the rail joints, will soon develop considerable wear of the housings and housing seats, as well as at the tap bolts and tapped holes in the housings.

This trouble has been one of the main factors leading to the development of the present standard box-type motor. The use of housings that have a tight driving fit in the ends of the solid frame has practically eliminated loose housings in railway motors. A number of methods for repairing loose housings in split frame motors, some temporary, others permanent, have been tried out on various properties and found to work out very satisfactorily.

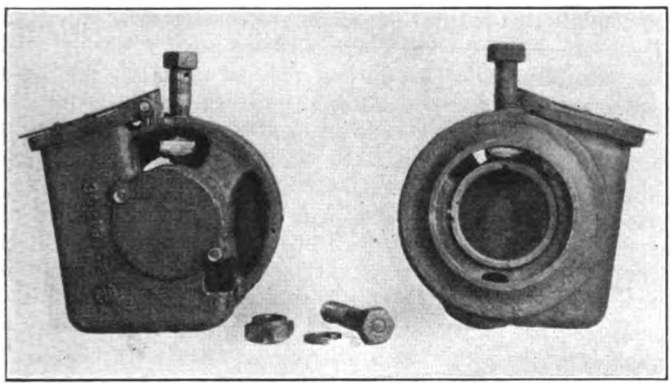
Strips of canvas duck treated with white lead may be placed on the worn housing, building it up to such a diameter as to insure a good tight clamping action of the two halves of motor frame when bolted together. In order to check whether the two halves of the frame of the motor are clamping the housings, it should be possible to get a 0.005 to 0.007 in. feeler between the frames at the split when they are bolted together with built-up housings in place.

Strips of advertising sign cards held in place by shellac are sometimes fastened to the worn housing, building it up to such a diameter as to insure a good tight clamping action of the two halves of the motor frame when bolted together. When the housing is not too badly worn, if made of malleable iron it can be built up by means of the electric or oxyacetylene welding process, after which it should be machined to fit the housing seat in the motor frame, plus enough allowance to insure a good tight clamping action of the two halves of the motor frame when bolted together.

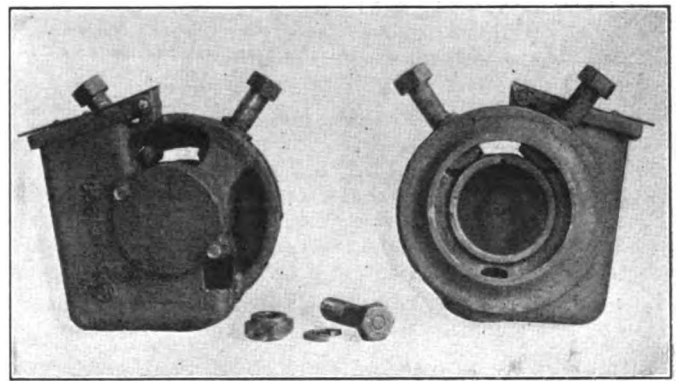
The worn tap bolt holes should be bored out large and cast iron plugs (which have been found to give best results) should be driven tightly into these enlarged holes. The worn housings should be turned down and a steel ring about ⅜ in. thick should be shrunk on the housing. If the housing has a double flange one of these must be turned off and a new flange made on the shrunk-on ring. It can then be turned down to such a diameter as to insure a good tight clamping action of the two halves of the motor frame when bolted together. New holes should be drilled and tapped in the housing through the shrunk-on ring into the cast-iron plugs to receive the tap bolts.

Building Up Housing Seats on Motor Frames

The housing seat in the motor frame may be built up by means of the electric or oxyacetylene welding process and then rebored to a smaller diameter to fit the worn housing (which should first be trued up), with enough allowance to insure a good tight clamping action of the two halves of the motor frame when bolted together. Another method is to bore out the housing seat in the motor frame and then to build this up by means of a semicircular steel liner, riveted in place, after which it should be welded at several points. The housing seats can then be rebored to fit the worn housings (which should first be trued up), with enough allowance to insure a good tight clamping action of the two halves of the motor frame when bolted together. Enough metal should be machined off at the split of both halves of the motor frame to insure a good tight clamping action on the worn housings of both halves of the motor frame when bolted together. When this method is used it will be necessary to rebore the pole faces, to make certain that the correct air-gap is maintained.



Through-Bolt Type of Housing Held by One Vertical Bolt



Through-Bolt Type of Housing Held by Two Radial Bolts

In connection with the repairs on worn bearings, several good methods have been used to fix up the worn tap bolt holes. Sometimes a longer tap bolt is used which will engage the lower threads of the tapped holes in the housing that have not been damaged by the loose shorter bolts.

Another method consists of filling up the old worn holes by welding in (preferably Tobin bronze) and reboring and retapping new holes. The worn holes may be drilled out to a larger diameter, and a threaded steel plug welded at edges may be inserted. This plug should be drilled and tapped to take the standard size bolts. Worn holes may be retapped for the next larger size bolts. When shrunk-on rings are used the enlarged holes may be drilled out and cast-iron plugs driven in tightly.

A new type of housing arranged with through bolts, as shown above, is being used to replace the old badly worn tap bolt type of housing. This type of housing is also used on new split frame motors of more recent design. With this through-bolt construction, housings can be kept readily in good condition, as there are no tapped holes in the housing to wear, should they tend to work loose in service. If, on account of lack of maintenance, the threads of the through bolts become worn or damaged, they can be renewed at a small expense.

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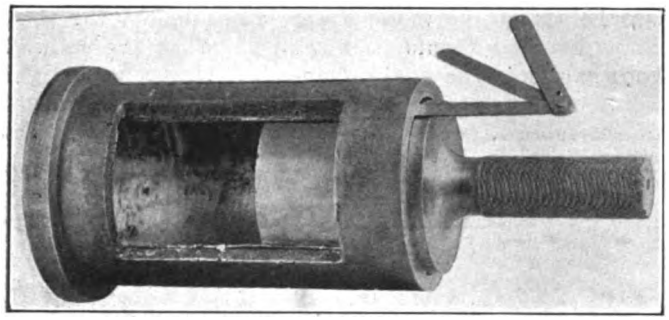
On motors of the split-frame type, using either the new tap bolt type, revamped tap bolt type, or the new through-bolt type of housing, to insure against housings working loose it is advisable to keep frame bolts and housing bolts drawn up tight. Lock washers should also be applied to all bolts and a good grade of heat-treated steel bolts should be used. When assembling motors all dirt at the split should be removed and the armature bearings should be kept in good condition, all bolts should be inspected regularly and systematically, and they should be drawn up tight.

Checking Armature and Axle Bearing Wear

The proper maintenance of motor bearings involves careful inspection and gaging to determine when renewals should be made in order to keep the motors in good operating condition. This is most important in



Gaging the Radial Wear of an Armature Bearing after Seven Years of Active Service

connection with armature bearings, for when these are neglected and allowed to wear down too far, the armature will rub on the poles, which may cause the destruction of the armature winding and more or less damage to the fields.

In the case of motors mounted on cars equipped for single-end operation, running in one direction only, the bearing wear due to the torque of the motor and the action of the gear and pinion depends on the rotation of the armature, as is shown in Table I, which applies to either double or quadruple equipments of railway motors. With cars running in both directions, wear on both the armature and axle bearings is more uniformly divided between the top and bottom.

To determine when bearings are worn to the limit and should be replaced several tests may be made. First a light test can be applied to motor frames that have inspection holes so located that a light can be held at one end of the motor and clearance in the air-gap observed by the workman. This method depends largely upon the judgment and experience of the man making the inspection and cannot be relied upon entirely.

Another method, very commonly used by many operators, requires a sweep gage made of varying thicknesses of cardboard or soft metal, and sometimes a long narrow flexible steel strip fitted with steel pads of varying thicknesses. These gages are inserted in the air-gap at the lower side of the motor. When the limiting minimum gage cannot be entered, the bearings show maximum allowable wear and should be renewed. In general, this method requires that the lower commutator cover be removed in order to apply the gage. This method may be applied to the upper side and a similar type of gage used, except that when the maximum gage can be entered in the air-gap at the top side of the motor the bearings show maximum allowable

TABLE I—DIRECTION OF BEARING WEAR

Position No.	Inside Hung Motors: Armature Rotation	Inside Hung Motors: Bearing Wear Armature	Inside Hung Motors: Bearing Wear Axle	Outside Hung Motors: Armature Rotation	Outside Hung Motors: Bearing Wear Armature	Outside Hung Motors: Bearing Wear Axle
1 and 3	Left	Down	Down	Right	Up	Up
2 and 4	Right	Up	Up	Left	Down	Down

wear and should be renewed. When using this method the gages are inserted in the top commutator opening, the cover of which can readily be removed for this inspection.

On very small armatures the bearing wear can be approximately obtained at the commutator end by reaching in through the top commutator opening and lifting the armature and noting the play. This is a crude method and is only used to get a rough approximation of the wear. If play is noticeable, the lower commutator cover can be removed and a sweep gage used to check the air-gap. A more reliable test, similar to the above, is made by removing the lower half of the gear case, then prying up the armature at the pinion and measuring the lift from a fixed point on the motor frame or the gear. This scheme gives actual pinion and bearing wear and is satisfactory, but involves considerable labor and time.

The armature may be lifted by motor power. This method has been used successfully by a number of operators, but requires the use of a minimum size sweep gage, which is entered into the air-gap of the motor and, with the brakes set, power is applied by using the first notch of the control only. If the gage shows clearance under these conditions, the bearings are considered O.K. This test must be made with the reverser on the car thrown first in the forward and then in the reverse position in order to check all the motors on the car.

When the motor is off the car and the pinion is removed, the pinion and bearing wear can be measured with a feeler gage. This method is accurate but not practical, as it requires too much work to check the bearings under these conditions. This method can be used to check the commutator and bearing of a motor on the car by removing the commutator end dust cap. With experience, the condition of the pinion end bearing can be estimated from the wear on the commutator end.

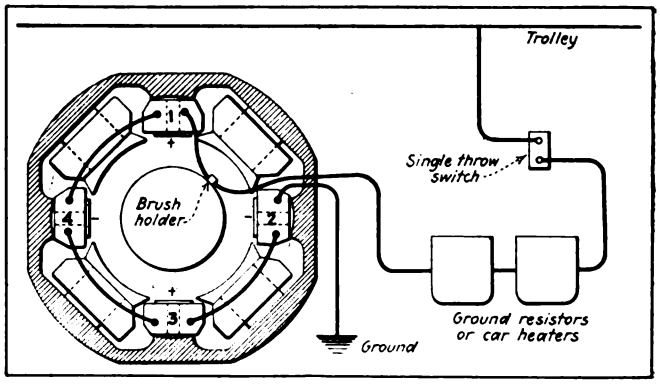


Fig. 3—Diagram of Connections for a Polarity Test of the Commutating Coils on Commutating-Pole Motor

One operator reports considerable success in determining maximum allowable bearing wear by building up the front core band with solder and turning this down so that it extends ⅛ in. above the armature iron. When this band begins to show signs of rubbing on the poles it is an indication that the bearings should be renewed. Three or more pads of solder built up ⅛ in.

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above the band and spaced equally around the armature would give a similar indication.

A device has been patented and used by one operator which is arranged so that when the bearings wear down to a predetermined point contact is made between the laminations of the armature and a small brass wheel supported by the frame. This wheel is caused to rotate and make contact with a bare fused jumper between the field coils, which grounds this field jumper, burning the fuse off and opening the motor circuit.*

Excessive wear of axle bearings is not as serious as that of armature bearings, as it only subjects the frame, axle cap and axle cap bolts to increased shocks and strains, and tends to spread the gear centers, with resulting less efficient gear operation, and rapid wear. For the above reasons, it is considered good practice to renew axle bearings that show a wear of from ⅛ to ¼ in. This is especially true with motors using 4 to 4½ diametrical pitch gears. This wear can be checked with a feeler gage by the workman from the pit, if the motors are not fitted with axle shields. Where shields are used and are fitted with inspection holes, the bearing wear can be checked through these openings. If inspection holes are not provided in the axle shield, it is necessary to remove them to make the inspection.

Another method, similar to that explained for checking armature bearing wear, consists of setting the brakes and throwing the control to the first notch and noting the play of the bearing by the lift of the motor frame. To check all motors on a car requires that this test be made for both forward and reverse positions of the reverser.

In connection with the life of armature bearings of railway motors, there are a number of things that must be considered when making a comparison of bearing life on various motors in service on different properties. It is a fact that the life of bearings of the same type of motor operating under apparently the same service conditions will vary widely, which no doubt is due to something inherent in the particular bearings in question, or to carelessness on the part of the men in charge of the upkeep and oiling of the bearings. With this in mind, it should be expected to find a wide variation in the life of the bearings on the different types of motors where they are subjected to all manner of service conditions, different methods of oiling, a large variety of lubricants, and with the upkeep and maintenance in the hands of many different types of workmen.

Most of the older type of motors used cast or malleable iron bearing shells with a heavy lining of babbitt anchored to the shell, while the more modern motors use bronze bearings which have a thin lining of babbitt which is made to stick to the shell by first tinning the inside of the shell. The following combinations are the ones found most common in service:

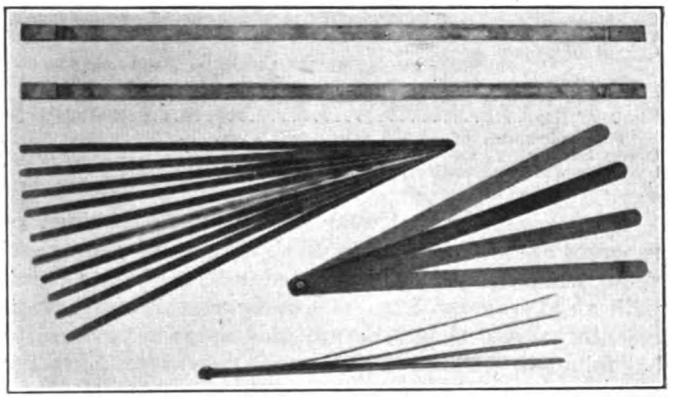
Shells	Lining Held by	Babbitt Metal
*Malleable iron	Anchor holes	Lead base
*Malleable iron	Anchor holes	Tin base
Bronze	Shell tinned	Lead base
†Bronze	Shell tinned	Tin base
Bronze	Shell tinned	No lining
Bronze	Shell not tinned	No lining

*These bearings can be improved by tinning the shells before babbitting.

†This type of bearing is the one that seems to give best all-around results in service and is most commonly used.

It is extremely important that all the details of babbitting bearings be carefully worked out and followed in order to get a finished bearing that will stand up satisfactorily under the severe service conditions. In this connection the bearing shells should be clamped carefully before babbitting and bronze shells should be well tinned. This operation will also improve bearings with malleable iron shells. It is desirable to use a good tin base metal for babbitting and the bearing shells and mandrels should be heated before pouring the babbitt. Babbitt should be poured at a temperature of from 460 to 480 deg. C. If all bearings are well tinned and then babbitted, the lining will stick to the shell and will be like a solid piece of metal. If such a bearing is held up by a piece of string and struck with a piece of metal, it will give out a clear bell-like tone.

Some operators babbitt bearings to the exact size of



Feeler Gages for Checking Air Gaps and Bearing Wear on Railway Motors

the journal plus an allowance and operate the bearings in this manner and apparently get satisfactory service under these conditions. The most common practice and the one that seems to give the best all-around results is to babbitt the bearing small and then to bore out the bearing to fit the journal. In some instances, the bearings are finished by means of a broaching tool which is forced through the bearing.

In general it is considered good practice to have all armature bearings fitted with oil grooves, so as to provide a better distribution of the oil to the surface of the journal. At least one of these grooves should extend to the bearing flange to supply oil at the rubbing surface between the bearing and the wiper ring. Bearings should have approximately from 3 to 5 tons press fit in the housing and in addition they should be held by either a key or a dowel as an emergency precaution. For this purpose, keys seem to be more satisfactory.

The most common type of bearings used are those fitted for oil and waste lubrication. The waste, preferably wool, is first soaked in a good grade of car oil for about twenty-four hours, and is then allowed to drain, after which it is packed firmly in the housing up to and around the bearing window. The housing is then filled up to within an inch of the top with waste packed in comparatively loose. It is considered good practice to repack these bearings every three months, putting new waste next to the journal. All waste should be removed about once every year.

In oiling bearings, a good grade of summer and winter car oil should be used. The most common practice is to use from one to two gills of oil at each oiling period, which is on the average every seven days. The use of too little oil is poor efficiency, as this apparent saving is more than offset by the added expense, due

*This apparatus was described in detail in the ELECTRIC RAILWAY JOURNAL for May 17, 1919, page 971.

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to either hot bearings or excessive bearing wear. The best results are obtained by pouring the oil into the separate oil well chamber, so it must feed up through the waste to the journal. If poured in on top of the waste it will tend to flood the inside of the motor.

Reports from a number of railway properties, both large and small, operating a great variety of different types of motors in city service show the following in connection with their armature bearing life:

CONDITIONS AND LIFE REPORTED

Material of bearing shell	Mostly bronze shells
Material of bearing lining	Tin base babbitt
Type of lubrication	Oil and waste
Oil grooves used	Eleven yes; five no
Oil grooves extended to the flange	Ten yes; six no
Period of lubrication,	Seven days minimum, fifteen days maximum; majority of roads, seven days
Radial wear allowed,	1/16 in. minimum, 1/8 in. maximum; 1/8 in. average
End wear allowed	1/16 in minimum, 1/8 in. maximum; 1/8 in. average
Type of gearing	Spur
Life of bearings,	*15,000 miles minimum, 200,000 miles maximum; 80,000 miles average
Method of holding bearings	Eleven use keys; five use dowels
Limit of life	Radial wear

*This minimum of 15,000 miles was given as the mileage between babbitting, and it is probable that a great number of the bearings were not entirely worn out when changed.

The allowable radial wear for armature bearings as reported above is from 1/32 in. to 1/16 in, with an average of 1/16 in., while the end wear reported is from 1/16 in to 1/8 in., with an average of 1/8 in. These figures are fairly representative and should be accepted as good practice to be followed. These figures are given for bearings which are used in connection with spur gears. There has been some question raised as to the end wear of armature bearings in connection with the use of helical gears. A recent investigation on several properties using both the spur and helical types of gears shows that the helical gearing does not produce any more armature bearing end wear than the spur gearing.

Boiler House Extension at Boston

FOR some years the Boston Elevated Railway has been somewhat short of power, not so much in the turbo-generator portion of its station equipment as in boiler capacity. In 1916 the company installed at its South Boston station a 35,000-kw. turbo-generator to supplement the three 15,000-kw. turbines previously in operation at that station. The turbine was designed to use steam at 200 lb. pressure, the pressure then being carried in the boilers in the station, but it was so arranged that additional stages could be provided in an extension of the turbine casing so that a steam pressure of up to 600 lb. could later be used in this machine if necessary. Since the installation of this turbine the existing boilers have been run at higher rating.

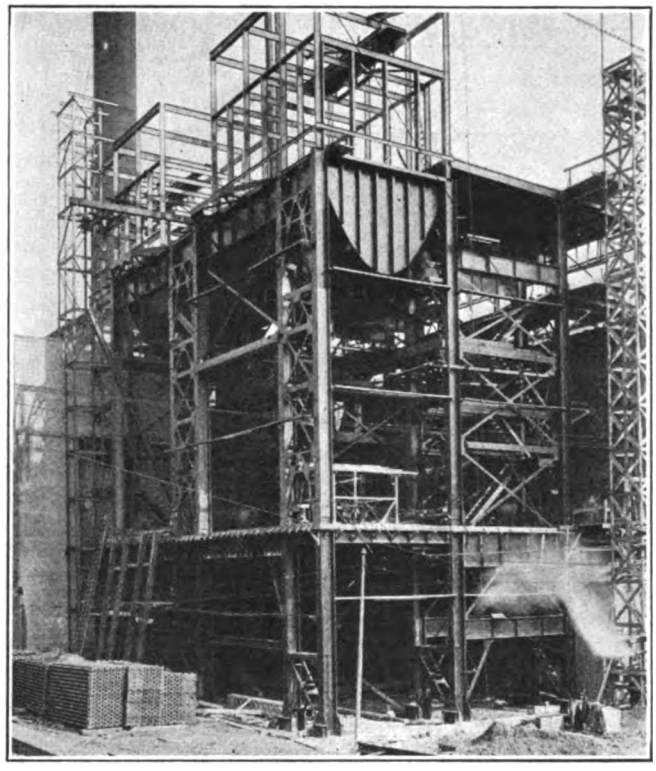
This turbine has been rebuilt so that at 200 lb. pressure it has a capacity of 40,000 kw. This made necessary an addition to the steam generating plant, to utilize the full capacity of the station and supply the needs of the railway for power. It was decided to keep for the present the steam pressure at 200 lb., but the new boilers will be designed so that later they can be run at 275 lb. pressure, supplying steam directly to the 40,000-kw. turbine, until it should seem desirable to reconstruct all of the equipment for this higher steam pressure. Incidentally, the changes in the large turbo-generator have increased its efficiency 3 per cent.

The new boilers, of which there are two, have a normal rating of 1,825 hp. each, with maximum rating of 6,400 hp. They are of the Babcock & Wilcox cross-drum type with thirty-nine sections in the header and twenty tubes high as compared with twenty-one sections in width and fourteen in height in the old boilers. A feature of the new boilers is their high setting, the distance from the boiler-room floor to the center of the mud drum being 15 ft. 4 1/8 in. They have a guaranteed efficiency as follows:

Rating	Efficiency
100 per cent	81.5 per cent
200 per cent	79.6 per cent
350 per cent	73.5 per cent

The boilers have Frederick underfeed stokers, supplied by the Combustion Engineering Company.

The boiler house of the station, including the coal bunkers and coal and ash conveyors, has been extended to accommodate these boilers, as shown in the engraving, the boiler house being designed so that duplicate boilers can be installed on the other side of the coal



Side View of Boiler House Under Erection

bunker in an extension of the boiler house to be built later. It was necessary, however, to build a new stack, and that is in course of erection. It will be of steel, 325 ft. high above the boiler-room floor and 355 ft. above the ground. The stack will be 15 ft. in diameter. Each boiler will be equipped with a Babcock & Wilcox superheater. Special foundations had to be provided for the station and stack on account of their height and comparatively small base area. The boiler plant was set on two concrete mats, each 36 ft. x 88 ft. and 6 ft. in depth. These mats rest on 400 Raymond concrete piles.

It is hoped that when this addition to the station is in operation, it will be possible to generate 1 kw.-hr. of alternating current at the switchboard for less than 1.6 lb. of coal, using coal containing 14,600 B.t.u.

The power station extension was designed by Dwight P. Robinson & Company, but the work of erection and the concrete work are being done by the Boston Elevated Railway with its own forces and by sub-contracting.

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Track Reconstruction on South Clinton Street, Showing Pouring of Concrete Paving Foundation

North Street Improvement, Showing Track Drain, and New and Old Pavement

Features of 1922 Trackwork in Rochester

New York State Railways Makes Extended Use of Machinery in Track Construction and Reconstruction—The Past Year Was a Busy One in the Way Department

CONSIDERABLE construction work was done on the Rochester lines of the New York State Railways last year under the supervision of Horace A. Abell, engineer of way and structures. The principal work outside of extraordinary maintenance was as follows:

Reconstruction, South Clinton Street from Court to Monroe	625 ft.
Extension of North Clinton line, Norton to Ridge Road	4,800 ft.
Reconstruction, North Street, Main to Central	3,960 ft.
Reconstruction, Main Street, Culver to Winton	9,940 ft.
Addition of double-track connecting curves, Franklin and North	250 ft.
Replacement of light T-rail with 70-lb. T-rail on Charlotte line	4,500 ft.
Temporary tracks for detour, Main and Caledonia	700 ft.

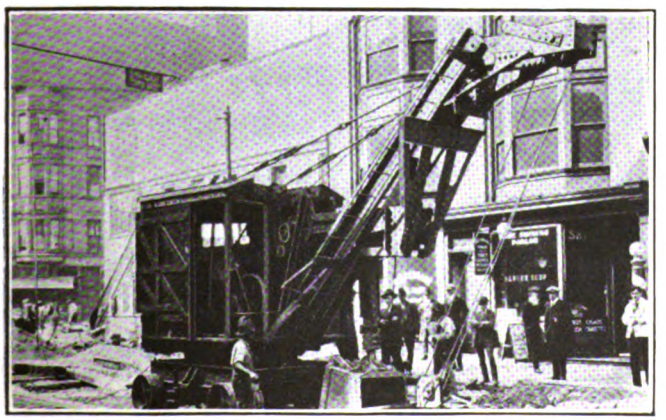
While there was no one outstanding feature in this program, there were a number of detail features which are of interest. The following notes have been prepared, therefore, to answer such questions as would arise in the mind of a way engineer were he visiting this well-administered property.

The new tangent track in all instances was that as shown in the accompanying cross-section, consisting of 7-in. T-rail, wood ties and crushed stone ballast. A mechanical joint, consisting of an Abbott plate and standard bars with 1-in. high-elastic-limit drive-fit machine bolts, was used. This joint has proved very satisfactory under the track and traffic conditions in Rochester. The bonding was done with Electric Railway Improvement Company brazed bonds 5½ in. to 30 in. long.

This type of track construction has been standard in Rochester for more than ten years, but slight departure made this year was the omission of tie rods and the tilting of the rails inward at a slope of 1 to 20 by adzing the ties. So far this procedure seems justified, as the wear from the wheels takes place in the center of the ball of the rail.

A feature in the design of the pavement which is a departure from previous practice is the omission of grooved rail block along the gage side of the rail. The sandstone paving block and brick are laid under the head of the rail. This permits of better bonding of the paving bricks or sandstone blocks, and makes a neater job. This construction is also believed to be better for vehicular traffic. A new type of track drain was used this year also. This provides a catch basin underneath the track. Its surface appearance is shown in one of the illustrations.

The South Clinton Street work was a short job, done under traffic. The annual maintenance on this short piece of track had always been exceedingly high. The



Electric Shovel at Work on North Street Job

Dump Cars in Work Train—Portable Forge at Left

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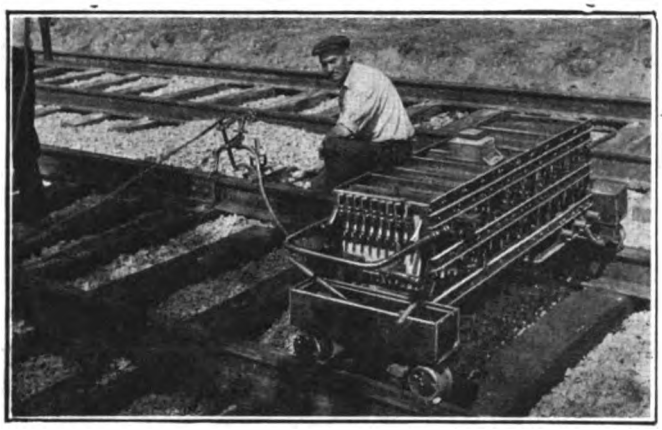
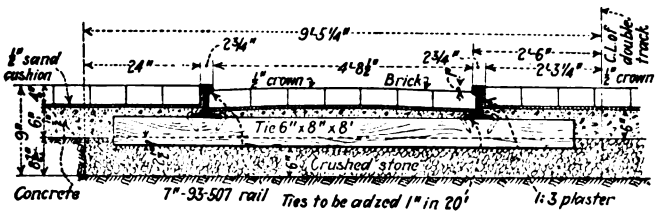


Resistance Type of Equipment Used in Rail Bonding

Track and Pavement in North Clinton Street Extension

wood block with which it was paved had never been satisfactory and the half-groove rail, laid in 1906, although not entirely worn out, caused many derailments when not exactly to gage. The new rail used on this job was L.S. section 93-507, and the pavement sandstone block.

The North Clinton Street job was a double-track extension from the old loop terminal at Norton Street to a new loop about half a mile directly northward, the old loop being left in place. Because of the lighter traffic anticipated over this line a 70-lb., 7-in. T-rail, L.S. section 70-267, was adopted, the joints being stand-



Standard Track Construction for High T-Rail with Brick Pavement

ard eight-hole bars with 1 in. drive-fit bolts. An Abbott plate was used under each joint. Brick pavement was laid in this track.

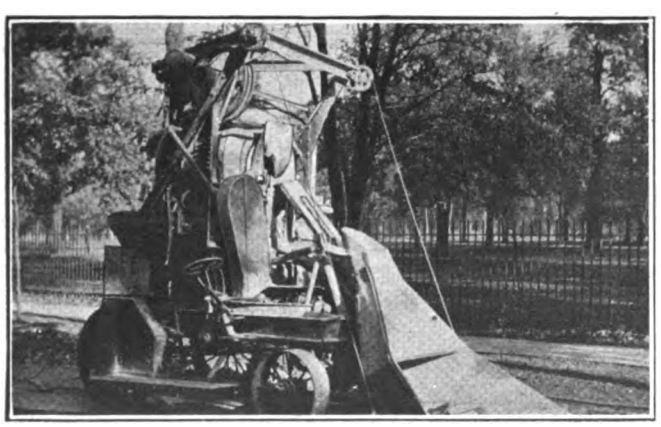
The North Street track had been in service since 1901 under fairly heavy traffic. The old rail was L.S. section 91-350, a 7-in. grooved rail. The old joints were of the electric-weld type, and wood ties and gravel ballast had been used. The new rail is L.S. section 93-507, with sandstone pavement. One track at a time was relaid, the car service on this track being rerouted to another street when necessary. A feature of the work was raising the entire track about 2 in. so that the city could place asphalt pavement outside the legal width without disturbing the old sandstone.

In connection with the North Street improvement, double-track connecting curves were built connecting North Street, southbound, with Franklin Street, westbound. This was to provide for the rerouting of the Hudson and Allen line, thus bringing it within a short distance of the business center. It was necessary to set the curb back at this location. Seven-inch, 140-lb. A.E.R.A. guard rail was used, with iron-bound and hard-center construction. The spirals were A.E.R.A. standard switch spirals. This company has adopted the 5.3 and 10.0 spirals as standard.

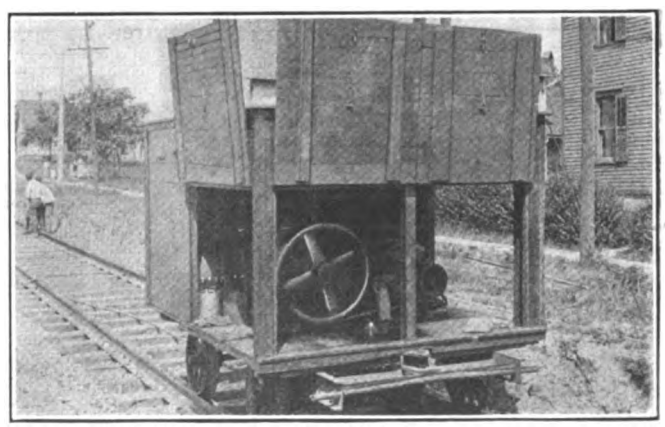
The largest reconstruction job this year was that on East Main Street. The old construction was open track on the side of the street, using 70-lb. A.S.C.E. T-rail. The new construction is standard paved construction in the center of the street. In this case the new track was constructed without disturbing the old one, thus taking care of the regular traffic and the work-train service. Brick pavement was laid on this job.

As the 70-lb. T-rail removed from Main Street was not badly worn, although it had been installed in 1907, it was used to replace a lighter-weight T-rail in open track on the Charlotte line, which rail had been in use since 1888.

The excavation on all the reconstruction work done this year was made with a ½-yd. Thew electric shovel. A Koehring ½-yd. electrically operated concrete mixer was used, and the tamping was done with an Ingersoll-Rand four-tool pneumatic tie tamper. Automatic dumping work cars made by the Differential Car Company were used in handling material.



Type of Concrete Mixer Which Is Used on All Construction in Rochester



Four-Tool Pneumatic Tie Tamper Used in East Main Street Construction

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Reducing Lubrication Costs

Methods of Lubrication and Amount of Lubricant Used on Various Types of Motor and Journal Bearings on the Rolling Stock of the Northern Texas Traction Company and Tarrant County Traction Company, Fort Worth, Tex.

By H. M. Robinson

Mechanical Engineer Northern Texas Traction Company, Fort Worth, Tex.

IN THIS description of methods used by the Northern Texas Traction Company for lubricating armature, axle and journal bearings specific information will be given regarding the amount of lubricant applied to different bearings, the interval between lubrication and the methods used for applying the lubricant.

The electric car oil used by the Northern Texas Traction Company is furnished by the Pierce Oil Corporation. It is a straight mineral oil, the summer grade being used about seven months of the year and the winter grade for the remaining five months.

The cost per thousand car-miles for the three divisions of the company is shown in the accompanying graphs, Fig. 2. This includes all lubricants for rolling stock, including trolley wheel and air compressor lubrication, over a period of twenty-six months. The record for the twelve months, September, 1920, to August, 1921, is typical of the experience before the installation of the present methods of lubrication. The graphs for the fourteen months from September, 1921, to October, 1922, show the results obtained in reduced costs by the present system and schedule of lubrication.

Fig. 1 shows the cost of rolling stock lubrication per thousand car-miles for all divisions and includes trolley wheel and air compressor lubrication for the twenty-six months, September, 1920, to October, 1922, inclusive. There is a decided reduction in the lubrication costs under the present schedule of lubrication, the city division averaging between 8 and 9 cents per thousand car-miles, the Fort Worth-Dallas Interurban averaging between 21 and 22 cents per thousand car-miles, and the Fort Worth-Cleburne Interurban averaging between 20 and 21 cents per thousand car-miles.

When it was decided to tackle the problem of reducing lubrication costs our first step was to advise the car oilers as to what we intended to do. A schedule of lubrication was laid out and the oilers were fully instructed as to the proper method of packing each type of bearing. Previous to this time, the oilers used their own discretion as to the amount of lubricant that should be applied to any bearing. The oilers were also given new Acock oil cans, manufactured by the Handlan-Buck Manufacturing Company, St. Louis, Mo., and new Alemite grease guns, manufactured by the Bassick Manufacturing Company, Chicago, Ill., and they were instructed to apply to the various bearings the amount of lubrication as called for in the schedule. If in the oilers' opinion the schedule required varying they were instructed to notify the foreman in charge, and the foreman acted according to the circumstances.

One big thing was to find out how much lubricant was needed for each type of bearing, so that it would

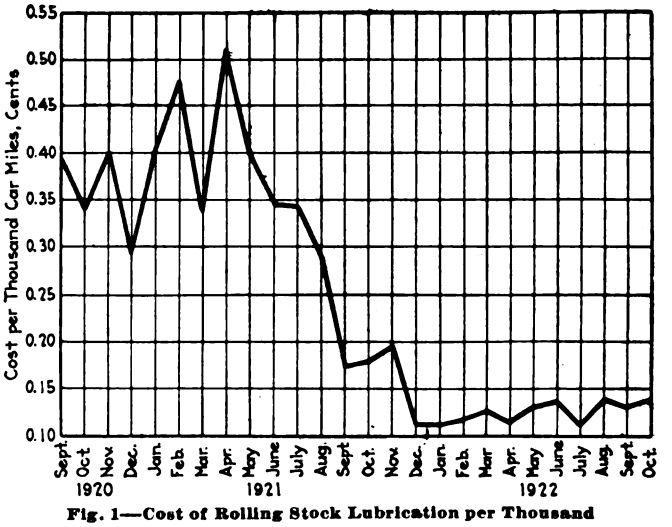

Fig. 1—Cost of Rolling Stock Lubrication per Thousand Car-Miles for All Divisions

be well lubricated from one inspection to the next. This was determined upon by experimenting. In order to play safe, we allowed enough lubricant per bearing so that it could run about 200 car-miles more than it was supposed to run between inspections.

After the amount of lubricant was determined upon, it was necessary to supply the oilers with a device that would accurately measure the quantity and deliver the lubricant direct to the bearing. The Acock oiler, with a few modifications to suit our particular purpose, solved the problem.

The oil is delivered to the motor and axle bearings of all motors by means of a 1-gal. capacity Acock

AMOUNT OF OIL NEEDED FOR CARS ON REGULAR INSPECTION
FORT WORTH DIVISION (CITY CARS), NORTHERN TEXAS TRACTION COMPANY, FT. WORTH, TEX.

Car Numbers	Type Motors	No. of Motor Bearings	Amount of Oil for All Motor Bearings	No. of Axle Bearings	Amount of Oil for All Axle Bearings	No. of Journal Bearings	Amount of Oil for All Journal Bearings	Total Amount of Oil to Be Issued for Hose Can for This Type Car	Total Amount of Oil to Be Issued for Journal Can for This Type Car
67 to 77 inclusive....	GE 54, 81	8	4 gills	8	4 gills	8	6 gills	2 pints	1½ pints
80 to 91 inclusive....	GE 203	4	3 gills	4	3 gills	8	6 gills	1½ pints	1½ pints
120 to 129 inclusive..	GE 81	4	2 gills	4	2 gills	4	4 gills	1 pint	1 pint
130 to 175 inclusive..	GE 54, 52, 81	4	2 gills	4	2 gills	4	4 gills	1 pint	1 pint
204 to 207 inclusive..	GE 219	4	3 gills	4	3 gills	8	6 gills	1½ pints	1½ pints
203 and 208.....	GE 52, 54	8	4 gills	8	4 gills	8	6 gills	2 pints	1½ pints
213 to 235 inclusive..	GE 219	4	3 gills	4	3 gills	8	6 gills	1½ pints	1½ pints
236 to 239 inclusive..	GE 203	4	3 gills	4	3 gills	8	6 gills	1½ pints	1½ pints
240 to 249 inclusive..	GE 201	4	3 gills	4	3 gills	8	6 gills	1½ pints	1½ pints
501 to 550 inclusive..	GE 258	4	grease	4	2 gills	4	grease	.....	½ pint
551 to 585 inclusive..	GE 258	4	grease	4	2 gills	4	2 gills	.....	1 pint

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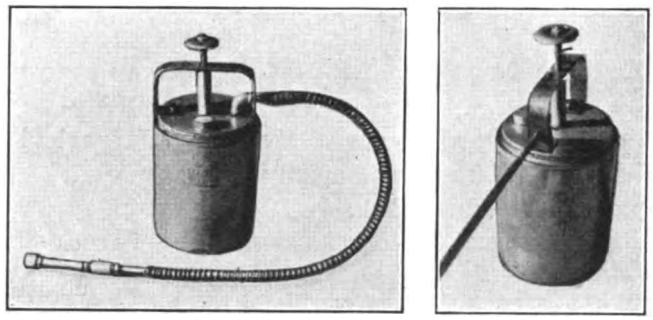

Left—Positive Oil Can with Hose Connection for Lubricating Armature and Axle Bearings. Right—Positive Oil Can with Connection for Oiling Journal Bearings

positive oil can, having a rubber hose 6 ft. long. At the delivery end of the hose is a check valve so built that the oil will flow through the check valve only when pressure is applied to the piston of the oiler, otherwise the oil would run out and be wasted. One push downward on the piston of this positive oil can delivers ½ gill of oil to the bearing.

The same type of can is used for journal oiling but this has a ⅛-in. pipe 12 in. long with three holes spaced respectively 1, 2 and 3 in. from the extreme end of the pipe, so that the oil will be delivered over the entire length of the journal.

Previous to the use of this system of lubrication, the oilers were allowed to take whatever quantity of lubricants they thought they would need for their day's work. As the oilers were not required to account for the lubricants used, the method was wasteful and loose.

All rolling stock on this property was also divided into groups, depending on the type of motors used. The quantity of car oil necessary to lubricate one car in each group was determined and this was further divided to indicate how much of the oil should be used out of the journal oiling can and how much should be used out of the motor and axle bearing oiling can or, as we commonly say, "the hose can."

This classification is as shown in the accompanying table. In the afternoon, when the master mechanic's office makes up the list of cars which will be inspected the next day, the clerk also makes up a lubrication requisition, calculated from the table. The next morning the oilers receive from the storeroom the exact amount of lubricants called for by the requisition. The oiler is expected to lubricate all cars on regular inspection with the lubricants given to him. If he does not do so he is called on by his foreman to explain. Of course, if the oiler requires extra lubricants for some extra work, other than the regular inspection cars, another requisition is issued to the oilers for the extra lubricants required.

The table shown is for the city division and similar tables are in use by the two interurban divisions, and the oilers are controlled in the same manner.

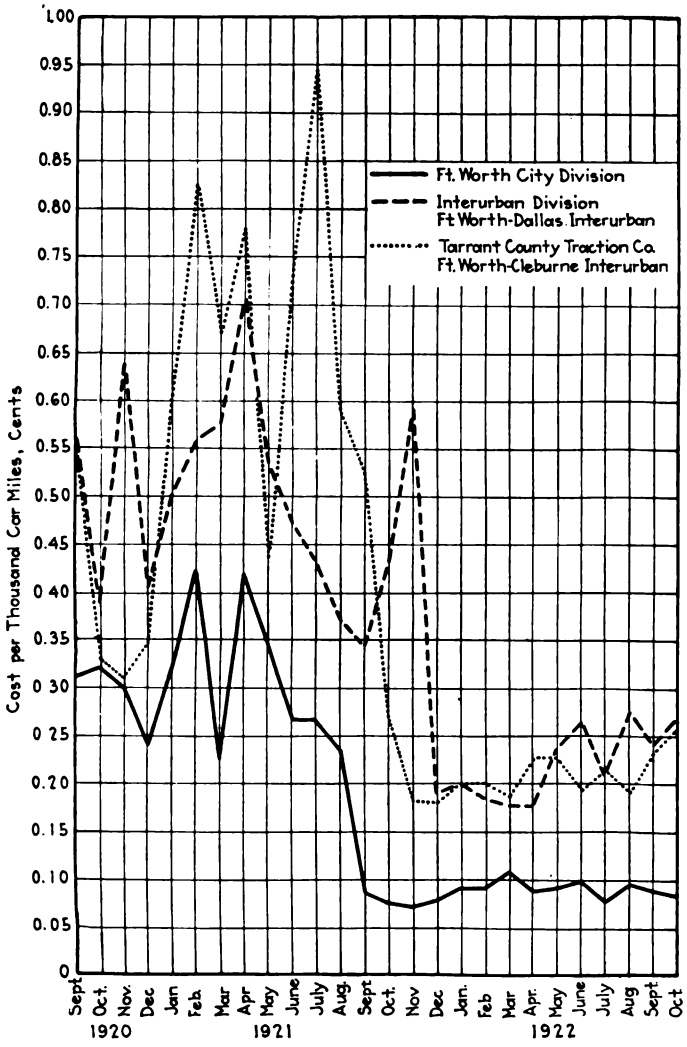

Fig. 2—Cost of Rolling Stock Lubrication per Thousand Car-Miles by Divisions

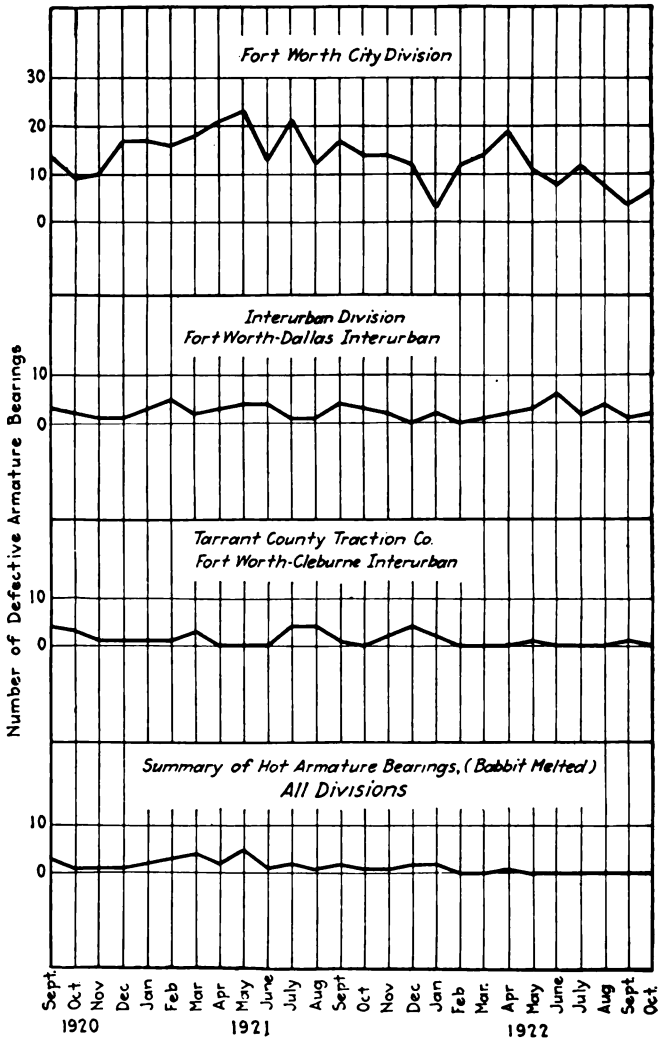

Fig. 3—Summary of Armature Bearing Troubles by Divisions and Chart of Hot Armature Bearings for All Divisions

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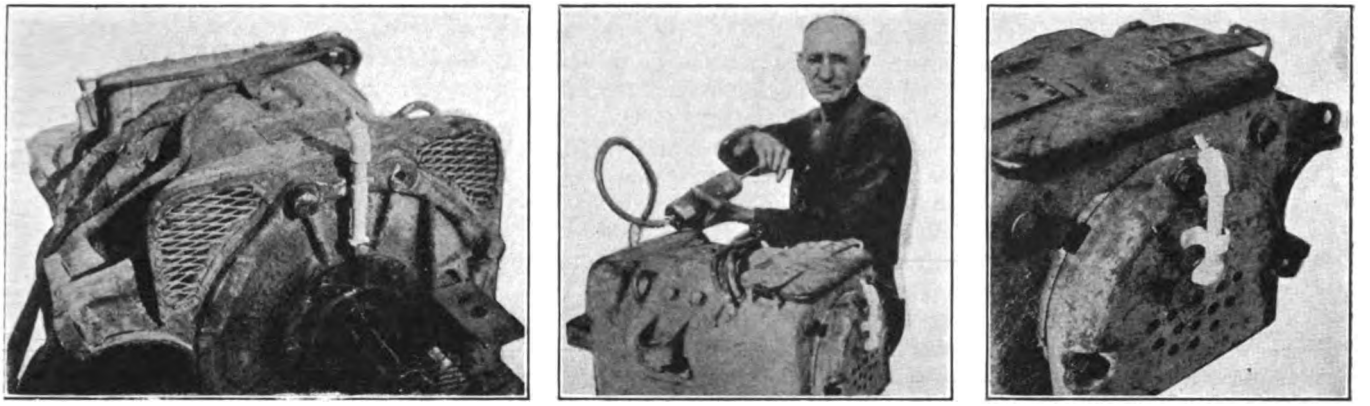

At Left, Pinion End Lubrication Connection for GE-258 Motor. In Center, Lubricating a Motor by Means of the Grease Gun. At Right, Commutator End Lubrication Connection for GE-258 Motor

The new system of lubrication has been in effect on the Fort Worth city division since September, 1921, on the Fort Worth-Dallas interurban since December, 1921, and on the Fort Worth-Cleburne interurban since October, 1921, and has shown a decided saving. The company now spends about $1,000 a year for rolling stock lubricants instead of $3,000 a year, as under the old system, thus effecting a direct saving of about $2,000 per year.

Another saving has resulted from the decreased amount of work thrown on the mechanical department, due to hot bearings, armatures rubbing the pole faces, etc., and it is significant that since the present system of lubricating has been in effect the number of bearing failures of all kinds has decreased materially. This is shown by the graphs in Fig. 3, which are typical. Better service has resulted from the elimination of hot boxes, and no one can estimate the value of this in dollars and cents.

The costs per thousand car-miles, as given in the graphs, are calculated from the costs of all lubricants used on the rolling stock, which includes electric car oil, air compressor oil, compressor grease, and gear lubricant. The costs per thousand car-miles does not

Oiling Schedule for Cars of the Northern Texas Traction Company

MOTORS—CITY CARS

GE-52 and GE-54 Motors

ARMATURE AND AXLE BEARINGS

Packing—Take a piece of wool felt 2 in. square by ⅝ in. thick, and split it for 1¼ in. Place the ⅝-in. end in the slot in the shell so that it touches the shaft and bend the wings of the felt over the bottom of the shell. Place a layer of wool waste about 1 in. thick on top of the felt wings, then pack the remainder of the box with cotton waste, leaving room at the top for a piece of wool felt, which should fit tightly in the top of the box. Leave about ¼ in. from the top of the box to the top of the felt, as this space is necessary for the oil.

Oil—Oil on a basis of 1,000-car-miles for regular inspection, using ¼ gill of car oil to each armature and axle bearing.

GE-81 Motors

ARMATURE BEARINGS

Packing—Pack entirely with wool waste.

Oil—Oil on a basis of 1,500 car-miles for regular inspection, using ¼ gill of car oil to each armature bearing.

AXLE BEARINGS

Packing—Pack exactly the same as the bearings on GE-52 and GE-54 motors.

Oil—Oil on a basis of regular inspection every 1,500 car-miles, using ¼ gill of car oil to each axle bearing.

GE-219 Motors

ARMATURE BEARINGS

Friction, Side Feed

Packing—Pack entirely with wool waste.

Oil—Oil on a basis of regular inspection every 1,500 car-miles, using ½ gill of car oil to each armature bearing.

AXLE BEARINGS

Friction, Bottom Feed

Packing—Pack entirely with wool waste.

Oil—Oil on a basis of regular inspection every 1,500 car-miles, using ½ gill of car oil to each axle bearing.

GE-201 and GE-203 Motors

ARMATURE BEARINGS

Friction, Side Feed

Packing—Pack entirely with wool waste.

Oil—Oil on a basis of regular inspection every 2,000 car-miles, using ½ gill of car oil to each armature bearing.

AXLE BEARINGS

Friction, Side Feed

Packing—Pack entirely with wool waste.

Oil—Oil on a basis of regular inspection every 2,000 car-miles, using ½ gill of car oil to each axle bearing.

GE-258 Motors

ARMATURE BEARINGS

Ball Bearing

Oil—At the beginning make sure that the bearings are full of compression grease. Then thereafter at each regular inspection (2,000 car-miles) give the grease gun four complete turns to each bearing, thus injecting ½ ounce of grease into the bearing. This ½ ounce of grease replaces the amount of grease that leaks out or is used up between inspections.

AXLE BEARINGS

Friction, Side Feed

Packing—Pack entirely with wool waste.

Oil—Oil on a basis of regular inspection every 2,000 car-miles, using ¼ gill of car oil to each axle bearing.

INTERURBAN MOTORS

WH-56 Motors

ARMATURE BEARINGS

Packing—Place a piece of wool felt ⅝ in. thick over the bearings. This is fitted into a slot in the shell so as to remain in place. Place a layer of wool waste about 1 in. thick over the bottom of the box, then pack the remainder of the box hard with cotton waste, leaving room at the top for a piece of wool felt which should fit tightly in the top of the box. Leave about ¼ in. from the top of the box to the top of the felt, as this space is necessary for oil.

Oil—Use ¼ gill of car oil once every twenty-four hours on each armature bearing.

AXLE BEARINGS

Packing—Same as armature bearings.

Oil—Use ¼ gill of car oil once every twenty-hour hours on each axle bearing.

WH-76 Motors

ARMATURE AND AXLE BEARINGS

Packing—Same as WH-56 armature and axle bearings.

Oil—Use ¼ gill of car oil to each armature and axle bearing once every forty-eight hours.

GE-73 and GE-240 Motors

ARMATURE BEARINGS

Friction, Side Feed

Packing—Pack entirely with wool waste.

Oil—Oil on a basis of regular inspection every 1,500 car-miles, using 1 gill of car oil to each armature bearing.

AXLE BEARINGS

Friction, Side Feed

Packing—Pack entirely with wool waste.

Oil—Oil on a basis of regular inspection every 1,500 car-miles, using 1 gill of car oil to each axle bearing.

JOURNAL BEARINGS

City Cars

FRICTION BEARINGS

Friction journal bearings are oiled at each regular inspection of the car according to the needs of the box, but not more than ¼ gill of car oil should be put on each side of the journal bearing at one oiling.

BALL BEARINGS

Grease at each inspection of the car every 2,000 car-miles. Force grease into the box until grease shows up at the plug hole at the top of the box.

On the average 2 ounces of grease at each inspection will replace the grease that leaks out or is used up.

Interurban Cars

FRICTION BEARINGS

Pack with wool waste. Oil at each regular inspection according to the oilers' discretion, but not more than ½ gill of car oil should be put on each side of the journal bearing at one oiling.

GEARS

City Cars

Gears on all types of city equipment are examined at each regular inspection and from 3 to 4 ounces of gear lubricant is applied.

Interurban Cars

Gears are greased at each regular inspection according to needs, but not more than 6 ounces of gear lubricant is applied at one time.

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include the cost of wool packing, felt, cotton packing, or the labor necessary to do the oiling.

The Fort Worth city division averages more than 500,000 car-miles per month, the Fort Worth-Dallas interurban averages more than 150,000 car-miles per month, and the Fort Worth-Cleburne interurban averages more than 40,000 car-miles per month.

The method used and schedule of oiling for the city and interurban cars on this property is given on page 121.

In repacking the city and interurban cars on this property, the packing is pulled out of all armature, axle, and journal bearings. It is then culled over and the best is used in repacking journal boxes. If there is not sufficient good old packing with which to repack the journals, the deficiency is made up by using new wool packing in the journals.

When repacking journal bearings, care is taken that none of the waste hangs out of the box, as waste in this position acts as a wick and will drain the oil out of the box. All motor and axle bearings, with exceptions as noted, were repacked with wool waste made by O'Neal Brothers, Inc., Philadelphia, Pa. The wool waste is soaked twenty-four hours and drained twenty-four hours, thereby leaving approximately 3 pints of oil to each pound of waste.

Cotton waste is soaked twenty-four hours and drained twenty-four hours. Felt is soaked twenty-four hours and drained until used, as felt will retain the oil even when left on the drain board for ten days.

In repacking armature and axle bearings with wool packing, the packer is careful to pack the waste moderately tight into the bearing, up against the revolving part of the axle. If the waste is not tightly packed it will settle away from the revolving part and cause a stoppage of the oil from the bearing.

Accompanying illustrations show the system adopted for greasing the ball bearings of our GE-258 motors. This is a modification of the Alemite lubricating system. Grease connections are added to each end of the motor as shown. These are raised high enough so that the grease gun can be applied easily through the trap-doors of the car.

Nitrogen-Filled Transformer Case

A NEW principle in transformer design has been incorporated in a 25,000-kva. bank of power transformers under construction by the Westinghouse Electric & Manufacturing Company for the Middle West Power Company, Sargent & Lundy, consulting engineers. The new principle consists in filling the transformer case above the oil level with nitrogen. This is produced in an automatic generator attached directly to the transformer tank. The generator keeps the space above the oil level always full of the protective nitrogen.

The protective layer of inert gas above the oil level acts as a cushion or buffer to take the shock of any sudden pressures that develop under the oil level if there should be a short circuit or any defect in the transformer windings. The gas is easily compressed and it is enough of a buffer to take the brunt of the explosive pressure and save the tank from injury. The inert gas protects the oil against both air and moisture, and claims are made that oil used under the nitrogen will even improve with age.

The transformers for this Illinois installation will be the first of this type to be built.

The Readers' Forum

Progress and Prospects in Electric Railway Engineering

THE CLEVELAND RAILWAY COMPANY
CLEVELAND, OHIO, Jan. 10, 1923.

To the Editors:

Referring to your review in the Jan. 6 issue it seems to me that during the past year no particular instance of greater advancement is found than that accompanying the development and adoption of automatically controlled substations and water-wheel plants. This type of equipment has reached a point of perfection where its reliability is no longer questioned, as is shown by the serious consideration being given to it by a number of the large properties where continuity of service is the prime necessity.

The coming year should witness a much greater development and corresponding increase in the number of installations, particularly because the issues involved in the adoption of such equipment are much better defined and more generally understood than heretofore.

There has also been evidenced, during the year, a tendency toward determination of standards regarding systems for use in electrification of steam railroads of various types. This is, indeed, significant, and it is hoped that progress will continue along these lines, removing the many differences of opinion existing, so that much greater activity may be registered in this particular field in the very near future.

Electric power at lesser cost is of vital importance to the industry as a means of meeting increasing competition. There are several methods which are now being utilized with more or less success for the production and distribution of small blocks of power. Reference is made to the possibility of utilizing numerous small automatic water-wheel plants, located upon unnavigable streams, all plants being arranged to feed into a common transmission system. Further development of the mercury arc rectifier or the vacuum tube may be possible also, rendering these devices applicable to conversion of energy on a larger scale and at a reduction in cost over present methods.

L. D. BALE,
Superintendent of Substations.

Nickel-Chrome Steel for Special Trackwork

NEW YORK, Jan. 15, 1923.

To the Editors:

I have read with interest the engineering review appearing in the issue of the ELECTRIC RAILWAY JOURNAL for Jan. 6. There is just one point in connection with this review where I see a possibility of a misleading impression being given, namely, in the paragraph where the use of nickel-chrome steel in special trackwork is referred to.

It seems to me that the installations of this steel are so far entirely of an experimental character and represent an endeavor to prolong special trackwork life by means of repairs through welding. Not sufficient of this work has been in use long enough to determine its ultimate life and the maintenance cost in comparison with manganese steel and other constructions.

"ENGINEER."

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Equipment Maintenance Notes

Dayton City Railway Remodels Cars for One-Man Operation

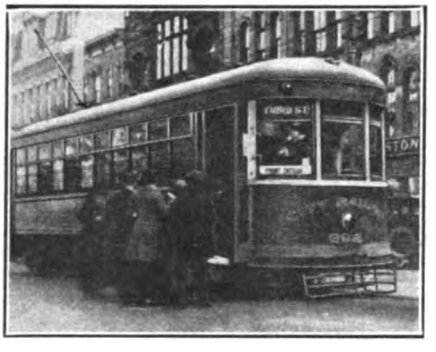
The Program for Reconstructing Double-Truck Cars for One-Man Operation Will Require an Expenditure of Approximately $175,000—Some New Trucks and Motors Will Be Used

THE City Railway of Dayton, Ohio, is remodeling all of its old double-truck cars for one-man operation. There are fifty-six of these cars and they can be classified into four general types. In the first class are fifteen class 100 double-truck cars built by the Barney & Smith Company of Dayton, Ohio, in 1906. These cars have Barney & Smith class I maximum traction trucks and two GE-57 type motors. The cars weigh approximately 34,000 lb., and have cross seats, with an aisle 20 in. wide, which is too narrow for present service conditions. The cars also have Cooper hot water heaters.

In the remodeling of these fifteen cars the trucks and motors are being retired, and in their place will be used fifteen equipments of 0-36 Standard Motor Truck Company's maximum traction trucks each equipped with two Westinghouse No. 306 motors. These trucks and motors are at present in use under some steel cars which will also be remodeled, as referred to later.

In order to obtain an aisle of greater width the seating arrangement is being changed. Six cross seats are removed from the right-hand side looking forward and six from the left-hand side in the rear. Longitudinal seats are installed in their place for the same distance as was occupied by the cross seats. This gives a staggered seating arrangement with cross seats opposite each longitudinal seat and so gives a much greater aisle width. As Gold electric heaters are to be used in place of the hot water heaters, the hot water heater and the front bulkhead are removed and two additional cross seats are added on the forward left-hand side, in place of a short longitudinal seat which was necessary with the old arrangement. The old seating arrangement provided a seating capacity of forty-eight, and a very small additional standing room on account of the narrow aisle. With the new arrangement the seating capacity will be the same, but there will be considerably more standing room.

A turnstile is installed on the rear platform, and as these cars are arranged for single-end operation with narrow platforms at the rear, additional seats cannot be installed on them. The folding doors used are operated by National Pneumatic Company's standard equipment,



Car Remodeled for One-Man Operation in Service in Dayton

which is controlled by the operator from the front end of the car. Other equipment and appliances are the same as for the new cars recently placed in service, and described in the ELECTRIC RAILWAY JOURNAL for Oct. 28, 1922. The total weight of the cars as remodeled will be approximately the same as previously. The different type of truck decreases the weight somewhat, but the additional equipment installed just about makes up for this.

NEW TRUCKS AND MOTORS WILL BE USED

The second class of cars being remodeled consists of twenty all-steel cars which have Standard 0-36 trucks. Trucks from fifteen of these cars will be used under the class 100 Barney & Smith Company's cars just referred to. New trucks will replace these, which are made by the Cincinnati Car Company and consist of its standard arch-bar combination elliptic and coiled spring type of truck. Each truck has two GE-264 motors, which give a total of four motors per car. The cars have K-35-HH control and Westinghouse air brakes. The roofs of these cars consisted of steel over cork. This type of construction has not proved satisfactory, as the roof has deteriorated after being in service only ten years. New wooden roofs will be placed on these cars. The other five cars of this class will retain their present trucks and equipment but will be completely overhauled and will have new roofs, new brake rigging on the trucks and will have the additional equipment such as heaters, mirrors, buzzers, fare boxes and the like installed, as required for one-man operation.

The turnstiles used on these cars are mounted just inside the body in a position quite similar to that on the new cars previously referred to. Originally these cars had a rear drop platform. This is rebuilt so as to bring the platform floor flush with the car floor. A small well is retained with an exit step and passenger seats are provided around the end.

The former seating capacity of these cars was forty-four. By eliminating a short longitudinal seat where the turnstile is installed and by adding seats on the rear platform a seating capacity of forty-six is obtained. The former weight was 32,000 lb. By substituting the arch-bar truck with four 25-hp. motors of the Standard 0-36 trucks and Westinghouse No. 306 motors, and by replacing the hot air heater with electric heaters, a saving in weight of 4,000 lb. is obtained, so that the remodeled cars will weigh but 28,000 lb.

The third class of cars being remodeled consists of ten steel cars, which are of a slightly different type than the second class. They are equipped with Standard 0-45 maximum traction trucks and Westinghouse No. 306 motors. The length of these cars is also different from the steel cars previously referred to. The reconstruction of these cars will require about the same work as for the other steel

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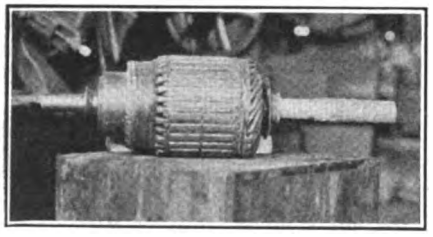
cars except that the original steel roof will be retained, as it is at present in fair condition and does not warrant replacing. All the equipment will be carefully overhauled and the rear platform will be built out and seats provided in a manner similar to that for the other steel cars.

The fourth class being reconstructed is eleven double-truck cars with wooden bodies. These are equipped with Standard 0-45 trucks and Westinghouse No. 306 motors. They are being rebuilt by the Oakwood Street Railway of Dayton in its shops for one-man operation with similar arrangement and equipment as described for the steel cars just mentioned. The old seating arrangement provided a capacity for forty-eight passengers. With the improvements this will be increased to fifty-two. Seven of these cars have already been completed and are now in service.

All material for this remodeling and reconstruction has been ordered and amounts to approximately $175,000. The work is progressing rapidly and it is thought that by March, 1923, the road will have 100 per cent one-man operation with as fine and up-to-date equipment as any similar road in the country.

Broken Compressor Shafts Welded Cheaply

BROKEN compressor armature shafts are not replaced but welded in the Elyria shops of the Cleveland, Southwestern & Columbus Railway. The breaks usually occur where the shafts have been turned to a smaller diameter to receive the pinion. The end of the broken shaft is turned to a point as is the practice with new stock, which is ¼ in. larger in diameter than the shaft. The armature is centered on the tail stock of a lathe with a rest under the shaft near the point to be welded and the new piece is centered and held in the chuck. The welding material is then melted into the V-shaped gap with a gas flame as the armature is slowly rotated.

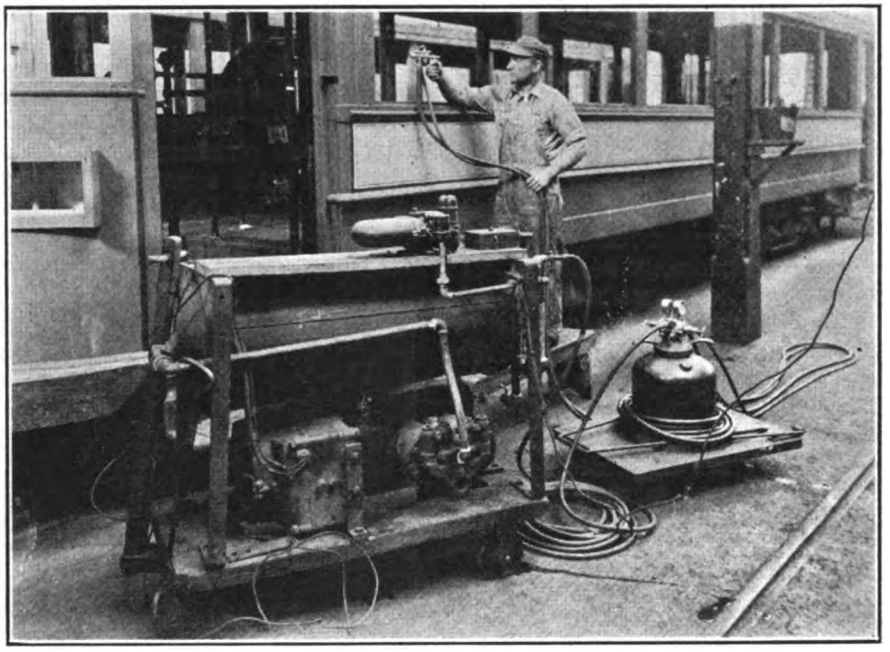


Broken Compressor Shaft Repaired by Welding

The cost of making such a weld alone is about $1 and it is estimated that the machining costs slightly more than $1. After the job is finished it is impossible to detect any sign of the weld. This same method is used whenever possible in repairing main motor shafts since the removal of the shaft would necessitate the stripping of the armature.

Home-Made Portable Compressor Outfit for Paint Spraying

THE accompanying illustration shows a portable compressor outfit constructed in the shops of the Grand Rapids (Mich.) Railway. It consists of a three-wheeled truck on which are mounted a compressor, air reservoir, governor and necessary switches, fuses and strainer.



Shop-Constructed Portable Compressor Outfit for Paint Spraying

The compressor is mounted directly on the wooden platform at the bottom and the air compressor reservoir is installed directly over this and supported by a strap-iron framework. A board on top of this framework serves for holding the governor and switch which is connected in the compressor circuit. As dry air is quite necessary for paint spraying, particular precautions have been taken in this respect, and a strainer is installed between the compressor tank and the connection to the paint-spraying equipment. The piping is also provided with a drain with a pipe connection at the bottom to form a pocket for receiving any water. The reservoir also has a drain cock at the bottom.

The electrical connections are made by having a lead from the compressor switch attached to a hook on a long pole so that this can be hooked over the trolley wire as desired. The ground connection is made by a flexible lead to a clamp which is attached to the track. All of the equipment used was obtained from a dismantled car. The arrangement is very compact and can be readily hauled about the shop by one man and can thus be placed in any location convenient for spray painting.

Good Scheme for Keeping Shop Neat

THE Fall River division of the Eastern Massachusetts Street Railway has considerably rearranged the maintenance shops at Fall River. Here light repairs are made, oiling is done, etc. In the pit shop where the inspection and light overhaul work is done a successful and economical plan of keeping the place looking neat is used.

The shop is divided into areas, and each man is assigned to one of these. It is his duty to see that the floor and equipment within his area are

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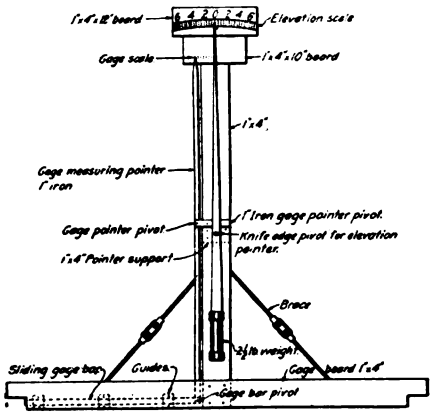
in first-class shape when work starts in the morning. The areas are not so large but that the cleaning up can easily be done during the fifteen-minute period allowed for this purpose in the morning. The work is done in the morning rather than at night because experience has shown that it is done better when the men are fresh rather than when they are tired at the end of the day's work and are anxious to get home to supper.

In order that there may be no difference of opinion as to the territory assigned to each man, a chart is posted showing the boundaries of each area and the name of the man assigned to take care of it.

Device for Gaging Track and Determining Elevation

HIGH-SPEED interurban roads require frequent inspections of curves to make certain that the track gage and elevation are within the limits desired. With the usual form of track gage and a common level, considerable stooping is necessary by the man doing the work, and various devices have been produced to make this inspection easier and less trying. Among the home-made devices used is one by C. S. Lusk, section foreman of the Erie Railroad, which was described in a recent issue of *Railway Maintenance Engineer*.



Combination Track Level and Gage Board

The device includes both a track gage and a level, and except for a few strips of iron and the bolts that are necessary for fastening the parts together, the machine is made of 1-in. x 4-in. boards, and weighs but 12 lb. An accompanying illustration shows the construction of this device, which consists of a wooden cross-piece or gage board with a vertical standard or upright fastened to this. Two pointers are mounted on the upright, one for measuring the elevation and the other for measuring the plus gage of the track. The gage board is notched at the end to fit the rail head and has a sheet-iron band to protect it from wear. On the back side of the gage board is a bar of iron which works in guides and has a movement along the gage board. The inside end of this bar is connected by a pivot to the vertical pointer. This pointer is pivoted at the center and by pulling the top end until the bar on the gage board engages the rail head a reading can be obtained of the number of inches as marked on the scale board.

The pointer for measuring elevation is approximately 4 ft. long and is kept plumb by a 2½-lb. weight attached to the lower end. In order to provide a pivot which will work without appreciable friction, the pivoting bolt is filed to a V shape and the hole in the pointer is bushed with a thin iron bushing. An elevation scale at the top enables the operator to read the elevation conveniently as soon as the pointer comes to rest. The scale is divided so as to show the elevation in inches.

Jones Gets Some Pertinent Pointers on Housekeeping

THE face of the machine shop foreman on the Jinxville Electric Railway property wore a frown that morning as he sauntered sullenly in front of the lathes where his men were turning up bearing shells for Westinghouse 69 and GE 73 motors. "S'matter, Bill, you're darn glum this mornin'. Anybody sick at home?" spoke out "Whistling Dick" Singer, one of the old timers who was a warm personal friend of Bill Jones, the foreman.

"Nothin' wrong at home, I'm glad to say, Dick, thanks. Fact is the boss just had me on the carpet about the looks of this here shop. He says it's a disgrace the mussy way the machines look. And the floor, he says, looks as if it hadn't been swept in a month. The old place looks good enough to me. You don't expect a railway machine shop to look like a front parlor on a Sunday mornin'."

"No, Bill, you don't, but I've wished for a long time you'd have the shop kept neater. I hated to mention it, for fear you'd think I was buttin' in. Fact is, Bill, you ought to change the way machines are used around this shop. Now, bein's the boys kind o' look up to me they've let me hang onto this 12-in. lathe right along. It's the only one in the place that's true. I can get good work out of it. I try to keep it clean and I keep that old box underneath to catch most of the turnings off those bearings. Most of the fellows, however, work on any one of the machines they need and they use it for a time, then shift to another one. They don't give a

rap whether they leave it lookin' neat or not. Say, you did a good thing when you put Ole Olson on that radial drill three months ago. That shows what having your own machine will do for a fellow. That guy loves that machine like a baby. He cleans it up every night; and did you notice he puts boards on the bedplate under the motor shells, so the bedplate won't get scored? Some careful lad, I'll say; but I believe it pays."

"Wait a minute, Bill," continued Dick, as Bill made as if to move on a little impatiently. "While I'm suggestin', if I was you I'd give each careful man a machine of his own as far as you can and make him responsible for it. Give him a word of compliment now and then if he keeps it neat. He'll take real pride in it, and the machine will last years longer. And say, Bill, jack that dago sweeper up so he'll take a little more care of the floor. I believe we'd all get more fun out of our work and do it better, too, Bill, if the place looked trimmer. Think it over. No offense, I hope, Bill?"

"Sure not, Dick, old top; you said something. Open your head whenever you feel like it, Dick. I've got to do something to please the boss, anyhow. Maybe you've got the right dope."

"By the way, Bill, the road's making a little money now. Wonder if you could get the boss to buy some new machines and get rid of these antiques. They take about three times as long to do a job as they ought to and it isn't right when you get done."

"I don't know, Dick. I might try the old man again, after we get the shop cleaned up so he'll be a little sweeter. Maybe he could get the G. M. to O. K. a purchase order now. Heaven knows we need some new machines. That's why I ain't had no heart to doll up these old relics."

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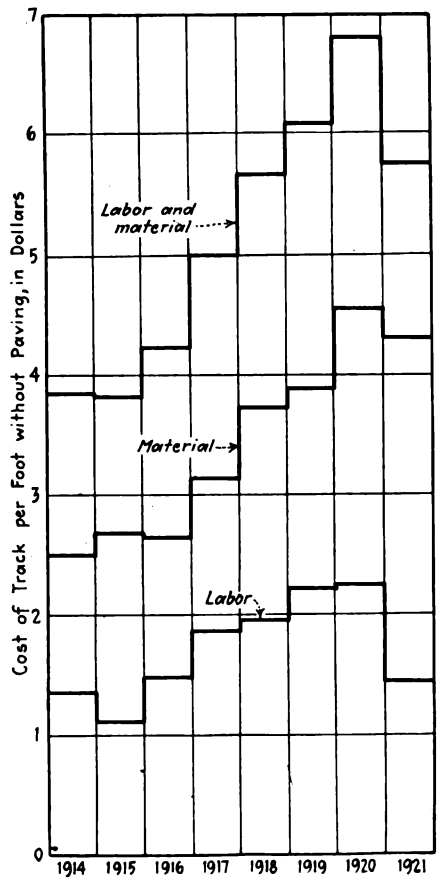
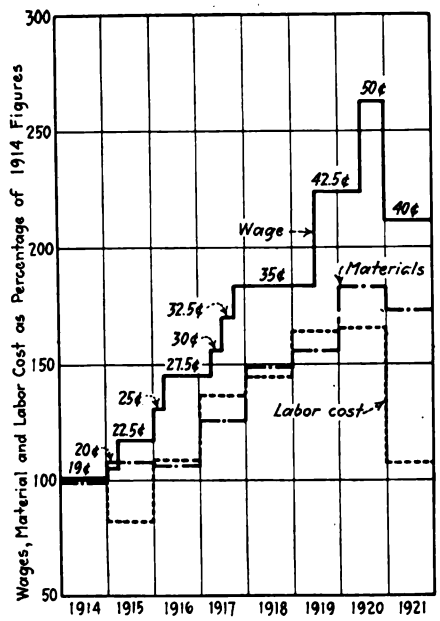
Labor-Saving Machinery Shows Economies

THE results of the use of labor-saving machinery, devices and methods in track construction by the Cleveland Railway are shown in the accompanying charts. One graph is based on the actual cost per foot of track construction, and the other shows the percentage change in the wage scale and material and labor costs by years since 1914. The latter curve indicates that the employment of labor-saving methods and machinery helped materially to hold the labor costs within reason in spite of a rapidly mounting wage scale. The curve also indicates that the labor costs as an average over the entire period were held down to about the same increases as took place with materials. While little could be done to reduce materials expense, it is seen that the utilization of new devices as they were developed was effective in smoothing the wage scale peaks from the labor cost.

Present-day Cleveland track reconstruction tactics include the use of plows for tearing up paving. This method has eliminated the necessity of employing a large gang of men



The Labor Item in Track Construction Has Been Reduced by Use of Modern Equipment



Actual Labor and Material Costs for Track Construction in Cleveland

and as a result has reduced that item of cost from a considerable to a negligible proportion of the total. Cutting out old rail with gas torches has likewise been a great aid in saving labor and time. The further economies are largely the benefit derived from the use of larger and better equipped work trains, steam shovels, concrete mixers, gravel conveyors, etc.

Nicks in Trolley Wire

MANY linemen have a custom of nicking the trolley wire when they wish to renew a frog, crossing or other casting supported from it. This is usually done with their pliers so as to mark the exact location of the old casting and to permit installing the new one in the same place.

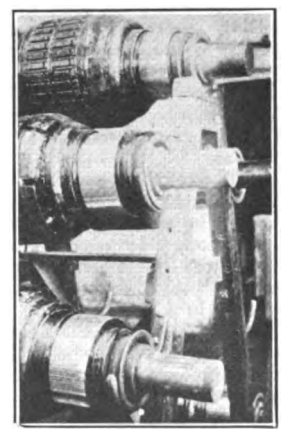
This is bad practice and should not be permitted. Copper wire is weakened greatly by a very small nick or even a scratch and is much more liable to break where it has been nicked than at any other place. Copper wire manufacturers have experienced difficulty from this and when copper wire is tested at the mill the manufacturer insists that the inspector take samples for testing from a point several feet from the end of the reel, preferring to scrap a number of pounds of wire rather than to take the chance of getting a poor sample that has been damaged by scratches when being coiled on the reel.

While this nicking is detrimental to any copper wire, even if soft-drawn or alloyed, it is most harmful to hard-drawn wire, which is the kind used for trolley wire on all roads except those using some of the special alloyed wire. The "skin" of a hard-drawn wire is much harder and stronger than a like area of the same wire inside of this outer coating, and once the hardened portion has been cut through, the wire beneath is but little stronger than soft-drawn wire.

The fact that the nick comes just where the casting is attached to the wire results in the wire being weakest just where it is exposed to the greatest stresses. Most of the vibration of the wire must be absorbed at the castings because of the change from the more or less flexible trolley wire to the rigid casting. The results of the practice of nicking the wire are therefore to reduce greatly the life of the wire and to increase liability of breakage.

Solid End Armature Bearings

THE accompanying illustration shows a type of solid end armature bearing which has been used by the Spokane United Railways for several years and has proved very satisfactory. Trouble was experienced with the usual type of open-end bearings due to the impossibility of keeping sand, grit and like substances out of the bearing and to the difficulty of keeping the oil in. The new type of bearing now used is cast



Solid End Armature Bearings. At Top—Old Type. In Center and at Bottom—New Solid End Type

with a solid end and results show that these require to be re-oiled only about once every 900 miles, whereas the old type required attention about every four days with less than half the mileage. A type of bearing with a screwed-in end was tried, but this also was found unsatisfactory.

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New Type Passimeters in New York

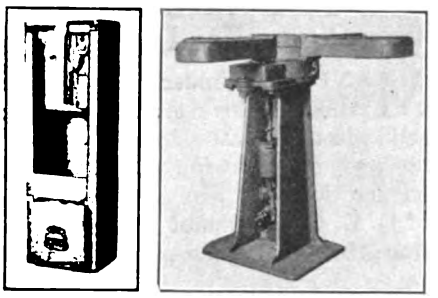
Automatic Passimeters with Coin Box Have Been Tried Out in the Subway Stations of the New York Municipal Railways, and Their Use Is Being Extended

A NEW TYPE of fare collecting and registering passimeter has been installed in several of the stations of the New York Municipal Railway and is proving very efficient for speeding up fare collection and for preventing congestion. The mechanism consists essentially of two units—the coin box and the passimeter. These are installed in the line of entrance of passengers with the coin box in front and the passimeter just beyond, so that passengers on entering deposit their nickels in the slot of the coin box and when recorded the passimeter is unlocked so that entrance is obtained without obstruction. These automatic turnstiles are installed in banks, the number of individual mechanisms depending upon the service requirements at the particular point. Another innovation has been made in the arrangement for collecting fares. Instead of requiring all passengers to obtain change from a change booth and then pass through the automatic turnstiles the change booth is located in such a position that passengers who have not the necessary 5-cent piece for operating the automatic mechanism can pay their fare and then pass through a registering turnstile without the necessity of returning to the other machines.

The turnstiles are designed for use solely as entrance facilities and separate exits are provided at each of the points where the turnstiles are installed. This arrangement serves to divide the incoming and outgoing traffic at each point and eliminates congestion due to the use of the same facility for both entrance and exit purposes at important traffic centers.

The coin box consists of a rectangular sheet-iron housing 37 in. x 12 in. x 12 in. One-eighth-inch sheet iron is used in its construction, and the corners are reinforced with angle irons. The upper portion of the coin box is used for the mechanism necessary for receiving the coins, recording them, and establishing the necessary connections for unlocking the passimeter. The lower part is used for the lock-up receptacle which receives the nickels after they are released by the upper mechanism.

The lock-up receptacle is a new and original design with special features for safeguarding the money received. These receptacles are 12 in. x 12 in. x 12 in., and are provided with a locking mechanism at the top. The receptacles are placed in the opening at the bottom of the coin box with the top opening unlocked and open. The bottom portion is then closed and locked. To remove the receptacle the entrance door is unlocked and the receptacle can then be pulled out. In doing this, however, the receptacle is automatically locked and cannot be opened by any one before it reaches the receiver in the main office, who is the only person with a key for unlocking the receptacles.



At Left—Coin Box. At Right—Passimeter.

The mechanism in the coin box for receiving and registering the fares and unlocking the turnstile is the same as that used in a type of coin box used by the Brooklyn Rapid Transit Company and described in the ELECTRIC RAILWAY JOURNAL for Sept. 9, 1922, except that this mechanism can be operated only by a nickel. The slot for receiving coins, however, will receive both pennies and dimes, but these coins pass through without interruption into a coin receptacle and are thus returned to the passenger without unlocking the turnstile. Provision is also made for returning nickels which may be in such a battered condition that they will not operate the mechanism, or coins which may be deposited while the mechanism is temporarily out of order. A push button is provided in the top portion of the box, and by pushing this the coin is automatically returned to the coin receptacle. The slot in the top of the coin box for receiving fares is of sufficient depth so that two nickels can be deposited at one time and these will permit the entrance of two persons before it is necessary to deposit another fare.

The passimeter consists of a top unit which has four wooden arms. This is mounted on a cast-iron base. The top head carrying the arms is constructed in a unit so that it can be quickly detached and removed for repairs if necessary, and another head reinstalled in its place without delay. The center portion carrying the arms has ball bearings, so that very little pressure is required to rotate the arms. A spring is also provided which assists in the movement of the arms after they have once been started and insures that they rotate 90 deg. to their required stationary position.

The mechanism for unlocking the passimeter and controlling its operation is installed inside the lower cast-iron base. This mechanism is also mounted as a unit, and should it

Passimeter with Automatic Coin Boxes Installed in the Thirty-fourth Street and Broadway Station of the New York Municipal Railway

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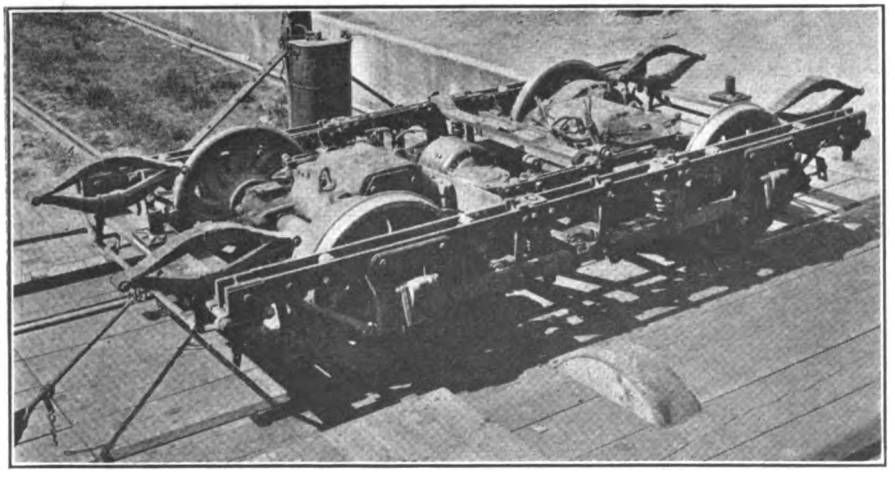
get out of order it can be quickly removed and a new mechanism put in place so that repairs can be made at the shops. The height from the base to the top of the arms is 36 in., and when installed in position a sheet-iron cover is provided across the top and this extends down on the outside so as to provide a smooth surface and thus prevent the catching of clothing, hand bags, and the like, of passengers as they pass through the turnstile. The top unit of the passimeter is arranged to swivel a slight amount in either direction. Rubber bumpers are provided so that should the arms be pushed forcibly, as is frequently the case when passengers are in a hurry, the vibration and strain is taken by these rubber bumpers.

Accompanying illustrations show an individual unit and also a battery of five passimeters as installed in the New York Municipal Station at Thirty-fourth Street and Broadway, New York. The equipment was developed by E. J. Kennedy, superintendent of the railway register department, and the equipment is being manufactured by the Perey Machine Works, Brooklyn, N. Y.

Truck Mounting for Compressor

THE mounting of compressors and the installation of air brake equipment on single-truck cars which are to be used for one-man operation often presents quite a problem. It is desirable to keep the overhang at the ends for such cars as short as possible, and there is very little room for the installation of equipment in the center portion of the car. The accompanying illustration shows a method of mounting the compressor on some single-truck cars being converted by the United Traction Company of Albany, N. Y. The compressor is supported by two channel irons which are fastened at each end of the truck sideframe by U clamps. These channels drop down after extending inward about 10 in., so as to provide the desired clearance for the top of the compressor when installed.



Compressor Mounted in the Center of a Single Truck

Kinks in Repairing Controller Drums

MANY of the older types of controller drums were made from a solid piece of brass so that there was no way of renewing the segments burned down by arcing. A number of G. E. C-6 drums of this construction that had been removed from equipment on the Lake Shore Electric Railway, Sandusky, Ohio, because of burned and worn-down segments were again made serviceable by turning all the segments to the same radius in a lathe. They were restored to the proper radius by having curved brass strips, ¼ in. in thickness, screwed on. The screw heads were not countersunk but were cut off and the contact surface smoothed up. In some cases more than ¼ in. had been burned from the corners of the segments, but no attempt was made to turn off any more than the standard amount. Any gaps between the segments and the new strip were filled in with solder.

Curved Strips Form New Contact Surface on Segments of Old-Type Controller Drum

Platform Lights for One-Man Cars

A METHOD of providing lights on the platforms of cars operated by one man whenever the doors are open and the steps lowered has been in use on the cars of the Springfield (Mo.) Traction Company for some time. The plan, it is found, reduces boarding and alighting accidents, and the operator is also provided with the necessary light for making change, issuing transfers, etc. The device also serves as an additional safety device so that the operator can tell the instant the doors are properly closed and steps folded, and thus operation can be speeded up.

The additional lighting circuit and provisions for making connections are shown in the accompanying illustration. An additional circuit of five lights is installed, two on one end and three on the opposite end of the car. These lights are wired in series by tapping on to the positive side of the lighting circuit and by grounding the circuit through contacts operated by the folding steps. In the accompanying diagram the circuit passes through lights 1 and 2 at the No. 1 end of the car and then through lights 3, 4 and 5 at No. 2 end of car. The ground side of the circuit is connected to two contacts, one at each step, so that whenever either step is lowered the ground connection is established.

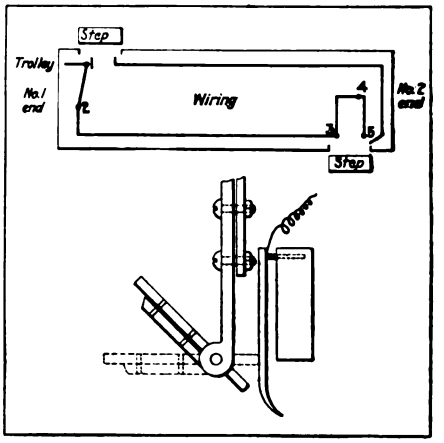


Diagram of Lighting Circuit for Platforms of One-Man Cars—Step Contact Mechanism for Grounding Lighting Circuit

The grounding contact consists of a spring mounted on a block of wood. As the step is lowered, a small metal portion on the back makes the contact with this spring and establishes the ground connection. Most step mechanisms have a projection which can be used for this connection.

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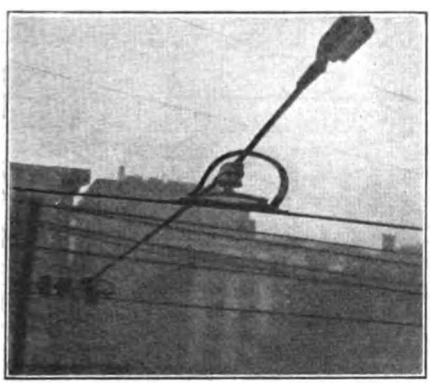
Spring Trolley Ears in Cleveland

IN REPLACING the trolley on a 1,500-ft. section on both tracks of the St. Clair Avenue line, the Cleveland Railway has used No. 0000 grooved wire supported with Drew spring ears. It is intended to extend this type of construction along St. Clair Avenue, which is one of the heavy traffic lines of the city. James Scott, engineer of overhead construction, feels that this type of suspension is the proper one to use for stringing grooved wire and that its merits will soon be found under actual heavy service conditions.

The Drew ear is slotted only deep enough to receive the upper section of the grooved wire so that the trolley wheel does not come in contact with the ear itself. With no irregularity in the lower surface of



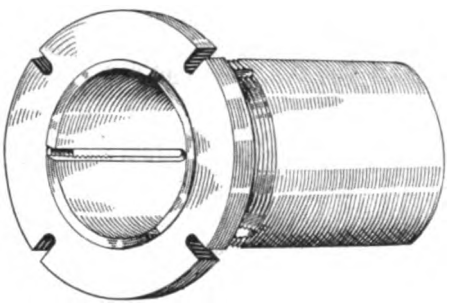
Spring Ear Used on St. Clair Avenue Line, Cleveland

the wire, arcing is practically eliminated when the wire is drawn tight, as is the practice in Cleveland. The spring steel support is also effective as it reduces what might be called the unsprung weight of the overhead. This type of ear was used in the overhead construction on the high level of the Superior Street tunnel and has been in use for about a year.

Self-Centering Chuck for Finishing Motor Bearings

A HOME-MADE chuck to hold motor bearings while they are being bored has proved a time saver in the shops of the Cleveland, Southwestern & Columbus Railway at Elyria, Ohio. The features of this chuck are shown in an accompanying illustration. The bearings are automatically centered, the outside portion having previously been machined. The chuck is screwed onto the headstock of the lathe like any other chuck and its bore is of such a diameter that the bearings form a sliding fit.

After a bearing has been inserted in the chuck it is held and centered



Home-Made Self-Centering Chuck for Holding Motor Bearings

by merely screwing up the threaded outside ring with a spanner. The inside shell of the chuck is split in three places so all three jaws close in on the work together.

The old chuck replaced had two jaws instead of three and each side was brought together independently with bolts passing through lugs. It required considerable adjusting and several trials before the work could be centered. Elimination of this task permits finishing bearings in one-third the time formerly used.

The simple construction and cheapness of such a chuck will enable any master machanic to make one for himself. It is made from a hollow brass casting solid on one end. The end is bored and tapped to fit the headstock threads and is then attached as it normally would be used while the inside is bored to the correct diameter and the outside is machined and threaded. The slots are cut on a milling machine.

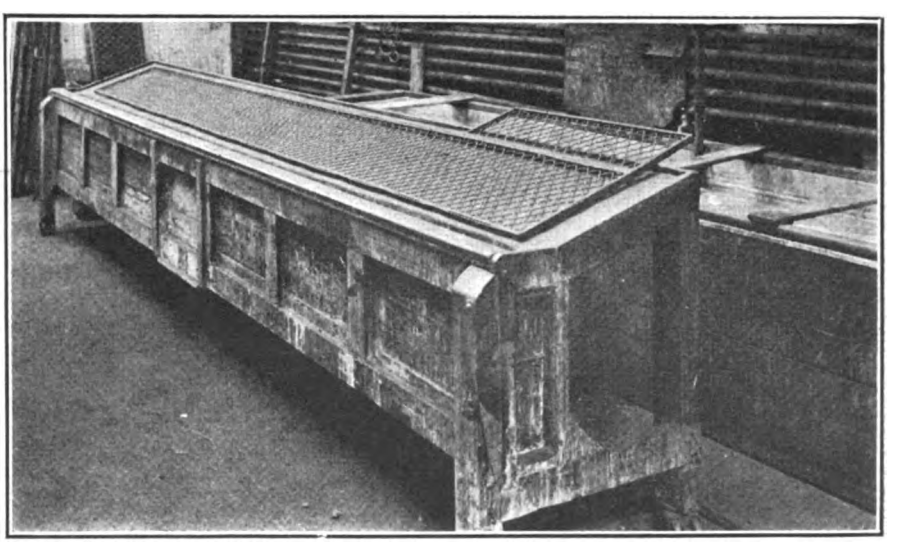
Trough and Drainboard for Cleaning Screens

RAILWAYS which use car screens as guards to prevent passengers putting arms and heads out of open windows find considerable difficulty in cleaning the screens. The ordinary brush method has proved quite unsatisfactory, and for thorough cleaning it is necessary to remove the screens from the car. The accompanying illustration shows a portable tank and drainboard used by the Grand Rapids (Mich.) Railway for the cleaning of its car screens.

A compartment at the lower front edge is made watertight and is filled with some cleaning fluid which will loosen the dirt readily. The width of this trough is sufficient so that four screens can be put in at once. This constitutes the equipment for one car.

The screens are allowed to soak in this compartment to loosen the dirt and then they are removed one at a time and placed on the drainboard which constitutes the back of this trough and is inclined toward the front edge. After a few minutes' draining they are placed in a washing tank, which is shown at the back in the accompanying illustration, where the screens are thoroughly rinsed.

The device is constructed in a very substantial manner and is mounted on four rollers so that it can be pushed to the side of the car from which the screens are being removed for cleaning. The equipment has been found very convenient and a time saver for this class of work.



Portable Trough and Drainboard Which Have Been Found Effective in Grand Rapids for Cleaning Car Screens

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Reconstructing Cars in Berlin

By the Use of a Special Truck Framing the Entire Car Body, Together with Long Platforms, Is Supported by the Truck Construction

BY E. KINDLER
Chief Engineer The Berliner Strassenbahn

THE decaying of the wooden structure of electric cars operated by the Berlin Railways has caused considerable trouble and has necessitated a thorough overhauling of the car body every two or three years. The joints between the wooden and steel girders become loose and allow water to enter, which causes rusting of the steel and rotting of the wood to such an extent that the entire car body becomes rickety. In an attempt to remedy this condition, the single-truck cars which are now being rebuilt have a truck frame extending the full length of the car body which supports the entire superstructure. For supporting the platform four 4¾-in. channels are attached to the truck framing. This construction gives a lighter weight car as well as a stronger one. The platform girders can be readily replaced, which is of great importance as collisions are quite frequent in Berlin. To protect the windows, roofing and vestibule sheathing, a steel reinforced wood bumper is provided at either end of the car. This takes the place of a heavy all-steel buffer previously used.

The flat, through-going supporting surface provided in the truck construction has a further advantage on this system, which uses many different types of cars, as car bodies of varying length can be placed upon the same truck. In reconstructing the cars a judicious shaping of the vestibule produces cars of uniform length and the passenger capacity can also be standardized.

The spring construction consists of four flat leaf springs resting directly on the journal boxes. Each of these is 68 in. long and 4 in. wide, and is built up of eight leaves. In order to give flexibility the ends slide in slots. The wheelbase of the reconstructed cars has been increased considerably, the dimensions being 9 ft. 2¼ in. now as compared with 5 ft. 9 in. previously. The frame is constructed of ⅜ in. steel plates riveted together, the openings having their edges reinforced by angle irons. Gusset plates are used at all corners.

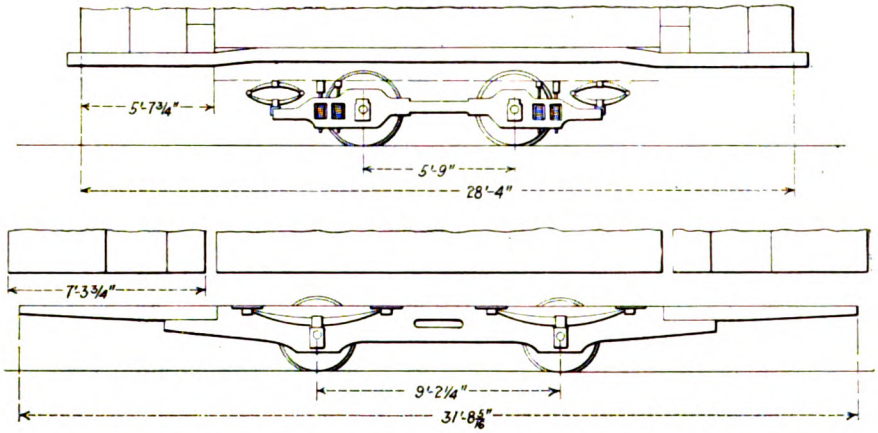
In the remodeling, the car bodies inside the bulkheads are not changed materially. In order to do away with the use of large sizes of glass, the side windows are divided into a number of panels. Glass ⅛ in. thick is used. The platforms are lengthened from 5 ft. 7¾ in. to 7 ft. 3¾ in.

The vestibule ends are provided with the usual sliding windows to permit throwing of switches by the motormen by opening this window. Outer doors are 28 in. wide and are of the Dresden type, which consist of a folding upper part with an inserted board at the bottom. This board insert has to be changed from one door to the other at the end of the line, but has advantages in space and in easy adaptation to weather conditions. A new German patent type of coupling is used. This has a special spring arrangement which insures smooth operation when two cars are coupled together.

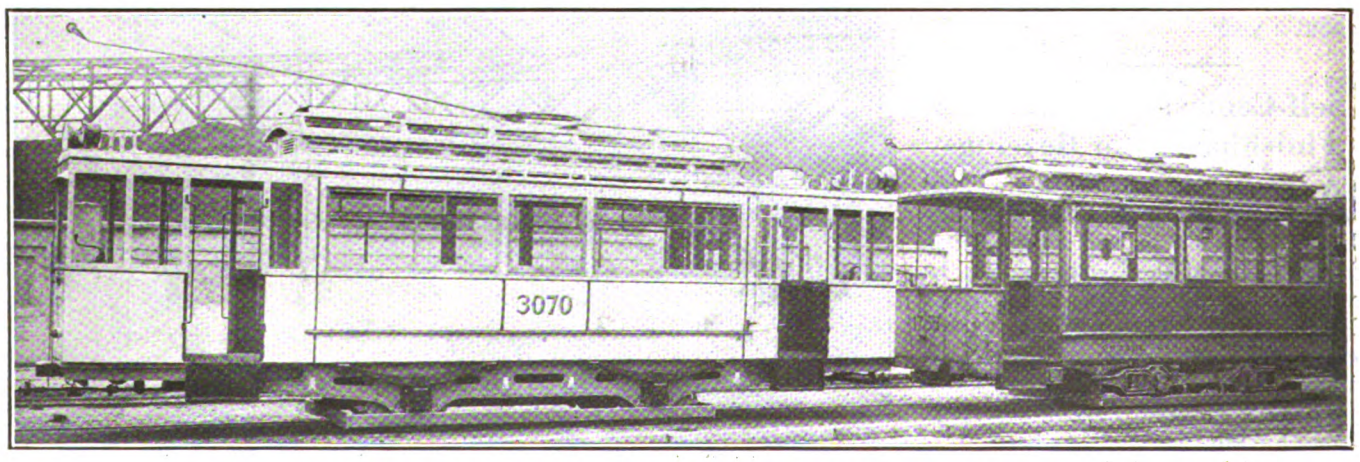
Hand brakes are of the lazy-tongue type, which insure that the brakeshoes will fit to the wheels re-

COMPARISON OF OLD AND NEW CARS

	Old	New
Weight of car, tons	10	9.1
Seating capacity	20	20
Standing capacity in car body	2	2
Standing capacity in vestibules	14	24
Total passenger capacity	36	46
Over-all length	28 ft. 4 in.	31 ft. 8 5/16 in.
Wheelbase	5 ft. 9 in.	9 ft. 2¼ in.
Length of vestibule	5 ft. 7¾ in.	7 ft. 3¾ in.
Wheel pressure (full), lb.	7,000	6,900
Weight of car per passenger, lb.	550	400



Comparison of Truck Construction of Old and New Cars



New Constructed Car at the Left, Old Car at the Right

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gardless of the load on the car. This type also prevents any grinding of the shoes upon the wheels and consequent uneven wear. The shaft of the hand-brake spindle carries a spiral groove casting to take up the chain.

Some changes were made in the electrical equipment, which was of obsolete type. The motors, which are GE-52, have been retained. Through this construction the rolling stock has been improved to a considerable extent, and expensive investments in new equipment and enlargement of shops have not been necessary. An accompanying table gives a comparison of the old and new cars.

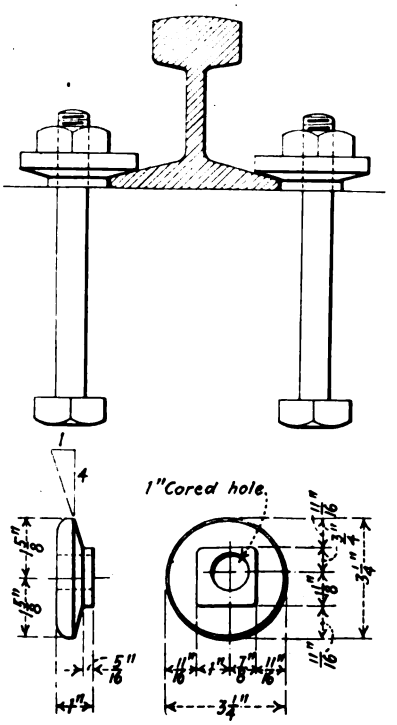
Inside Rigging Eliminates Brake Tronbles

DURING the past few years the Lake Shore Electric Railway, Sandusky, Ohio, has changed over the brake rigging on about forty trucks from outside to inside hung. A number of faults and undesirable features in the old construction were overcome by the conversion. The outside-hung brakes caused a lot of chattering and were difficult to maintain in adjustment. There was also trouble from the breaking of the beam pull rods, and the absence of transoms in the truck construction allowed an excessive stress on the bolsters with the result that they were pulled out of shape. As one consequence of this, abnormal wear of the wearing plates and center bearing resulted.

These difficulties were all remedied by having steel transoms cast from which to suspend the inside brake rigging. The addition of these permitted the circle bars to be moved closer to the bolster centers so the turning of the truck has a decreased effect on the brake adjustment and minimizes the danger of tearing the rigging to pieces when the car splits a switch.

Eccentric Grip Washer

OCCASIONS sometimes occur when it is desirable to provide permanent fastenings for different widths of equipment. An example of this is the use of different rail sections on a concrete structure where the bolts used for fastening are set in the concrete. Where the bolts are set to accommodate a certain size rail, difficulty is experienced if renewal is necessary with rails of different sections. For these bolts have been set for a particular width of rail base, and usually will not fit another width.



Details of Eccentric Grip Washer

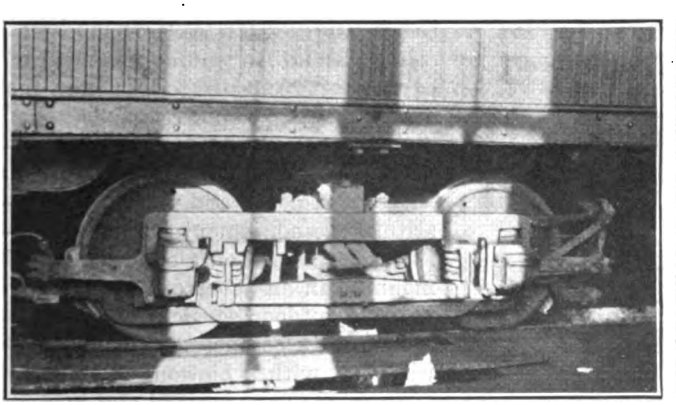
The accompanying illustration shows a type of grip washer which is used by the Canadian Pacific Railroad to hold down a section of rail with steel supports, where a variation in bolt holes could not be readily taken care of. The bolts for fastening were set with sufficient space between them so that they would accommodate the largest rail base to be used, and variations from this were secured by the use of the eccentric washer.

This washer consists of two parts, an upper circular disk with a conical base made to fit the fishing angle of the rail, and a lower part which consists of a square boss made to fit against the edge of the rail base. The square portion was not made concentric with the bolt hole, but was offset in two directions so that no two sides of the square portion are at the same distance from the center of the hole. With the dimensions selected, the distance from the bolt hole to the square side was made to vary by intervals of $\frac{1}{8}$ in., from a minimum of $\frac{3}{4}$ in. to a maximum of $1\frac{1}{8}$ in. This would thus provide for a total rail base variation of $\frac{3}{4}$ in. without change in the fastening bolt.

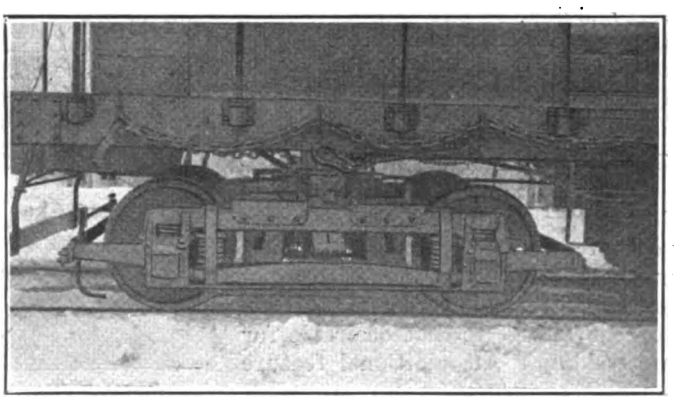
Getting a Few Years More Life Out of Old Track

NEARLY two years ago the railway company in Mason City, Iowa, installed some seventy of the joint boosters made by the Dayton Mechanical Tie Company. In spite of the fact that they were placed in the winter time by a force that was entirely unfamiliar with their use, the railway company reports that they have proved "very satisfactory indeed." The joints involved an expenditure of about 10 per cent of the reconstruction cost for the stretch of track in which the joints were used, and they give promise of securing several years further use of the track that the company is satisfied could not have been repaired in any other way.

The track in which these boosters were laid consists of 30-ft. lengths of 60-lb. low T-rails laid on cedar ties in solid concrete with a concrete



Original Truck Designed for Outside-Hung Brakes



Remodeled Truck with Transoms and Inside Brakes

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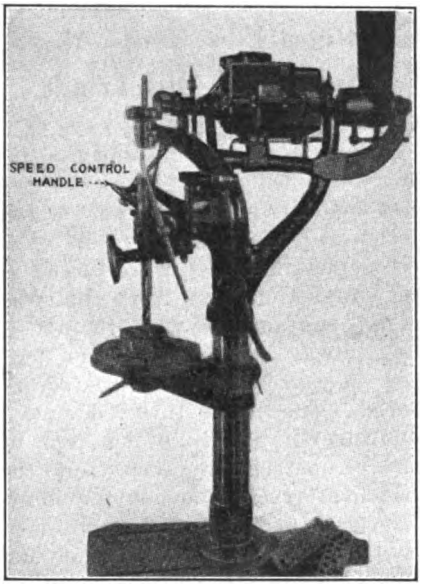
pavement. The concrete below the ties was inadequate as to depth, but the surface concrete was excellent. The bolted joints had loosened, and the rail had battered, cupped and become surface bent. With the concrete cut out around the joints, the joint plates were cut off and the boosters inserted in the concrete. The joint angles were tightened and in some cases renewed and rewelded to the rail and to the base plate of the booster, and the nuts on the joint bolts spot welded. Some of the surface bends were taken out by the aid of a vertical bending device.

New Equipment Available

Variable Speed Transmission

THE accompanying illustration shows a variable speed transmission device applied to a drill press. This equipment is being placed on the market by the Driscoll Transmission Corporation, New York, N. Y. It replaces the usual method of cone pulleys and belts to provide different speeds. Through the use of this device the speed may be varied at will to that desired within the capacity of the machine by turning the control wheel. The machine is reversible and entirely inclosed to keep out dust and dirt.



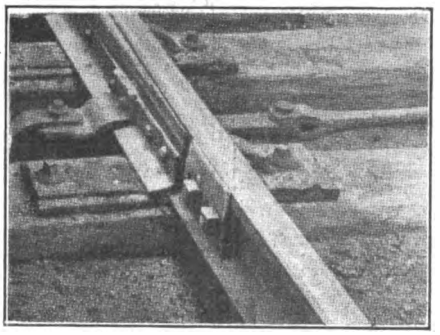
Variable Speed Transmission for Drill Press

Device for Lowering Welding Voltage

THE Electric Arc Cutting & Welding Company, Newark, N. J., has developed an adjunct for direct current arc welding. It consists of a magnetic switch together with a potentiometer for lowering the direct-current voltage to that desirable for arc welding. An additional feature consists of provision for adjusting the voltage at the arc as desired. This can be from 20 to 25 volts for metallic arc, or 40 to 50 volts for carbon arc. This does away with the ugly flare and a deep crater resulting from high-voltage direct-current welding. The magnetic switch remains out until the electrode is touched to the work. The closing of the circuit then brings the switch in, which holds the voltage at the desired low value. Should this value be exceeded, the switch automatically opens the circuit.

Railway Switch Point Protector

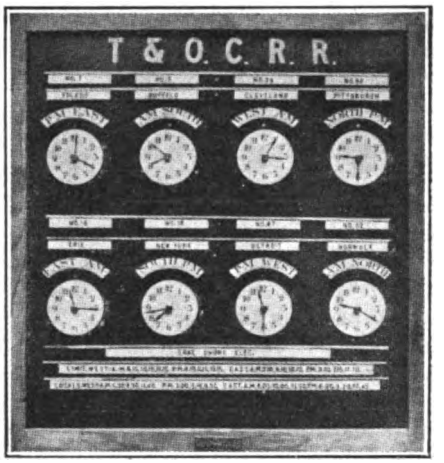
AN ACCOMPANYING illustration shows the Mack railway switch point protector which is being marketed by J. R. Fleming & Son Company, Inc., Scranton, Pa. The protector consists of a guard plate made of manganese steel and installed about 2 in. ahead of the switch point. The plate is shaped to conform with the head of the rail. Four bolt holes are formed in it to receive the fastening bolts and the heads of the bolts rest in a channel plate made to conform to the space between the flange web and the head of the rail. The object of the protector is to reduce the wear on the end of the switch point, to reduce the jar of impact on the switch rails and to avoid possibilities of derailment due to a loose switch point or the switch not shutting tight on account of an accumulation of snow or ice.



Railway Switch Point Protector

Board for Announcing Car Departures

A NEW TYPE of board for announcing the departure of electric railway trains or cars is being introduced by the Leu Perpetual Time Table Advertising Company, Chicago, Ill. It consists of a series of clock dials mounted on a base in a frame and covered with a glass door. The individual clock dials serve to indicate the time of departure or arrival of trains from a given point or destination. This type of board is intended to replace the blackboard and chalk system used for indicating the arrival and departure of cars.



Board for Announcing Arrival and Departure of Cars

Protection of Feeder Sections on Railway Lines

A NEW automatic feeder sectionalizing contactor, that automatically cuts out of service feeder sections on which short circuits or overloads occur and returns them into service again only when the trouble has been cleared, has recently been placed on the market by the Westinghouse Electric & Manufacturing Company. The contactor opens on overloads and recloses only when the potential difference between the feeder sections is sufficiently small to limit the flow of current on reclosure to less than the overload setting on a relay.

An overload relay, a main contactor, a holding relay, a snap switch, fuses, a resistor and terminals, constitute the equipment. This apparatus is assembled on a slate panel and mounted in an asbestos-lined wooden box for outdoor service.

The main contactor is of the clapper type, with a blowout coil and an arc chute. The overload and holding

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relays are similar to each other (except for the coils). Both relays are automatically reset, the moving core dropping back by gravity and spring pressure when the operating coil is de-energized.

The overload relay has an operating range of from one to two, so that the relay can be set for any desired load within wide limits. The holding relay can be arranged to release the main contactor on a difference of potential between feeder sections of from approximately 30 volts to 100 volts or even higher.

Change-Making Machine and Fare Box

THE accompanying illustration shows a change-making register designed by the Springfield Change Making Register Company, Springfield, Mass. This device is a combination of a change-making machine and the Springfield fare box designed by the same company, making a complete fare-collecting equipment which provides a record of each fare collection at the same time change is given to the passenger.

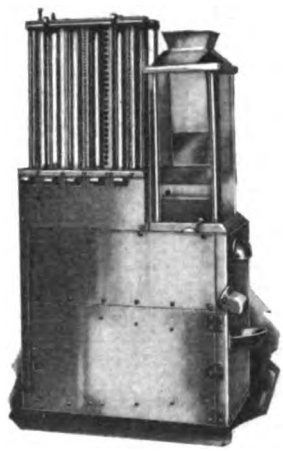
The fare box section shown at the right is of the locked type and includes all the improved features of the Springfield fare box. The receiving hopper, a casting of aluminum alloy, has a large, free passage admitting tickets as well as money, and is carefully baffled so that money cannot be drawn back through it by any mechanical means.

In the receiving chamber at one side of the inspection plate is a telltale ball, mounted on a vertical staff in such a way that if the box is overturned the ball rises to the top of the staff and is held there by a latch underneath the plate, which cannot be released until the box is returned to the office and opened by an inspector, who may, of course, make an investigation of the overturning of the box.

The money drawer, a single piece aluminum alloy casting, carried in an opening at the lower part of the casing, is locked into the casing by a Yale lock and can be removed only by an authorized person who is provided with a key. There is, in addition, an automatic locking device that retains the drawer in the casing, independently of the Yale lock, until the inspection plate has been tripped and held down, discharging all coins on the plate into the drawer before it can be removed.

The push button shown beside the receiving hopper is connected to a signal bell and to a visible register inside the glass receiving chamber by means of which the car operator registers the number of passengers entering the car. This eliminates the overhead register with its connections and fittings.

The change-making section, shown at the left, consists of two batteries



Combination Change-Making Machine and Fare Box

of vertical tubes, five tubes in a row, placed one row behind the other, inclosed in a plate glass casing. Five operating slides below them are arranged so that each slide controls a tube in the front row and its corresponding tube in the back row. A handle for each slide projects through the front of the casing. A casing which is a single casting of aluminum alloy supports the tubes and incloses all the working parts, also the money drawer for the fare box section and a separate drawer for receiving the record checks referred to further along. At the side of the fare box is a change cup into which the passenger's change is delivered through a spout.

The front set of tubes is loaded with coins so arranged in the tubes as to provide the correct change for the fare paid out of the coin tendered by the passenger when the proper operating slide is moved, as one out of a dime, one out of a quarter, two out of a quarter, the change being delivered by the movement of the operating slide to the change cup at the side of the fare box.

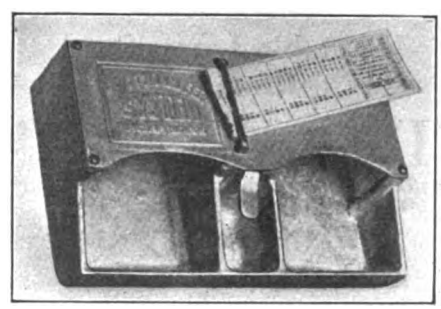
The rear set of tubes is loaded with metal checks which make the record of the fare paid when the passenger requires change. When the slide handle below a change tube is pulled to make change, checks are dropped from the corresponding rear tube into a separate locked drawer in the lower casing; one check if one fare is paid, two checks for two fares, and so on. At the same time the change is deposited in the change cup. The change cannot be deposited in the change cup without at the same time dropping the recording checks into the check drawer, and an automatic lock is provided in each check tube, so arranged that if the checks in any tube are all used, or so nearly used that there are not enough left to make a complete record of the number of fares being paid, the operating slide is locked and no more change can be issued from the corresponding money tube.

The money tubes are open at the top so that they may be replenished as needed by the conductor, who provides himself with change for that purpose. There is a separate cover with lock for these tubes and a lock in the base controlling the operating slides so that the conductor can lock the machine if he is obliged to leave the car. Provision is made in the operating slides for adjustment to meet changes in the rate of fare. The money and check tubes are perforated so that the amount of money or checks in each tube is visible.

The complete box is about 24 in. high, 16 in. wide, 8 in. from front to back and weighs 40 lb.

Transfer Abuse Prevented by New Issuing Device

UNTIL recently the Tri-City Railway operating in Moline, Rock Island and Davenport lost considerable revenue by the abuse of the transfer privilege. Presenting of invalid transfers was practised most consistently and flagrantly on certain lines carrying factory workers. With the ordinary punched type of transfer, the time indicated was not easily visible and in case an old transfer was detected, for the conductor to prove that he had received it from a certain passenger was practically impossible, especially in rush hours. Transfers punched "a.m."



Aluminum Box for Use with Tear Transfer System

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were being used at the indicated hour in the afternoon.

To correct this misuse a new type of transfer was developed which is torn off at a length according to the hour. The car operator can distinguish at a glance between a.m. and p.m. transfers because of the marked difference in length. Various colors are used for the different directions and lines for which transfers are issued. For holding and issuing the transfers a wooden box having several compartments was constructed and attached to the air pipes below the brake valve. An improved box has recently been adopted that is made by Nic Le Grand, Inc., Rock Island, Ill. It is made of cast aluminum and designed with a cleat like a fare box so that it is removable. The pad of transfers is inserted under a U-shaped bar which holds a constant pressure on the pad so that after the pad has been adjusted at the end of each trip a transfer can be torn off with one hand. The compartments of the box are for holding tickets and extra transfer pads.

Differently colored transfers are used for each line of a system, or where a line runs in two directions from the traffic center, and where lines parallel each other, which affords an opportunity for the passenger to double back on a transfer, separate colors are used for each end of the line. The date is printed in large figures and provision is made for punching the month at the extreme edge. The hours in fractions are so arranged on the transfer that the later in the day when torn off the longer will be the transfer. A system of keeping transfer records and issuing transfers to the operator so as to eliminate waste is a part of the Tear transfer system.

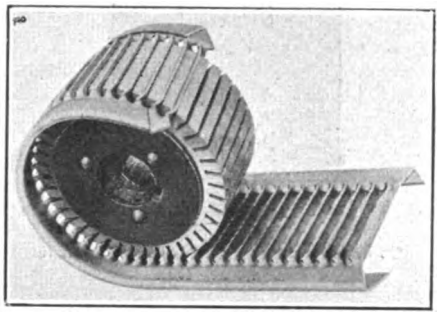
E. T. Anderson, superintendent of transportation, claims that the box is almost indispensable with one-man operation. All the equipment in Davenport and Rock Island was changed over to complete one-man operation about ten months ago.

Portable Lamp Cord for Rough Usage

THE Okonite Company, Passaic, N. J., is placing a new flexible unbraided portable cord on the market. It has the trade name of "Okocord" and has double tinned conductors scientifically stranded, insulated with Okonite, braided with dry white and black cotton, and inclosed in a jacket of smooth, tough, indestructible 60 per cent Para rubber. This new product is designed particularly for use in rough, wet or oily places, such as is encountered in electric railway shops.

New Type Motor for Shop Use

IN A NEW a.c. motor recently marketed by the Louis Allis Company of Milwaukee, Wis., a somewhat novel construction is used for the rotor windings. The motor is designated as the L-A type H.D. and the entire winding of the rotor consists of an integral sheet of copper punched and formed by a special mechanical process. This one-piece winding is machine-wrapped around the rotor core, the copper bars being expanded into the core slots by swaging, as indicated in the accompanying illustration. The multiplicity of joints contained in the ordinary type rotor is thus done away with and the single joint necessary which extends through the two end rings is silver welded, after which the metal at both connections is processed by means of a contracting operation that hardens the copper at the point where the heat, applied during the welding, has softened it.



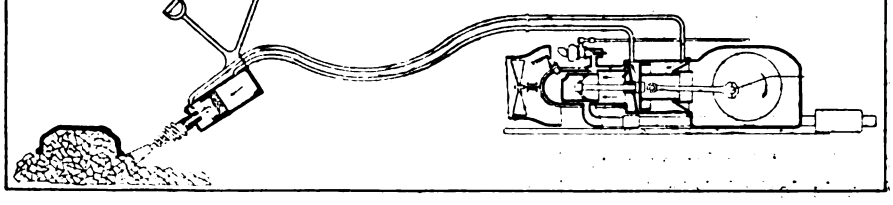
Rotor Winding Punched from a Single Sheet of Copper

The rotor core is a self-contained unit and may be pressed on and off the shaft readily. Particular attention has been given to the electrical characteristics of the new motors and they are guaranteed to carry their full rated load continuously with a temperature rise not exceeding 40 deg. C., and after their ultimate temperature has been reached to carry 25 per cent overload for two hours, with a temperature rise not exceeding 55 deg. C. The motors are made in standard industrial sizes, voltages and frequency.

Rapid Blow Tamper

A NEW TYPE machine for forcing crushed rock under ties is being built by the Krupp Works in Germany and was described in a recent issue of the *Krupp Monthly*. There are two air connections from the compressor to the tamper. One of these is on the exhaust side of the tamper piston, the other on the driving side. The movement of the tamper piston is actuated by intermittent air pressures supplied by a two-cylinder forced air-cooled benzol motor. Due to the differential action of this two-step air pump, the return of the tamper piston is much slower than its outward stroke. As constructed, about 1,400 impacts per minute are produced as compared to thirty by hand operation. This high speed results in a practically constant forward travel of the crushed rock.

In order to relieve the operator from undue strain, the tamper is provided with two handles located at an angle of 90 deg. to each other. The air compressor equipment together with the fuel reservoir, tools and spare parts are mounted upon skids to facilitate transportation.



New Tamper and Compressor

Figures given regarding the saving which results from the use of this machine indicate that approximately 40 per cent is saved in the actual time and labor, but as a tie with rocks forced under it by the machine will require considerably less attention than one tamped by hand, the real saving is about 60 per cent.

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Association News & Discussions

Results Obtained with High-Speed, Light-Weight Interurban Cars*

Some Operating Data Obtained with These Cars on the Western Ohio Railway, Which Has 112 Miles of Track—Improved Service and Increased Revenue Result—Accident Hazard Reduced

BY E. B. GUNN
Superintendent of Transportation & Equipment
Western Ohio Railway, Lima, Ohio

IN JANUARY, 1918, abnormal operating conditions forced the Western Ohio Railway temporarily to change its interurban service from a one-hour schedule to a two-hour schedule. Competition from the automobile and motor truck made it impossible to go back to the hourly schedule with the heavy cars then in use.

Realizing that two-hour service was not adequate for our territory, we began, in the fall of 1920, to investigate the light-weight interurban car proposition. In the neighborhood of Cincinnati we found two properties that had been operating cars weighing 24,000 lb. and 25,000 lb., with an energy consumption of about 1¼ kw.-hr. per car-mile as against the 2.8 kw.-hr. used by our 66,000-lb. car. In April, 1921, we placed an order for eight cars to be 45 ft. long over all, 34 ft. 3 in. over corner posts, 8 ft. 8½ in. wide over all, 10 ft. 9 in. from rail over trolley board and 32 in. from rail to floor with a seating capacity of forty-two plus seats for six passengers in the baggage compartment. These cars were to weigh not more than 33,000 lb. complete, equipped with four 35-hp. motors. It was specified that the cars must make the same or better running time from Piqua to Findlay (80 miles) than we had been making with our former equipment. This time was three hours and twenty minutes.

NEW SPRING SUSPENSION SUCCESSFUL

The cars were delivered early in September. They bettered our running time by five minutes, but did not ride comfortably at speeds greater than 30 to 35 m.p.h. The trouble was with the spring suspension. Below this speed the link used for suspending the elliptic spring appeared to take care of the side motion, but above this speed there was a serious jerky side motion with operation over an average track. The builders then devised a new set of spring links for suspending the elliptic spring, the head of each link being fastened rigidly to the truck frame. The cars now ride perfectly at any speed.

We are now operating between Piqua and Lima, 47 miles, in one hour and fifty-four minutes; from Lima to Findlay (on which the two-hour schedule is still operating) we make the 32 miles in one hour and fifteen minutes and a six-minute layover is allowed at Wapakoneta for loading baggage, etc., there being at this point a connection with cars from St. Marys and Colina.

QUICK ACCELERATION PERMITS MAKING OF FAST SCHEDULE

We are making our schedule more easily than with our former equipment. At Findlay we make connections with lines from the north, and often hold trains ten or fifteen minutes. We find that they can still get into Wapakoneta on time, 47 miles from Findlay. The cars make speeds as high as 53 m.p.h. in some cases. We make our schedule on account of the quick acceleration, due to the lightness of the cars and to having full voltage at the motors. These cars require but 175 amp. to start them. Since we have been using these cars, we can shut down one rotary converter in each of our substations during the day.

As to operating costs, as compared with the heavy car, the energy consumption of the new car for November and December last averaged 1.45 kw.-hr. per car-mile in November to 1.5 kw.-hr. maximum in December, due to heavier riding, snowstorms, etc. The cars make 76,000 miles per month, and average 309 miles per day.

The following table shows the comparative lubricating and brakeshoe costs:

LUBRICATION COSTS

November, 1922,	55 lb. tulc, at 7¼ cents	$4.26 or 5.65	cents per thousand car-miles
December, 1922,	51 lb. tulc,	3.95 or 5.42	cents per thousand car-miles
November, 1921,	165 lb. tulc,	12.78 or 19.3	cents per thousand car-miles
December, 1921,	155 lb. tulc,	12.01 or 20.6	cents per thousand car-miles

BRAKESHOE COSTS

November, 1922,	36 at 57 cents,	$20.52 or 27.2	cents per thousand car-miles
December, 1922,	51 at 57 cents,	29.07 or 38.8	cents per thousand car-miles
November, 1921,	95 at $1.10	104.50 or $1.57	per thousand car-miles
December, 1921,	125 at $1.10	137.50 or $2.02	per thousand car-miles

The 26-in. wheels that we use under these cars cost $22.50 each as against the cost of $41.66 each for the 36-in. wheels formerly used. It appears that we shall get two-thirds of the mileage that we did from the old wheels, as our cars have made approximately 35,000 miles and the flanges are still in good condition. They will probably make 45,000 to 50,000 miles more before requiring welding and turning.

The cost of trolley wheels will probably be 40 per cent less than with the old cars. We are having no trouble with the wheels spitting or burning, because the current drawn by the cars is small.

Track maintenance should be reduced materially, even though we still operate heavy freight service. This freight service is, however, low speed, so that once the track is put into condition it will not require the attention that it would with the high-speed passenger service.

MAINTENANCE COSTS REDUCED

We have reduced the cost of labor in the shops by the wages of seven men, and if it were not for the maintenance of the equipment we would need three or four men less. Of course the maintenance of the new cars costs nothing as yet, as they require only inspection and lubrication. We have been able in November and December to save about $2,100 per month at the shops, covering labor and material.

As to the effect of collisions on these cars, we have had about as many collisions with automobiles with the new cars as with the old ones, but none of these was serious, because the cars could be stopped quickly. As the cars are low, we find a tendency to push a vehicle ahead of the car rather than to tip it over. The occupants of a vehicle with which a collision occurs are not liable to be injured seriously. As far as damage to the bodies of the new cars is concerned, they have stood up as well as the old equipment. A collision usually means only new glass in the front and straightening up of the corner posts and steel front of the car. This work can be done cheaply and the car is soon back in commission.

Since the light-weight cars have been in operation our receipts are increasing. For the last three months of 1922 they have been ahead of 1921, whereas for the first nine months of the year they were behind practically every day. We believe that this equipment is going to be the salvation of our property, as it will enable us to compete with other means of conveyance and enable us to provide a service that will appeal to the traveling public.

*Abstract of paper read at meeting of Engineering Council, Central Electric Railway Association, Louisville, Ky., Jan. 18, 1923.

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Governor Smith's Recommendations Criticised*

Investment Bankers Consider the Legislation Recommended Will Impair Utility Credit and Retard Expansion—Municipal Authorities Too Interested to Act Judicially

By Henry R. Hayes
Chairman Committee on Public Utility Securities,
Investment Bankers' Association

IN HIS message to the Legislature of New York Governor Smith on Jan. 3 recommended legislation with respect to public utilities which requires the immediate and serious attention of the association.

The principal recommendations are:

1. To abolish the present Public Service Commission and to substitute therefor three commissioners (to be appointed by the Governor) to be charged only with authority to regulate "such utilities as will not be regulated by cities, either because they operate outside the corporate limits of a city or because the city may, by proper resolutions, request the State to do it."
2. "That in the preparation of the legislation to abolish the present Public Service Commission, the power heretofore held by the cities over the terms of their franchises be returned to them."
3. "That the cities themselves should be permitted to purchase, build, own and operate 'public utilities' when a municipality determines this to be in its best interests."
4. "That the Transit Commission in the city of New York be abolished and all its powers with regard to the laying out of routes and supervision of construction be transferred to the Board of Estimate and Apportionment, to be exercised by this body through any agency which it may select," and that "its regulatory powers should be restored to the Public Service Commission Act, which will contain the provision that a city may be the agent of the State for carrying out these powers unless it should by proper resolution, request the State to relieve it of the duty."

There are two main desires expressed in these recommendations:

(a) The practical abolishment of statewide regulation of public utilities and the substitution therefor of municipal regulation, and

(b) Municipal ownership of utilities where cities may so elect.

Prior to the delivery of the Governor's message the advanced news reports in the public press indicated that a very radical change in State regulation would be recommended, and your president endeavored, but without success, to have an interview with Governor Smith in order to apprise him of the views of this association. It was felt that the proposal alone of a very radical change in the regulation of public utilities in the State of New York would be alarming to investors.

In a discussion of these matters we must bear in mind that the situation with respect to the rapid transit and surface lines within the City of New York is special unto itself on account of the nature of the contractual relations existing with the city. Therefore, this phase of the problem will not be presented at this time by your committee.

Owing to the fact that credit of public utility companies and therefore confidence in the securities thereof have been created especially in States where there has been conservative and judicial regulation as well as freedom from local or political influences, your committee now feels concern over that part of the recommendation which has to do with the regulation of utilities other than the transportation systems in the city of New York.

Good Faith of State Is Involved

For a great many years the policy of statewide regulation of public utilities has been the established policy of the State of New York. In fact, New York was one of the first states to recognize this principle. It has been followed, as we know, very generally by other states throughout the country advantageously in the public interests. Furthermore, recognizing the great advantages of judicial regulation, protection of the public interests and freedom from political influences, especially up State, investors have freely placed funds in these utilities with all the risks attendant to these investments. When viewed in this light, the good faith and moral credit of the State is involved. Investors would not have continued so freely to support the much needed expansion of utility services by investment in their securities had they expected these industries to be again subjected to the danger of political control and local regulation.

This association, through its members, has in a very large measure been responsible for the providing of these investment funds. Surely, therefore, it is incumbent upon us to study the situation seriously with a view to giving constructive suggestions to the end that conditions which make consideration of such legislation possible may be remedied. In this way only can we progress and not retrace our steps a long way backward.

It seems pertinent, therefore, for us to inquire just what exists in this New York State situation which makes it possible to disregard the experiences of that and other states in this country.

Voters Don't Understand Situation

Preeminently, there stands out the fact that the voters of this state cannot understand or appreciate the real interest which they have in seeing to it that companies be honestly financed, managed and regulated and that only in this way can they, the voters, be furnished with adequate service at reasonable costs. Furthermore, it cannot be definitely recognized by the public as a whole that with proper regulation and the advantages which that supervision brings in the nature of protection to investment values and the creation of fair capitalization, public utilities are prohibited from making undue profits. Indeed, under sane regulation their profits are very limited when compared with the privately owned industrial concerns. Investors are quite willing to accept this restriction, but they must be afforded stability of interest and dividend returns, safety of principal and freedom from attack incident to local or political controversies.

The chief purposes of state regulation of public utilities are:

(a) To plan economically a development of service without regard to the corporate limits of any one locality, and to determine the extent and character of such service so that it shall meet all demands in the territory served and respond promptly to the increasing requirements of growing territory.

(b) To establish the fair investment values created for the service, and to fix the interest rates of return on such values sufficient to attract the ready flow of money into the business as needed.

The individual consumer or user of utility service concerns himself chiefly with the price of the service. How cheaply can he get it? He takes little or no interest today in the protection of the investor's money which provides that service. As a matter of fact any customer of public service, if he understands the problem, must admit that he is more interested in good service than in cheap service, and he can be shown that although a poor and underfinanced company can give him cheap service, only a prosperous company can give him the best service.

Municipality Too Interested to Act Judicially

Were a municipality to undertake the regulation of utilities within its corporate limits with the same broad powers now vested in the State Public Service Commission, the agency created by the city for this purpose would, among other duties, be required to act in a judicial capacity in determining the fair investment values upon which to base a rate of return and the charges for service, to produce this required return. As representing its citizens, the City has a partisan interest in the determination of such important matters. We thus see the city in a double rôle—acting as a special pleader for one side of a controversy on the one hand, and acting on the other hand as judge to decide the merits of a case as presented by both parties. Well-managed private business is not conducted under such procedure and there is no reason why public business should tolerate it.

The above are merely some of the important points needing emphasis in a broad plan of education in the economics of the public utility business which must be conducted in the State of New York to make clear to the voters the advantages of State wide regulation of public utilities. Much of this must necessarily be carried on by the managements of the privately owned prop-

*Abstract of interim report presented to the board of governors of Investment Bankers' Association of America by its committee on public service securities and adopted by the board on Jan. 12, 1923.

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erties in a manner to create confidence.

With reference to Governor Smith's recommendation that municipalities be given the right to purchase, build, own and operate public utilities, it is certainly the opinion of this association, supported by the indisputable results of public operation, that except in a very few instances municipally owned properties have not been successfully operated. On the other hand, they have almost invariably proved unsatisfactory to the tax payer and to the public served. The most recent experiment, namely, that by the city of Detroit, is already furnishing serious and difficult problems.

It may not be wise or expedient now to deny that a community ought to have the right to own and operate properties if it so elects. In view of the consistently poor record of federal, state and municipal operation of utilities, it is certainly our duty to challenge the wisdom of municipal ownership and operation. In any case where such legislation is proposed, it is essential to see that provision be made for the purchase of existing properties at fair values in order to avoid the evils attendant on competitive plants long recognized as distinctly undesirable from all points of view. To those who desire to study the results of public operation we commend the findings of the special committee of the Merchants' Association of New York in its report dated Jan. 23, 1919. The study made of government ownership and operation of public utilities by that committee was very comprehensive and we quote the following:

> Except under war conditions the sole plea that can be advanced to justify the operation by governments of public utilities is that governments can provide better service at less cost to the public than can private operators; that is to say, the assumption that government operation is more efficient and less costly than private operation.
>
> We do not believe that this contention can be sustained. On the contrary, we contend that the operations of governments in the economic field, and particularly under American conditions, are generally characterized by inefficient management and excessive cost; so that under government operation the public would get poorer service and pay more for it than under private operation suitably regulated by public authority.
>
> The cause of inefficient management and excessive cost when governments undertake economic activities is simple. All the activities of any government are necessarily carried on by political machinery and that machinery is wholly unsuited to the economic field.
>
> The fields of politics and economics are dissimilar and separate. The field of politics (meaning thereby the art of government) is mainly the regulation of conduct and the protection of rights. The field of economics is the production and utilization of material things. The principles, the methods and the machinery of political administration are wholly different from those of economic activities and not adapted nor adaptable to the latter. The differences are fundamental and cannot be reconciled. When, therefore, the machinery of political action is applied to economic undertakings, it works badly and makes impossible the perfect co-ordination which alone, in the economic field, produce efficiency and economy of operation. A brief comparison of the machinery of business with that of political action, will show clearly why political machinery does not and cannot work effectively in the field of economics.

Briefly, to summarize the New York situation, your committee unanimously feels:

1. That the legislation recommended by Governor Smith will create a lack of confidence on the part of large and small investors within and without the State, including insurance companies and savings banks, thereby seriously impairing the credit of utility companies and, accordingly,

2. That until such time as the policy of statewide regulation is reaffirmed definitely, the expansion of utility service will be greatly retarded.

Your committee believes, therefore, that this association should take an active stand against any legislation intended to carry out the special features of Governor Smith's recommendation discussed in this report, and recommends that the Board of Governors at this time give public expression to their disapproval of the legislation which is proposed.

A Foreman's Relation to His Men and His Company*

An Analysis of the Qualifications Needed in a Successful Foreman, Together with Some Observations on the Advantages of Employment with an Electric Railway Company

By F. G. Buffe
General Manager for the Receivers,
Kansas City (Mo.) Railways

ELECTRIC railway work is not easy in any department; but it has compensations. It is not monotonous; it has a compelling interest, and it gives an opportunity for initiative, tact and cheerfulness. There are no lay-offs, no shut-downs, no idle seasons, no strikes, no interruptions.

In the electric railway organization the link which connects the employee and production, on the one side, with direction, management and planning on the other, is the foreman, or assistant superintendent, or supervisor, or whatever he may be called. He forms the spirit of direct contact between employee and management. A foreman is chosen because he possesses certain qualifications, among which are: absolute knowledge of every job under his direction; ability not only to handle men but to lead them; willingness to accept responsibility and the obligations that go with responsibility; qualifications for promotion to higher position, and ambition for self-improvement.

A foreman must have executive ability and a thorough trade education. In addition, he must be able to judge men, have a deep sympathy with their troubles and be able to inspire their confidence. Energy, perseverance, thoroughness and self-control are also necessary. And the foreman must have a true realization of the value and dignity of his job, its responsibilities and obligations.

Job knowledge is so apparent a qualification as almost not to need special mention. A foreman is at the same time an instructor. He must be a competent and skilled workman, an expert operator, an accurate judge of work and machines, a judge of good work and an equally good critic of poor work. He must be able so to direct his men that the things they do may be done in accordance with the best methods.

The foreman must keep in touch with developments in his work. Where faulty and time-losing or material-wasting methods are being used, he must be alert to correct them. He must not only be prompt to make suggestions himself, but should encourage the making of suggestions by others. He should study the proper method of introducing a new man to the job. He should lead in safety first work and keep a careful eye out for safe practices on the part of every man and machine under his direction.

The ability to handle men and to lead them is the first mark of difference between a workman and a foreman. The scientific management of men is a professional equal to that of the teacher. It demands a deep study of human nature under all conditions and above all calls for an every-minute application of the square deal.

Definition of Executive Ability

The ability properly to handle men is acquired, although some have more native genius for it than others. A good definition of it is this: The art of producing the greatest amount and best quality of work at the lowest cost and in the least time with the greatest amount of satisfaction to all concerned.

A good foreman is concerned not only with his company's interest but with that of the workers. This implies friendly help, constructive criticism, encouragement, proper supervision, a square deal in every act, just discipline, no favoritism and broad sympathy with, and a thorough understanding of human nature. A conscientious foreman should learn something of the home surroundings of his men, their troubles and ambitions. He should be ready with a helpful word, timely advice, or a bit of sympathy.

A foreman must be able and willing to accept responsibility and its obligations. When a worker is elevated from the ranks, he becomes a leader, charged with the duty of governing. He can no longer think with the mind of a workman; his viewpoint must change; he is a part of the management. Many men when given authority are unwilling or unable to quit the mental attitude of a worker and adopt that of the new position. In other words, they have not awakened to the dignity or value of the job.

A good foreman should possess or acquire those qualifications which will

*Abstract of a paper read before the Shop Foremen's Association of the Kansas City Railways, Dec. 13, 1922.

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fit him for promotion. He should constantly strive to learn more of his job, and should study and develop his talent so as to be ready when the call comes. Opportunities for study and development are on every hand.

In conclusion emphasis should be laid on four qualities or characteristics which are essential to success. These are: Tact, sincerity, loyalty, and initiative. The foreman has been placed in a position of trust and responsibility. He is the channel through which orders are transmitted, and he is charged with the duty of getting the work out of his department in the quickest time at the least cost. To him has been deputized the part of management. The management's policy must be carried to the men through him. He is an indispensable link in the chain.

No Steam Railroad Exhibits This Year

FOLLOWING the announcement that there will be no convention during 1923 of mechanical division, V, American Railway Association, the executive committee of the Railway Supply Manufacturers' Association announces that its 1923 exhibits will be postponed. This decision was reached after a thorough understanding as to the wishes of the several divisions of the A.R.A. with which the R.S.M.A. has been associated. The R.S.M.A. executive committee understands that it is the plan of divisions V and VI, A.R.A., to hold strictly business meetings during 1923. The executive committee believes that this action will meet with the approval of the members.

American Association News

Equipment Committee Organizes for Active Season

THE committee on equipment of the Engineering Association met at the association headquarters in New York on Jan. 12 and inaugurated detail work for this year. Those present were F. H. Miller, Louisville, Ky., chairman; Daniel Durie, Connellsville, Pa., sponsor; Walter S. Adams, Philadelphia, Pa.; Louis J. Davis, Brooklyn, N. Y.; Charles Gordon, Chicago, Ill.; J. L. Gould, Wilmington, Del.; M. O'Brien, St. Louis, Mo.; E. D. Priest, Schenectady, N. Y.; P. V. C. See, Akron, Ohio; Karl A. Simmon, Pittsburgh, Pa.; C. W. Squier, New York, N. Y., and W. G. Stuck, Lexington, Ky.

The subjects assigned to the committee were discussed in detail and subcommittees were appointed to make investigations and collect data. The subcommittee appointed to study gearing is Mr. O'Brien, chairman, and Messrs. Davis, Gordon, Hazlewood, Hipple, Priest, Stuck and Taurman. This committee is to secure the co-operation of gear manufacturers in the study which will be made and their representatives will be invited to the next meeting of the sub-committee. A questionnaire will be sent to operating companies requesting desired information.

The sub-committee appointed to study various devices for trolley contact, together with the effect upon trolley wire, will comprise J. L. Gould, chairman, together with Messrs. Davis, Gordon, Hipple, Priest, Stuck and Taurman. This sub-committee will use a questionnaire in connection with its work.

As a sub-committee to review existing standards with the idea of possible revision and for presentation to the American Engineering Standards Committee, the following were appointed: C. W. Squier, chairman, and Messrs. Adams, Gordon, A. J. Miller and See. This subcommittee was directed to consider changes in the association specifications for rubber hose and to co-operate with the association's representative on the American Engineering Standards Committee dealing with this subject. The question of tolerances for the bore of gears was discussed and will be included in the committee's work for this year.

A new subject to receive consideration this year is that of spring supports for railway motors. From the discussion which took place and the various data which have already been collected, it appears that this subject will prove interesting and beneficial. P. V. C. See, chairman, and Messrs. Adams, Davis, Gould, Hipple, O'Brien and Priest will comprise the sub-committee to consider this subject.

The subject of dust guards for bearings was discussed, and it appears that no standards for these have been developed as yet. The equipment committee believed that such standards ought to be prepared, and a sub-committee was appointed to consider this subject, as follows: Charles Gordon, chairman, and Messrs. Adams, Davis and Gould.

Purchases and Stores

A MEETING of the Engineering Association committee on purchases and stores was held in New York on Jan. 16, with the following members in attendance: B. J. Yungbluth, chairman; W. S. Stackpole, vice-chairman; R. H. Dalgleish, sponsor; Jackson P. Dick, H. H. Lloyd, J. F. Fleming, W. C. Bell and W. H. Staub.

The committee having been assigned the subject of reviewing the 1921 report of the joint committee on stores accounting, the discussion of this report at the 1922 convention was first considered. The committee concluded that the report as originally submitted should be approved and that the material classification recommended therein should be adopted by the association.

A sub-committee was next appointed to prepare a detailed statement explaining the use of the classification code, for the benefit of those who may desire to put it into effect.

After recommendations made by Mr. Dick concerning the enlargement of the scope of activities of purchasing agents and store keepers in association work had been considered it was decided that the committee would make a formal request to the executive committee to arrange for a session of purchasing agents and store keepers at the next annual convention. The session, of course, will be entirely aside from presentation of the committee report at the regular engineering meeting. The committee expects to present with its request a comprehensive program of the special session and will conduct an active publicity campaign to make the meeting a success. Chairman Yungbluth then appointed Messrs. Dick and Lloyd as a sub-committee which will be in charge of the program for this special session.

Next, the report of the 1922 committee on purchases and stores was discussed. The importance of reaching a definite decision regarding the material classification and forms recommended therein was considered essential to the determination of proper inventory methods. It is expected that definite decisions in regard to these matters will be reached at the next meeting, which has been tentatively set for March 5.

Traffic Regulations

THE committee on traffic regulations of the T. & T. Association held a meeting in Chicago on Jan. 17. Previous reports of this subject were reviewed, and it was decided that each member of the committee should write a brief description of the traffic situation in his city, along the lines of the traffic survey of Baltimore, which appeared in the Jan. 13 issue of the ELECTRIC RAILWAY JOURNAL. These articles will be reviewed later on by the committee, and recommendations will be made based on the situation in these large cities. A questionnaire will be sent to a number of railway companies, to determine the situation as to anti-parking regulations and limitation of track use by vehicles. These companies will also be asked to tell about the progress of methods for improving the handling of traffic in congested centers, with particular reference to limitation of left-hand turns, segregation of vehicle traffic, semaphore control of traffic, location of passenger stops, one-way streets, etc. The report of the committee will show a number of photographs of congestion along street railway lines in various cities.

Those who attended the meeting were: H. B. Flowers of Baltimore, chairman; Frank P. Edinger of Chicago, Henry O. Butler of St. Louis, F. R. Cogswell of Pittsburgh, also J. V. Sullivan and John E. Wilkie of the Chicago Surface Lines.

It is likely that another meeting of the committee will be held about May 1.

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The News of the Industry

Rapid Transit Body Complete

Transit Development to Be Planned for Detroit Based on 3,000,000 Population

The rapid transit commission for the city of Detroit has been completed by the naming of Andrew H. Green, president of the Charcoal Iron Company of America, as the fifth member of the commission. The other members are Sidney D. Waldon, chairman; Clarence W. Hubbell, former Detroit city engineer; Willard Pope, civil engineer, and H. W. Alden.

Program for Rapid Transit

D. L. Turner, consulting engineer of the New York Transit Commission, has been retained as consultant by the Detroit commission and an estimate made of the commission's budget requirements with which to carry out the survey. The commission will make a survey of the city's rapid transit needs, supplementing the report of Parsons, Klapp, Brinckerhoff & Douglas, which was completed about four years ago.

The City Engineer's office, the Department of Public Works and the Department of Street Railways will all be asked to aid the rapid transit commission in working out a program for a rapid transit system.

Acting Mayor John C. Lodge has outlined a fourfold task for the commission, visualizing a population of 3,000,000 for the city of Detroit in 1950, within the 20-mile radius. The immediate drawing of a budget is advised by Mr. Lodge, for although the sum of $50,000 has been placed at the disposal of the committee by the Council for preliminary expenses, this money can only be drawn upon after the acceptance of a budget.

Four or more construction programs for rapid transit are to be drawn up by the commission and a sound financial plan evolved to be submitted to the electors for decision at the April election, 1924.

Duties of Commission Outlined

The essential duties of the commission are outlined as under the following four heads:

1. Study of the records of the city of Detroit and other large cities having similar rapid transit problems.
2. Consult with foremost authorities on urban rapid transit and related subjects.
3. Prepare building and financial plans.
4. Collect and preserve all such records, drawings and documents as may be of use, and readily turned over to the Department of Street Railways or other departments as may be designated by the Mayor.

The Detroit Board of Commerce has made a suggestion that a general manager be employed for the Department of Street Railways, which according to H. H. Emmons, president of the board, was prompted by the thought that a general manager ought to be appointed before the coming election to remove the Department of Street Railways from the plots and counter plots of politics. Mr. Emmons voiced the belief of the board that the question of management of the Department of Street Railways should be settled as a business matter immediately and not become an element of politics.

The fact was pointed out that since the resignation of former Mayor James Couzens, the street railway system has been in the hands of three very capable men whose interests necessarily are centered on their own individual business, and although every man in the present administration is doing the best that can be done under the circumstances, the commissioners are working under difficulties because authority is not centralized as it is in other city departments and in successful businesses.

The board will co-operate with the Department of Street Railways in making a complete survey of the municipal system with a view to submitting a report and recommendations for future developments.

$338,000 Added to New Orleans Rate Base

Mayor McShane of New Orleans, La., cast the only dissenting vote at the Commission Council meeting on Dec. 26 against the financial report filed by the Public Service Company adding $338,000 to the base amount on which the rate of fare and the income of the company are to be computed. The report, dated as of Sept. 30, raised the rate base to $49,348,226 and showed that the total stock issue permitted at that time under the agreement between the utility officials and the representatives of the city was $8,104,913.

The report, showed that the gross income for September of the street car lines was $670,769; electric power and light, $299,859; gas, $185,266; while the operating expenses were: Street car, $393,011; electric plant, $162,939; gas, $101,198. The total gross income was $1,155,859 and operating expense $657,-149, leaving a profit of $498,745, from which were deducted a tax item of $113,568 and uncollectable bills, $1,375, giving a net profit of $409,220 after adding an item for miscellaneous income of $9,535.

From this the company deducted, as allowed by the agreement, $100,000 for renewals and repairs and $71,757 for miscellaneous expense, leaving $238,105 which the report showed had gone back into the funds of the company for additional upbuilding. An additional $100,-000 was added to cover payments made on car trust certificates.

$11,360,000 Scheme Probably Dead

Canadian Border Municipalities Vote Against Ambitious Electric Railway Project

The municipalities between Port Credit and St. Catharines, Ont., registered an adverse vote on Jan. 1 of more than $7,500,000, expressed in terms of money, on the hydro-radial scheme for a line between these two points, estimated to cost $11,360,000 odd. As the *Financial Post* of Toronto sees it, unless some ingenious way can be found to revive the proposal and thousands of dollars more are spent in propaganda work to induce balky communities to take another leap the project may be regarded as dead as a door nail.

Under the so-called Drury act the government provided machinery by which interested municipalities could have another chance to declare themselves on the matter if they wished to do so and, further, the government guarantee of bonus to the extent of the $11,360,000 would remain effective should the verdict at the polls be favorable. A stipulation was made, however, that if municipalities representing 15 per cent of the total liability went against the undertaking it would be considered defeated. Fifteen per cent of the total estimated cost of the road would have been slightly more than $1,707,000. What has actually happened, says the *Post*, is that upward of 70 per cent has been rolled up against the venture.

There were thirteen municipaities in all concerned in the original scheme which was first voted on Jan. 1, 1917. Saltfleet and one of the Flamboro townships never would allow themselves to be courted by the Hydro officials from the very first and legislation was got through by which the other eleven places, without a revote of the electors, would be required to absorb the portion of liability which had been charged up against these townships. It seemed for a while as though the radial promoters might get their enterprise through on this basis, but the Sutherland Commission came along in 1921 and by a majority report gave the whole project a black eye. Then the Drury government performed a surgical operation on the hydro-radial act which was in force at that time and created a new act which practically stated that if the qualified voters of the municipalities from Port Credit to St. Catharines were really anxious to invest their millions they could have one more try by voting on by-laws an agreement on Jan. 1, 1923. In order, though, that there might not be any empty dreams about the government's guarantee of bonds to finance the road the Drury administration inserted the 15 per cent disability clause.

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The municipalities which went against the scheme with the amounts for which they were to become liable are as follows: Hamilton, $5,869,286; Saltfleet township, $1,002,296; North Grimsby, $424,077; East Flamboro township, $266,626; West Flamboro township, $66,669; and Barton township, $284,484, making a total of $7,913,438, or about 70 per cent of the $11,360,000.

Louisville Carhouse Partly Destroyed

Fire broke out at 11:45 p.m., on Jan. 15 at the Fourth Street carhouse of the Louisville Railway. As a result fourteen double-truck cars, fifteen single-truck cars and six trailers were destroyed, while a number of other cars were slightly damaged. The fire started in one of the cars in the L-shaped carhouse. The loss is estimated at $350,000 by President James P. Barnes, who also reported the company as insured. A few cars were still in service at the time of the fire. Cars on the south side of the house were not damaged to any extent. Most of the loss was of equipment used on the Fourth Street line, but normal service was resumed on the morning of Jan. 16, the first car leaving the carhouse at 4:32 a.m., a temporary dispatcher's office having been established in a car. The company has fifty-five one-man cars on the way from the manufacturers. It doesn't expect to have any trouble in taking care of its service. The work of the fire department was pronounced as being exceptionally good by the officials of the railway.

Conductors Arrested for Using Mutilated Coins

Federal authorities in Chicago, on Jan. 10 arrested two conductors for using mutilated coins with intent to defraud. A claim has been made that conductors were using flattened dimes to beat the fare boxes on the cars of the Chicago Surface Lines. Secret Service agents made an investigation and, as a result, they caught two conductors in the act. These men were Isaac Kraft and John Farrell, who had been in the company's service fifteen years and ten years, respectively. Kraft waived examination, and is said to be ready to plead guilty. Farrell was held for the Grand Jury.

These men were arrested for violation of Section 165 of the Federal Criminal Code, under which they are subject to a fine of $2,000 or imprisonment of five years, or both penalties. It is said that these two conductors flattened dimes so that they had the diameter of a penny and would register as such—thus defrauding the company of 9 cents each time the trick was worked.

The Secret Service agents of the government said this is a serious offense and they have successfully prosecuted conductors under this Section in other cities.

Revised Franchise Will Be Submitted

Resolutions Adopted Seek Old Franchise With Modifications—Bondholders' Approval May Result in New Election in April

Another attempt is to be made to obtain a resumption of street car service in Saginaw, Mich., with motor coach extensions to sections of the city not served in the past by the cars.

A revised franchise that was defeated at the polls Nov. 7, will be submitted. Just how radically different from the other it will be, is not known, as it will depend upon the attitude of the bond owners protective committee of the bankrupt Saginaw-Bay City Railway Company.

Litigation Ended Jan. 10

The litigation in the Circuit Court ended on Jan. 10 when in an opinion by the two judges nearly 1,000 "Yes" votes and several "No" votes were declared invalid. But this action seemed only to spur on the proponents of street cars to try again, and at a subsequent meeting of eighteen civic organizations summoned by the Board of Commerce, resolutions were adopted asking the trustee in bankruptcy, Otto Schupp, to agree to the same franchise with eleven modifications that seemed to be objectional last November. Mr. Schupp has not answered the resolutions, as he is to submit them to the bond owners for their approval.

It is planned, if they meet with the bond owners' approval, to ask the Council to submit the franchise at the election April 2, and if they refuse then start the circulation of petitions to initiate the franchise as was done last November.

The franchise that was defeated provided for the following rates of fare to obtain for two years, ten tickets 50 cents; four tickets 25 cents; 10-cent cash fare; universal transfers. After two years if the Council or the grantee were unable to agree, the Public Utilities Commission was to fix the rate of fare. The term of the grant was twenty-five years, and the company was to be relieved of all paving and repaving but was to pay for all extra ballast necessary because of the construction of its tracks, and was to keep the paving in repair between and 1 ft. outside the outside rails.

New Work Prescribed

Certain new work was to be done and a time limit was fixed. It meant a rehabilitation of the property. As there was some doubt about enforcing that part of the contract which was included by correspondence between Mr. Schupp and the bond owners' committee, the recent meeting incorporated the following in the proposed franchise to be submitted; not less than $400,000 was to be expended for improvements and equipment. The Council is to receive a detailed statement of expenditures and the right for a city audit of the books was included. Two thirds of the board of directors are to be Saginaw men. No by-laws are to be passed to deprive any of the Saginaw directors of their rights under the state law. Provision also is made that the directors hold stock in the company that they may qualify.

Other provisions of the franchise are: That the company is to be distinct from all other local utilities. Books and records are to be kept in Saginaw so they will be available for inspection at all times. That the grantee will in four months resume complete operation. Council given authority to restrict business district operation of freight cars on the Michigan Railroad within one year from date of the acceptance of the franchise. The Council be given the right to require the company to substitute new transportation when initial means becomes obsolete or impracticable. That the franchise may not be construed to restrict or in any way affect operation of motor trucks or taxicabs.

Of the eighteen representatives present seventeen were in favor of the above provisions. The exception was against the last grant and he took the position that disputes and rates of fare should be adjusted at home and not by the utilities commission. He also objected to the length of the grant.

When the franchise was last submitted it lacked the necessary 60 per cent for approval by fifty-seven votes. It is not known what the final count will be made until the board of canvassers completes its work under the Circuit Court opinion. Eight hundred "yes" ballots were declared invalid because of blundering by election inspectors, all but thirty-four votes in one election precinct being thrown out and 296 in another.

Council Opposed to Franchise

The council to a man was opposed to the franchise, yet it attracted an affirmative vote greater than ever accorded any municipal proposition or candidate in the history of the city and the negative vote against the measure is the chronic "no" vote registered against all public matters a study of the votes on various questions shows not only at the last general election but other years as well.

Although the franchise lacked a few votes of adoption on two occasions recently Mayor B. N. Mercer has conferred with George L. Bidwell of New York, president of the Trackless Transportation Corporation, relative to the installation of a motor bus company in Saginaw. As to the progress that has been made nothing definite in regard to the progress of the matter is known, as the chief executive refuses to make any statement on the subject.

It is expected, however, that Mr. Schupp will shortly be prepared to answer the resolutions, at which time, if the resolution can be included in the franchise, an active campaign will be started to have the measure approved by the electors.

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Mr. Mitten's Letter to a Stockholder

In a recent issue of "Service Talks" T. E. Mitten, president of the Philadelphia (Pa.) Rapid Transit Company, in replying to a letter from one of the stockholders of the company said in part:

It gives me pleasure to know that you are satisfied with the results secured by this management. The recent retirement of certain efficiency men need give you no concern, since the operating economies which they were brought here to effect have all been accomplished. The work is now being effectively done by carefully trained men, advanced from the ranks, who are in closest sympathy with the Co-Operative Plan.

"One-man management" is a term coined by our adversaries, which can be only truthfully applied if "every-man" is meant. The secret of our present and future success does and must lie in operating officers who are in sympathy with the workers, so that the every-day watchfulness of our 10,000 employees may continue, and their experience be made more and more useful in perfecting our operating practice.

Competent assistants, from the ranks of our own employees are being carefully trained to fill every position of consequence, including my own, to the end that this great work shall go on uninterruptedly, the confidence reposed in me by the stockholders fully justified, and the participation by the men in the ownership of this property intelligently perpetuated.

The loyalty and co-operative efficiency of our employees is unparalleled. These employees are stockholders who have voted to make the payment of the last 10 per cent of their annual wage conditional upon their first having earned and paid the fixed charges of the P. R. T. system and a dividend of 6 per cent to P. R. T. stockholders. This is the greatest possible assurance that the P. R. T. dividend will be continuously earned. Organized labor has no righteous cause against us.

In the matter of P. R. T. publicity, the money cost is believed to be most wisely expended in the advancement and protection of this property. I would ask that you regard these publications as a means of setting forth the facts relating to the various problems confronting this property before the three interested parties—the car rider, the employee and the investor. Only by frank statement and fair dealing has it been possible for P. R. T. men and management to secure such a large measure of public confidence.

New Jersey Governor Raps Utilities

George S. Silzer was inaugurated Governor of New Jersey at Trenton on Jan. 16. In his inaugural address to members of the Legislature the new Governor recommended a legislative investigation to fix the prudent investment value of the various railway properties in New Jersey and predicted that a fare of 5 cents or less would be possible. He bitterly denounced the street railways for watering stock and declared that if they had properly handled their business there would have been no need for an 8-cent fare today. In requesting the lawmakers to investigate the property value of these concerns, he asserted that as he had conceived that value, after study, he was sure it would bring about a 5-cent fare and later a further reduction. This value, however, would, according to the Governor's plan, only be fixed after advice from the Public Utility Commission.

After this proposed investigation the new Governor recommends that a sliding scale basis be adopted for future fare charges. Starting with a 5-cent fare, according to his idea, the companies should be permitted to earn 6 per cent on prudent investment. If the profits increased, then the fare would be reduced to 4 cents and the companies permitted to earn 8 per cent and so on, producing an equitable decrease of fare and a corresponding increase in dividends.

In connection with this attack upon the street railways, the Governor said that the same principles involved should apply to the various light, heat and power companies. In solving this whole problem, he said, there are but two equities to be considered—the security holders and the public—and after carefully weighing the right of both he declared that the equities are in favor of the "innocent public," and asserted that "we must follow the course that brings this result."

Cost-of-Living Chart Presented

The Boston (Mass.) Elevated Railway explains in *Co-operation* for January, 1923, that in July, 1920, Mr. Doherty made an award of 70 cents an hour as the maximum rate for conductors and motormen. It says that in view of the fact that the cost of living as published by the Massachusetts Commission on the Necessaries of Life has, of late months, shown an increase, attention has been directed to the reduction in the hourly rate mutually agreed upon. As in the discussion of the eight-in-ten hour law in the bulletin issued March 15, 1921, it is explained that it is the desire of the management that all questions be considered fairly, intelligently and upon the facts. In consequence it has presented a chart which it says should be the basis upon which consideration of the subject rests.

Directly following the Doherty award, the cost of living declined rapidly, and while during the last few months it has increased, the company says it is about at the same point as in 1918, when the War Labor Board made the award of 48 cents an hour. Examination of the chart also indicates, says the company, that the War Labor Board and the Endicott Award raised the rate per hour to the cost of living line, and the Doherty award raised the rate slightly in excess of the increase in cost of living.

Since that award, the agreements mutually entered into have provided a margin between the downward fall of cost of living and the decrease in rates, so that today, allowing for the change in hours per day, the maximum 61-cent rate is 24 per cent above the cost of living line.

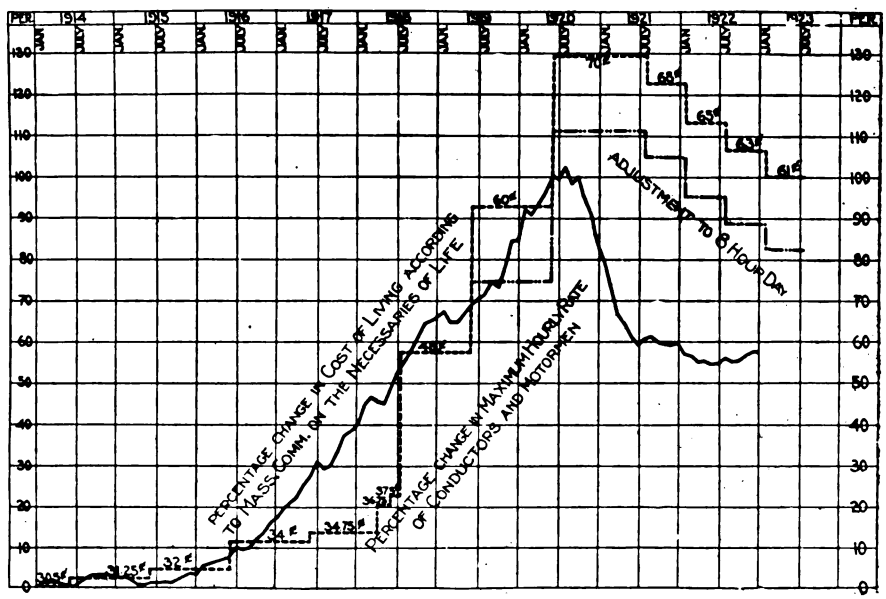
The trustees of the company referred to the reduction being less than the fall in the cost of living as follows:

1. The fact that although a substantial decrease has already taken place in many items affecting the cost of living, that cost is not yet upon any settled basis, so that it is peculiarly a fitting time to put in practice the belief of the trustees that to be consistent they should be as deliberate and conservative in following the cost of living when it is upon a downward trend as in following it when it is in an upward movement.
2. The fact that they thoroughly appreciate the co-operation that the men have given to the management during the past year. The existence of this spirit has financial, as well as other value, in the conduct of this service.
3. The fact that as public officials they are in charge of a public business and should be careful not to follow any other rule than that of a full fair wage for work that is earnestly performed.

It would not seem difficult to keep up the spirit of co-operation and service to the car riders under such conditions nor have much concern for a future which has not as yet arrived.

$1,220 Goes to Safety Teams

The Nashville Railway & Light Company, Nashville, Tenn., distributed a cash bonus of $1,220 last Christmas. This sum was divided among the safety teams which had taken part in the accident reduction contest starting Oct. 1 and ending Dec. 19. The number of accidents for the year just ended, namely 1,680, shows a reduction of 489 as compared with the 1921 total. It was pointed out by railway officials that these figures are significant in view of the fact that traffic and congestion had increased considerably in 1922 due to the increased number of automobiles.



Boston Elevated Cost of Living and Wage Chart

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Financial and Corporate

Receiver for Queens Line

Company Has $7,694,394 of Unfunded Debt—Interborough Advanced Company $7,000,000 — Will Quit Now

Gen. Lincoln C. Andrews, who has been executive officer of the New York Transit Commission for the last two years, was appointed receiver for the New York & Queens County Railway on Jan. 18 by Justice James C. Van Siclen in the Supreme Court, Long Island City. Application for the receivership was made by W. W. Green of Alexander & Green, attorneys for the Bankers' Trust Company, trustees for outstanding bonds of the company.

ROAD A DRAIN ON INTERBOROUGH

The New York & Queens County Railway is a subsidiary of the Interborough Rapid Transit Company and the application for a receivership followed the recent declaration of Colonel Grayson M. P. Murphy, the new chairman of the executive committee of the Interborough board of directors, that the Interborough Company would no longer pay the recurring deficits of the Queens County Company but would concentrate its resources in improving its existing rapid transit facilities and in co-operating with the public authorities to build new lines.

Announcement to this effect was made on Jan. 15 by Colonel Grayson M. P. Murphy, the new chairman of the executive committee of the Interborough board of directors, following a conference with a delegation of residents of Queens. Colonel Murphy promised the Queens residents that the Interborough would co-operate in every way in the reorganization of the company and would continue to furnish it power to prevent any break in operation.

$781,000 NEEDED FOR IMPROVMENTS

The New York & Queens County Railway now owes $350,000 in taxes and the city has judgments for paving amounting to $237,206. The total unfunded debt of the company is $7,694,394.

The three controlling reasons which impel the Interborough Company to take action now are these:

1. For the Interborough to continue the operation of the Queens County lines will require a further advance of funds for both capital expense and to make up deficits. The Interborough management feels that all their resources should be devoted to improving the service of the subway and elevated.
2. The Interborough management has come to the conclusion that its sole function should be that of providing rapid transit and that accordingly it would relieve its officers of the responsibility for the management of lines which present a different and a difficult problem in themselves.
3. In view of the foregoing, the Interborough company should retire immediately and allow an independent interest to obtain possession of this property and thus develop it for the promotion of public convenience.

Some idea of the drain which the Queens County system has been upon the Interborough can be gathered from the fact that during the past twenty years the Interborough has advanced to the Queens County lines nearly $7,000,000. During all of these years there has been a substantial operating deficit, and in 1922 the receipts from the operation of the Queens County lines were $450,000 less than the actual expense for operation.

The Transit Commission's engineers have estimated that $781,000 of new money will be needed to put the lines in first-class operating condition. The most valuable parts of the system, the Steinway lines, comprising practically all the tracks east of Woodside and separating the lines now operated by the company from Manhattan, are being operated under a receivership obtained by the holders of the underlying bonds of the old Steinway Railway. Passengers traveling over the two parts of the once united system now not only have to pay two fares but to change cars. Slaughter W. Huff, president of the Third Avenue Railway, and Robert C. Lee are receivers of the Steinway Railway.

Preferred Stock Payment Plan Announced

The directors of the Alabama Traction Light & Power Company, New York, N. Y., have proposed to the holders of the $1,000,000 of 6 per cent preferred stock a plan for funding the accrued dividends in order to permit of the payment of future dividends in cash. A provision is made that any shareholder who is unwilling to accept payment in stock will receive an undertaking from the company to pay such dividends in cash at a future date. A dividend of 48 per cent has been declared on the preferred stock covering the cumulative dividend periods to Dec. 31, 1922, payable to shareholders of record on that date on surrender of the warrants either in preferred stock at par or on or before Dec. 31, 1925, in cash without interest. Option of exchange must be exercised before Aug. 1, 1923. All new stock issued in payment of dividends to shareholders exercising this option will be entitled to 6 per cent dividends cumulative from the date of issue.

Dismantling Work Under Way

Work of dismantling the Springfield & Washington Railway, operating between Springfield and South Charleston, Ohio, was started Jan. 2. Order permitting the company to discontinue service on the line Dec. 31 was issued some weeks ago by the Ohio Public Utilities Commission.

All of the material with the exception of 3 miles of track will be sold as junk. These 3 miles of track will be used by the Baker Wood Preserving Company to provide switching facilities.

Refinancing Plan Made

American Railways Would Pay Accumulated Dividends on the Preferred Stock in Additional Stock

Plans have been announced for refinancing the American Railways, Philadelphia, Pa. Accumulated dividends amounting to 19½ per cent on the $4,000,000 (par value $100) 7 per cent first preferred stock of the company will be paid in additional preferred stock if two-thirds of the holders of the common and preferred stocks of the company approve.

Future quarterly payments on the first preferred stock also will be paid in the same manner until there has been accumulated out of earnings after Jan. 1, 1923, a surplus of $1,000,000. Thereafter, the plan states, if earnings of the company warrant, cash dividends on the preferred stock will be resumed. A special meeting of stockholders will be held in Camden, N. J., on Feb. 1 to act on the plan.

The plan also provides for sale by the company of all its common stock equity in the Ohio Valley Electric Railway, Ironton Electric, Boyd County Electric, Lynchburg Traction & Light and Roanoke Traction & Light Companies to the Consolidated Light, Heat & Power Company, which is owned by the American Railways.

The Consolidated Company will issue approximately $7,000,000 of bonds and $1,500,000 of cumulative 7 per cent preferred stock, the proceeds of the sale of these securities to be used in paying the American Railways for the stock of the other companies, a total of approximately $7,500,000, the remainder to be used for installation of new power equipment.

The plan further provides for redemption of $3,000,000 of 7½ per cent gold notes of the American Railways due Feb. 1, 1925; retirement of not less than $1,000,000 of its five-year 8 per cent notes; extension of the Wilmington & Chester Traction Company collateral trust gold extended 6s, due April 1, 1923; retirement of the $4,000,000 second preferred stock and an increase in the authorized first preferred stock from $4,000,000 to $8,000,000, and a change in the name to the American Electric Power Company.

Van Horn Ely, president, in a letter to shareholders, says:

> The directors unqualifiedly recommend to the stockholders approval of the plan for refinancing, which in their judgment is a constructive one and places the company on a firm financial basis. The company has concluded arrangements with bankers who have agreed, subject to the satisfactory completion of the foregoing plan, to undertake the formation of a group for the purchase of all of the securities involved.

The directors of the company, according to Mr. Ely, are firm in the conviction that, if the earnings continue during 1923, as they have indication of so doing, the necessary surplus to warrant resumption of cash dividends on the preferred stock will be reached before the close of this year.

Approximately $11,000,000 of new securities will be issued under the plan.

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Ordinance Defers Tax Payment

With four negative votes and after an address by Councilman Edwin Kellogg, the Council of Cincinnati, Ohio, on Jan. 10 passed an ordinance deferring for six months payment of the $350,000 franchise tax provided for in the service-at-cost franchise granted the Cincinnati Traction Company.

Councilman Martin referred to the fact that the recommendation for the deferment had been made to the Council by Mayor George P. Carrel's traction committee, members of which were of the opinion that an increase in fares resulting from a refusal of the Council to defer payment of the tax might seriously interfere with the adjustment of the traction problem. He also called attention to the fact that before the city could obtain any part of the money due under the franchise the company would collect $160,000 due it as earnings under the franchise.

He said further that the deferment ordinance was introduced merely as a riding over measure until committees representing the Cincinnati Traction Company and the Cincinnati Street Railway could agree on a basis for the reorganization of the two companies. He promised that when that time came a new ordinance would be passed to take the place of the present service-at-cost ordinance which would eliminate parts of the ordinance now found to be objectionable.

Bankers Suggest Purchase Terms Be Arbitrated

E. M. Sanderson, of Sanderson & Porter, was one of the delegation that waited on the members of the City Council of St. John and later on the government of New Brunswick in St. John, N. B. Others in the delegation were Henry R. Hayes, of Stone & Webster, New York City, chairman of the public utilities securities committee of the Investment Bankers' Association of America; O. B. Willcox, New York, counsel of the Investment Bankers' Association of America; R. D. Bell, Montreal, and E. C. Long, Toronto, representing the Bond Dealers Association of America, the former being the chairman of the public utilities committee of that body.

The members of the delegation asked the members of the City Council of St. John to arbitrate the dispute between the city and the New Brunswick Power Company over the question of purchasing the undertaking, and suggested a higher value in the street railway property than that fixed by the city. The city's offer of $2,577,665 for street railway, gas plant, electric light and power plant and real estate was pronounced much too low. Several of the members of the City Council agreed to the view that the price was too low, but refused to listen to the suggestion that the dispute be submitted to arbitration. The delegation told the members of the City Council that continued hostility to the New Brunswick Power Company and refusal to offer a figure higher than the sum named for the property would create an unfavorable feeling against St. John in financial circles.

At the meeting with the New Brunswick government, the delegation endeavored to induce the government to interfere and demand that the members of the City Council of St. John submit the controversy to arbitration. This the government has refused to do, stating the dispute is one wholly between the city of St. John and the public utility corporation.

Tentative Plan Drawn for B.R.T. Reorganization

A tentative plan for the reorganization of the Brooklyn Rapid Transit system formulated by protective committees for the two principal securities —$74,520,000 stock and $57,230,000 gold notes of 1921—has been submitted for consideration to committees representing other securities of the system. This is a step forward in the reorganization, which is not yet in shape for announcement of details.

According to the *Wall Street Journal* the tentative plan provides for a new issue of 6 per cent collateral trust bonds to replace existing 7 per cent gold notes of 1921, the exchange to be accompanied by partial payment in cash of accumulated interest since June, 1919. New bonds, if the tentative plan is adopted, will be secured by New York Municipal Railway first 5s, at present pledged under the notes. B. R. T. 5s of 1945 and the first refunding 4s of 2002, it is believed, are similarly to be replaced by the new 6s. The latter issues, owing to pending litigation involving priority of property liens, will require extensive negotiation before an agreement can be reached, but it is hoped by July 1, next, to have secured agreement of all interests. The amount of cash payable to noteholders has not been finally agreed upon; cash payments to B. R. T. 5s and 4s cannot at the present time be estimated with accuracy.

Stockholders, under terms of the tentative plan, will be asked to subscribe for new securities, principally collateral trust 6s, to the extent of approximately $35 for each share held.

Auction Sales in New York.—At the public auction rooms in New York, there were no sales of individual electric railway securities this week.

Would Tax Net Income.—A petition filed by D. A. Baldwin with the State Legislature on Jan. 11 asks that a tax be placed on the net income of electric railways of Massachusetts instead of the present franchise tax.

Abandonment Approved.—The stockholders of the Brooklyn (N. Y.) City Railroad on Jan. 8 approved the resolution which provided for the abandonment of the company's line beginning at the intersection of Furman Street with Fulton Street along Furman Street to Atlantic Avenue, Brooklyn, N. Y.

Authorizes Disposal of Certificates.—The Northern Massachusetts Street Railway, Athol, Mass., has been authorized to dispose of $25,000 of receiver's certificates. It was shown that unless the company was enabled to borrow money to pay certain bills it would have to cease operating its lines, which serve the section from Orange to Fitchburg.

Wants to Issue Bonds.—Pacific Gas & Electric Company Sacramento, Calif., has applied to the Railroad Commission for authority to issue $5,490,000 face value of its general and refunding mortgage gold bonds and to deposit and pledge them with the Mercantile Trust Company under the terms of the company's first and refunding mortgage.

Railway Reorganized. — The York (Pa.) Railways reorganized on Jan. 8 and elected the following new directors: George E. Baker, Gordon Campbell, L. B. Harvey and Joseph W. Swain. A statement was issued showing the York Railways and its allied public utility corporations expended during the past year for improvements $30,000.

Date on Valuation Argument Announced.—The Missouri Public Service Commission has set Feb. 15 as the date for the argument in the United Railways of St. Louis valuation case. Action was taken on request of former City Counsellor Caulfield, special attorney for the city, who asked for additional time to reply to company's brief.

Line Bought.—The Chicago, Aurora & De Kalb Electric Railroad, Aurora, Ill., was recently bought at a mortgage foreclosure sale in Geneva for $90,000. It was bought by Israel Joseph, an iron dealer of Aurora. The line is 31 miles long and runs between Aurora and De Kalb. The new owner did not state whether he would junk the line or operate it.

Lake Pontchartrain Road Elects Directors.—At the recent annual meeting of the Jefferson & Lake Pontchartrain Railway, a subsidiary of the New Orleans Public Service Company, Inc., the following directors were elected for the ensuing year: R. S. Hecht, J. P. Butler, Jr., J. D. O'Keefe, Hugh McClosky, Joseph D. DeGrange, Harold Newman, A. D. Parker.

To Sell Preferred Stock.—A license has been granted by the state securities commission to the Salt Lake & Utah Railroad, Salt Lake City, Utah, to sell 500 $100 shares of its 7 per cent cumulative preferred stock at a discount of $5 a share. A sales commission of 3 per cent has been granted by the commission. The proceeds of the stock sale will be used for new construction work.

Gold Bonds Offered.—A $3,000,000 offering is being made of the first lien and refunding 6½ per cent gold bonds of the Central Power & Light Company, St. Louis, Mo. Upon completion of this financing the company will operate directly or through its subsidiaries thirty-two central electric power stations and do a gas, water and street railway business in sixty-three cities.

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Net Income $1,258,487.—The Market Street Railway, San Francisco, Calif., for the eleven months ended Nov. 30, 1922, reports a railway operating revenue of $8,744,616 and expenses $6,288,408. The net income, which included no provision for federal income tax, sinking fund or betterments, amounted to $1,258,487.

Traffic Decreases.—According to the annual report of the Nashville Railway & Light Company, Nashville, Tenn., there was a falling off in traffic in 1922 compared with 1921. There were 34,000,000 passengers in 1922 which represents a loss of 5 per cent. The mileage operated was approximately 5,350,000 miles which showed an increase in service rendered during the year.

Authorizes Abandonment.—On Sept. 26, 1922, the California State Railroad Commission authorized the Pacific Electric Railway to abandon a portion of its single-track line, 2.3 miles in length, and known as the Terracina line in the city of Redlands. That portion of the Terracina line abandoned was producing so little traffic as to justify discontinuance of service. The railway company has taken up its tracks.

Falling Off in Receipts.—In his annual message to the stockholders for the year ending Nov. 30. 1922, Gordon Campbell president of the York (Pa.) Railways states that the decrease in traffic from the peak of 1920, continued in the railway practically to the end of 1922. It was then that the normal increase appeared to show itself. Compared with 1921 the railway receipts showed a decrease of about $20,000.

Special Dividends Declared. — The Columbus Railway, Power & Light Company, Columbus, Ohio, has declared a special dividend of 2½ per cent on the outstanding common stock payable Jan. 20 to holders of record on Jan. 10. No dividends on the common stock have been paid since 1917 when the quarterly dividend payments of 1¼ per cent starting in May, 1914 were terminated.

Five Months Income Reported.—The passenger revenue of the Brooklyn (N. Y.) City Railroad for the five months ended Nov. 30, 1922, was $4,861,766 against $4,685,461 for the same period in 1921. Operating expenses and taxes increased from $3,956,568 to $4,016,433 for the five months ended Nov. 30 of this year. The net corporate income amounted to $783,016 against $633,876 for the period ended Nov. 30, 1921.

Gold Bonds Offered.—Fletcher American Company, Indianapolis, and Illinois Trust & Savings Bank, Chicago, recently offered $973,000 twenty-five year first mortgage 6 per cent gold bonds of the Indianapolis, Columbus & Southern Traction Company, Columbus, Ind. The price was 100 and interest. The bonds are dated Feb. 1, 1923, and are due Feb. 1, 1948. The purpose of the offering was to refund an issue of first mortgage 5 per cent bonds due on Feb. 1, 1923.

Debenture Bonds Offered.—Bonbright & Company New York, N. Y., are offering at 90 and interest to yield about 6.70 per cent $2,500,000 gold debenture bonds of the United Light & Railways Company, Grand Rapids, Mich. The bonds, known as Series "A" 6 per cent, are dated Jan. 1, 1923, and are due Jan. 1, 1973. The proceeds will provide funds for the retirement of the 8 per cent bond-secured gold notes due Nov. 1, 1930, which will be called for redemption at once.

Will Increase Common Stock.—The Indiana Public Service Commission has authorized the Lafayette (Ind.) Street Railway, Inc., to increase its common stock from $125,000 to $200,000 and to issue $200,000 of twenty-year 7 per cent bonds. The corporation will withdraw and cancel its $125,000 of preferred stock which was authorized but never issued. The new securities issue was authorized, it is said, to reimburse the company for capital expenditures made or contemplated.

Stock Issue Authorized.—The Alabama Traction Company organized by John B. Weakley, Birmingham, and associates to take over the electric railway systems in Albany and Decatur, Ala., was granted authority by the Public Service Commission to sell $50,000 in common stock of the company and to issue $150,000 of twenty-year 6 per cent mortgage bonds. The first mortgage bonds will be used in acquiring the property of the North Alabama Traction Company under the court's approval.

Property Transfer Made.—On Jan. 8 the Tiffin, Fostoria & Eastern Electric Railway transferred its property to the Tiffin & Fostoria Railway, recently organized to take over the line. C. F. M. Niles, Toledo, is president of the new company and Samuel B. Sneath, Tiffin, is secretary. Mr. Sneath was also secretary of the Tiffin, Fostoria & Eastern. The consideration was $175,000, and the new company filed a mortgage for that amount to the Ohio Savings Bank & Trust Company, Toledo. No change in management is involved in the transfer, the line remaining virtually under the same ownership.

Warrant Basis Date Announced.—City treasurer and city comptroller of Seattle, Wash., have announced that Seattle's Municipal Railway fund will go on a warrant basis on Jan. 25, instead of Jan. 10, as first planned. With the fund on a warrant basis, employees will be unable to cash warrants with the treasurer, and banks will probably only cash them at a discount. A bond interest and redemption payment of $1,243,975 is due Feb. 1. Of this amount, $833,000 will be for bond redemption. This calculation does not take into consideration the payment of warrants Jan. 25, which will be approximately $275,000.

Line Sold.—The Millers Falls branch of the Connecticut Valley Street Railway, extending from Turners Falls to Millers Falls, Lake Pleasant and Montague, Mass., has been sold to Michael Blassburg, a junk dealer, of Turners Falls, who is about to dismantle the property. The branch was opened to traffic in June, 1895, and was prosperous for a time. The first setback was met with in the revoking of boating and fishing privileges on Lake Pleasant, and the rise of the automobile and the motor bus brought the branch to a condition regarded as hopelessly unprofitable. Service was discontinued recently.

1922 Better Than Previous Year.—The Stark Electric Railroad, Alliance, Ohio, carried 3,142,949 passengers in 1922. This was 348,600 more than in 1921. The banner month of the year was December when 296,169 were carried. In December, 1922, 9,000 more passengers were carried in the city than in the previous year. The income for passenger traffic for the year 1922 was about $20,000 less than the income of the previous year. This was caused mainly by the reduction of fares in Canton and Alliance and the issuance of tickets between Louisville and Canton. Though the receipts from fares are less yet the gross receipts the past year were greater than the year previous. There were fewer accidents in 1922 than in 1921.

Abondonment Order Issued.—Orders for the immediate abandonment of the New Carlisle junction branch were issued by Federal Judge Killits in Toledo, Jan. 15, according to announcement from the local headquarters of the Indiana, Columbus & Eastern Traction Company. The order comes as confirmation of a decision of the State Public Utilities Commission, set to go into effect at midnight Dec. 31, last, but held up by protests of residents along the line. At the same time, Judge Killits gave protestants to the abandonment of the Lima-Defiance division until Feb. 1 to raise funds to purchase the branch, after which date, unless sold, the Indiana, Columbus & Eastern is authorized to abandon service. No decision has been handed down in the case of the Columbus-Orient branch.

Northern Ohio Electric Report Shows Big Gain.—The Northern Ohio Electric Corporation, Akron, Ohio, in its annual report for 1922 shows net income of $122,544, or $1.63 a share, earned for the 75,000 shares of common stock outstanding. This compares with a deficit of $117,741 in the preceding year. Gross revenues totaled $9,354,964, a gain of $682,886 over 1921, but $1,659,881 less than in 1920, the record year. Net after taxes was $2,457,191, and the balance after charges, but before depreciation and preferred dividends was $482,544. After allowing for dividends on the preferred, none having been paid since Dec. 1, 1919, there was net of $122,544 available for the common. Bank loans were reduced by $720,000 in 1922, partly by the use of funds derived from sale by the Kent Water & Light Company of its electric property to the Northern Ohio Traction & Light Company. The balance sheet shows cash of $23,874 and securities $9,762,222. Notes payable stand at $2,880,000, construction reserve $232,786 and surplus $179,139.

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Traffic and Transportation

Through Routes and Joint Rates

Père Marquette Required to Meet Demands Made Upon It by the Michigan Railroad

The Michigan Railroad has won a victory before the Interstate Commerce Commission over the Père Marquette Railroad and others. The commission has entered an order requiring the Père Marquette Railroad to establish through routes and joint rates in connection with complainant between points on complainant's line in the State of Michigan, namely Saugatuck, Vriesland, Forest Grove, Jamestown and Frankenmuth and certain interstate points on defendant's lines.

COMMISSION'S ORDER QUOTED

In the commission's own words:

We find that complaint (Michigan Railroad) is engaged in the general transportation of freight and that, subject to the above limitations, through routes and joint rates between Saugatuck, Vriesland, Forest Grove, Jamestown and Frankenmuth and various interstate points on defendants' lines are necessary and desirable in the public interest.

We will accordingly require defendants to establish in connection with complainant between Saugatuck, Vriesland, Forest Grove and Jamestown on both carload and less-than-carload traffic, and Frankenmuth on carload traffic, on the one hand, and the interstate points from and to which through routes and joint rates are at present maintained in connection with complainant's Allegan-Battle Creek division on the other hand, through routes and joint rates which, as to traffic destined to points on complainant's lines, will not short-haul its connections, and which, as to traffic from points on complainant's lines, will reserve to complainant its long haul; provided, however, that such through routes and joint rates are not hereby required to be maintained over circuitous routes.

The commission said that the record did not afford sufficient basis to enable it to prescribe reasonable rates or divisions of rates in connection with these routes and that if complainant and defendants are unable to agree upon reasonable rates, as well as just, reasonable and equitable divisions thereof, the matter may again be brought to the commission's attention.

The electric road operates lines wholly within the State of Michigan, extending from Saugatuck on Lake Michigan, through Holland, northeasterly to Grand Rapids, a distance of 44.8 miles; from Grand Rapids southerly through Monteith to Kalamazoo, 49.7 miles; from Battle Creek northwesterly, through Monteith on complainant's Grand Rapids-Kalamazoo division, to Allegan, a distance of 42.5 miles. and from Flint northerly through Saginaw to Bay City, with a spur to Frankenmuth, a total distance of 65 miles. The company's Flint-Bay City line has no physical connection with its other lines.

Practically all the steam carriers in the United States were parties defendant. The electric road or its predecessor started its freight business in September, 1913, by the purchase of the Allegan-Battle Creek line from the Michigan Central. Through routes and joint rates are maintained by defendants in connection with complainant from and to all points on this line; the complainant having succeeded to the Michigan Central's tariffs.

In the proceeding just decided the electric road applied under section 15 of the interstate commerce act for the establishment of similar through routes and joint rates from and to points on its Saugatuck-Grand Rapids and Grand Rapids-Kalamazoo divisions, and on its Flint-Bay City division between Mount Morris and Bridgeport, and asked that the Interstate Commerce Commission prescribe the divisions of such rates. It alleged that the failure and refusal of defendants to establish such routes and rates constituted violations of section 1, paragraph 4; section 2 and section 3, paragraph 3, of the act, but it adduced no evidence in support of the alleged violations of section 2.

In its decision the commission said that the right of the electric road to relief under section 15 depended upon whether it engaged in the general business of transporting freight in addition to its passenger and express business, and was able to maintain in connection with defendants the through routes and joint rates prayed for; whether such through routes and joint rates were necessary or desirable in the public interest; that is, whether they were practicable and would substantially serve the convenience of the public; and whether by the establishment of such routes any of the defendants would be short-hauled.

Railway to Install Bus Service

East St. Louis Railway, East St. Louis, Ill., will install motor bus service about March 15 on a crosstown route, according to an announcement by President W. H. Sawyer. Three buses have been purchased. The rates of fare will be 8 cents, the same as on the electric railway cars, and transfers between buses and trolleys will be issued. Mr. Sawyer stated the bus service was an experiment and was made because it was inexpedient to extend the railway service at this time and that a crosstown trolley line was still a future possibility.

Will Provide Bus Service. — President Clark V. Wood of the Springfield (Mass.) Street Railway has indicated his willingness to provide a supplementary service by auto on condition that all jitneys now run are barred by the city. Mayor Leonard has approved such arrangement. The proposition will be put into shape for formal action by the City Council and the company. The term for which jitney licenses has been granted will expire on May 1.

49,036,746 Passengers at One Station

Compilation Made by New York Commission Shows Staggering Totals Handled at Busiest Traffic Points

Times Square and Brooklyn Bridge are the principal centres of rapid transit traffic in New York City. This statement is based on figures compiled from the reports of ticket sales at the various stations of the rapid transit lines of both the Interborough and Brooklyn Rapid Transit systems to the Transit Commission. The figures are for the fiscal year ended June 30 last. They were made public on Dec. 9.

While the ticket sales for both systems at Times Square, 49.036,746, are about 2,500,000 less than those at the Brooklyn Bridge centre, the latter includes not only the subway figures at the Brooklyn Bridge station, but the ticket sales of the Brooklyn elevated lines and the Second Avenue and Third Avenue elevated railroads there and the sales at the Chambers Street terminal of the B. R. T. system under the Municipal Building.

Considered as a subway centre alone Times Square is far in the lead, 49,036,746 of ticket sales being contrasted with 14,984,289 at the Interborough Subway's Brooklyn Bridge station and 13,238,249 at the Chambers Street terminal of the B. R. T. under the Municipal Building, a total of 28,222,538 subway ticket sales at Brooklyn Bridge.

TIMES SQUARE TRAFFIC HEAVIEST

The Times Square figures, in addition represent a greater traffic concentration as the passengers who enter both systems at that point pass through the same entrances and passageways for the most part. The Times Square station is the largest, from the viewpoint of traffic, on the Interborough subway system with ticket sales of 31,966,237 for the year, more than 2,000,000 more than at Grand Central. The Times Square station is also the largest on the B. R. T. system, the ticket sales for the year having totaled 17,070,509.

If the number of passengers who leave the trains at Times Square be considered equal to the number who board trains there, then in the last fiscal year the number of persons who passed through the Times Square entrances and passageways to and from the interconnected Interborough and B. R. T. stations was equal to a figure only a few millions less than the population of the United States.

The Interborough traffic at Times Square represented an increase of 2,396,977 over 1921. The increase at the B. R. T. Times Square station was 2,495,936. In 1921 the Interborough traffic at Times Square exceeded that at Grand Central by only 170,000—these two being the leading Interborough stations — but in 1922 the ticket sales at Times Square sprang ahead and exceeded the sales at Grand Central by 2,028,000.

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The Interborough fare collections—this term being interchangeable with ticket sales, which were partly discontinued by use of the new turnstiles—at Times Square alone were greater than upon the entire length of several of the subway branches, exceeding both the Queensboro subway and the Eastern Parkway line by several millions.

Brooklyn Bridge Figures

Of the total traffic at the Brooklyn Bridge center, 13,908,471 were upon the Brooklyn elevated lines, 14,984,289 upon the Interborough subway, 13,238,249 at the Chambers Street terminal of the B. R. T., 3,408,400 upon the Second Avenue Elevated and 6,219,200 upon the Third Avenue Elevated.

Other important rapid transit centers follow:

FOURTEENTH STREET-UNION SQUARE	
I. R. T. Lexington Ave. subway	16,966,522
B. R. T. Broadway subway	14,721,993
Total	31,688,515
GRAND CENTRAL STATION	
I. R. T. Lexington Ave. subway	29,938,128
I. R. T. 3d Ave. "L"	1,290,300
Total	31,228,428
ATLANTIC AVENUE	
I. R. T. station	15,545,431
Pacific Street station	7,513,686
Brighton Line station	1,594,226
Fifth Ave. "L" station	1,513,829
Total	26,167,172
BOROUGH HALL	
I. R. T. station	13,845,912
Court Street B. R. T. station	3,534,821
Boerum Place "L" station	1,163,904
Myrtle Ave.-Court St. "L" station	923,772
Total	19,468,409

The largest stations, from the standpoint of traffic, on the Interborough subway system, follow, with the figures of tickets sold or fares collected in the fiscal years of 1922 and 1921.

	1922	1921
Times Square	31,966,237	29,568,260
Grand Central	29,938,128	29,397,748
Pennsylvania Station	25,009,251	23,071,850
14th St. (E. S. subway)	16,966,522	15,862,000
Atlantic Avenue	15,545,431	19,929,720
Brooklyn Bridge	14,984,289	15,238,000
Borough Hall	13,845,912	14,898,200
Fulton Street	13,530,045	14,803,100
14th St. (W. S. subway)	10,949,399	10,093,000
86th St. (E. S. subway)	10,266,101	10,161,200

The most important stations on the Interborough's elevated system were at Grand Street on the Third Avenue line with ticket sales of 7,534,600, a loss of about 330,000 for the year, Thirty-third Street on the Sixth Avenue line, which had 6 965,400, a loss of about 460,000, and City Hall on Third Avenue line, with 6,219,200, a loss of 364,000.

The busiest stations on the B. R. T. subway system follow, with comparative figures for 1922 and 1921:

	1922	1921
Times Square	17,070,509	14,574,573
34th Street	14,723,077	12,666,574
Union Square	14,721,993	12,850,863
Brooklyn Bridge (Park Row)	13,908,471	14,799,521
Coney Island Terminal	13,868,226	12,116,339
Chambers Street	13,238,249	13,754,998
Essex Street	11,126,708	10,040,297
Cortlandt Street	10,466,274	8,467,507
De Kalb Avenue	9,552,077	7,862,448

The total Interborough subway traffic last year was 644,975,474, a gain of about 5,000,000, and its total elevated traffic was 384,517,216, a loss of about 25,000,000. The total B. R. T. traffic, which is not segregated as to subway and elevated lines, because of joint operation, was 444,747,229, a gain of a little less than 40,000,000.

Six-Cent Fare Extended

Council of Binghamton Renews Railway Agreement—Order for Two Men on Car Rejected

Six cents will be the fare charged by the Binghamton (N. Y.) Railway until Jan. 15, 1924. The extension of the present fare agreement between the city and the company was authorized by the Common Council at the adjourned session on Jan. 12. An amendment to make it compulsory for the company to have crews of two men on each car was voted down.

The ordinance was adopted by seven votes, with three Aldermen opposed and three Aldermen absent. Seven votes were needed. The amendment was lost with seven voting against it, three opposed and three absent.

Previous to the action on the ordinance of Alderman Edward F. Roman on the 6-cent fare agreement, the special committee named to confer with the officials of the Binghamton Railway presented a lengthy report.

The report contained a statement of assets and liabilities of the company and the railway income account for the first eleven months in 1922, showing the net corporate income to be $41,723 and the operating expenses to be $595,-339. The total bonded debt of the company is now $2,423,565.

Tell of Saving Effected

In the report it is stated that the company effected a saving of approximately one-half cent per kilowatt by bringing power from Dalton, Pa., but the officials claim some of this saving does not show, as the new cars take more power. The cost of this improvement, it is stated, has not been charged to expense, in fact, has not been paid for as yet, as the company had an agreement with the concern doing the construction work that it was not to be paid for until the company was out of the hands of the receiver. The report also states that there have been no unwarranted expenses or increase in salaries of officers.

The committee also reported that the company has a considerable source of income from lighting contracts but the officers state and the figures show, the report says, that all of this has been used to pay for improvements and debts of the street railway system. In 1921 the railway made a profit of $31,301. In eleven months in 1922 the company had profits of $41,723.

The company's records show a remarkable decrease in business in 1922 as compared with 1920, as the company carried 328,469 fewer passengers in 1922 than in 1920. This is explained in part by the fact that there were 8,000 automobile licenses issued in 1920, in Binghamton, as compared with 16,-000 in 1922.

The scale of wages on Jan. 1, 1920, was 41-45 cents.

The present scale is the same for the two-man cars and 46-50 cents for the one-man cars.

In January, 1920, 174 men were employed on the cars.

At present 122 men are employed and actually running cars.

In January, 1920, fifty-two cars were available and in use.

At present sixty-nine cars are available and in use.

In 1920 1,987,904 car-miles were made as compared with 2,182 258 in 1922, an increase of 184,454 car-miles.

There were eleven fewer boarding and alighting accidents reported in 1922 than in 1920, and eighty-seven more automobile accidents.

Every car is thoroughly inspected every 1,000 miles and every 50,000 miles the cars are taken down from the trolley to the ground and all necessary repairs made. Care are repainted every eighteen months.

Boston Fare Policy Indorsed

"Neither sense, justice nor expediency" supports the suggestion of a 5-cent fare on the Boston Elevated Railway, according to the State Department of Public Utilities, which has filed with the Legislature a lengthy report on the transportation situation in Boston and surrounding cities and towns. As for Mayor Curley's proposal that any deficit in the cost of operation at a 5-cent fare be paid out of the tax levy of the cities and towns served by the company the suggestion is ridiculed.

The department indorses the present proposition of having the Elevated operated on the service-at-cost basis, under public trustees, and while opposing strongly the general 5-cent fare, approves the plan of establishing such a fare within certain zones, in accordance with the plans already put into effect by the trustees in certain cases.

The department recommends the establishment of a Metropolitan Transportation District to take over the lines of the Eastern Massachusetts Street Railway in East Boston, Chelsea and Revere and lease the same to the Boston Elevated. The longest haul on these lines would be approximately 4 miles.

The department recommends also the establishment within the metropolitan district commission of a metropolitan planning division, which would consider the whole subject of transportation and make recommendations from time to time as to improvements that might be effected in local service.

The department recommends further that street railways should be relieved of the payment of all commutation taxes and should also be relieved from the expense of paving streets between rails. It believes that the subway rentals should be continued.

The recommendations of the commission will be reviewed at length in an early issue of the ELECTRIC RAILWAY JOURNAL.

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Personal Items

A. E. Reynolds Joins Sanderson & Porter

Albert E. Reynolds, who recently resigned as general manager of the United Traction Company, Albany, N. Y., and its subsidiaries, will become associated with E. N. Sanderson of New York in the operation of gas, electric light, power and street railway properties. Mr. Sanderson is senior member of the firm of Sanderson & Porter, well known engineers and contractors, and is president of the Federal Light & Traction Company, which operates public utilities in various cities of the United States, with the principal office in New York City.

Mr. Reynolds began his railway career with Sanderson & Porter when they owned and operated the Plattsburg Traction Company at Plattsburg. He remained with the firm for eleven years, when the Plattsburg company was purchased by the Delaware & Hudson Company.

His work in the organization and operation of the Plattsburg road won recognition from its new owners, and in 1909 he was transferred to Glens Falls, where he was promoted to general manager of the Hudson Valley Railway, a subsidiary of the Delaware & Hudson Company. In 1917 Mr. Reynolds was promoted to the general managership of the United Traction Company, the largest of the Delaware & Hudson electric lines. He also retained the general managership of the Hudson Valley.

Dean J. Locke with Public Service Railway

Dean J. Locke will enter the service of the Public Service Corporation of New Jersey on Feb. 1 as special engineer attached to the office of R. E. Danforth, vice-president and general manager of the Public Service Railway. Mr. Locke was graduated from the Worcester Polytechnic Institute in June, 1912, with the degree of B. S. in electrical engineering and since then has been in the employ of Albert S. Richey. He received the degree of electrical engineer at Worcester Polytechnic Institute in 1916. The work that Mr. Locke did for Mr. Richey was very broad in its character, including the conduct of car and equipment tests, the making of traffic surveys, the preparation of studies of wage trends and living costs and the interpretation of valuation data. In fact, Mr. Locke was resident engineer in entire charge of the inventory and appraisal of the Toronto Railway rolling stock in connection with the purchase of the property by the city. His work has also included car and equipment tests. The system in New Jersey with which Mr. Locke will become connected includes city suburban and interurban lines, but Mr. Locke's experience has covered engineering work on similar properties for which Mr. Richey has acted as consultant in the past.

O. D. Street McGraw-Hill Vice-President

Former Western Electric Official Is in Executive Charge of Transportation and Electrical Units of Publishing House

O. D. Street, well known for the past ten years as general manager of distribution of the Western Electric Company, has been elected vice-president of the McGraw-Hill Company, in executive charge of the ELECTRIC RAILWAY JOURNAL, *Bus Transportation*, *Electrical World*, *Electrical Merchandising*, *Journal of Electricity and Western Industry* and *Industrial Engineer*. Mr. Street brings to these publications a broad background of business training and a very extensive contact in the electrical industry.

O. D. Street

Mr. Street entered the organization of the Western Electric Company in 1901 on his graduation from Williams and has a broad practical training. He was in charge of telephone sales on the Pacific Coast, assistant to the president, Atlanta branch manager, general telephone sales manager and latterly general manager of distribution. During the war he rendered invaluable service in reorganizing the warehousing division of the Quartermaster's Corps and establishing an orderly system of forwarding to Pershing's army where chaos had existed before.

Under his administration the Western Electric system was expanded by the creation of twenty-two branch houses until Mr. Street was in executive charge of fifty jobbing houses distributing electrical supplies. This responsibility has entailed a personal contact with all sections of the country and all branches of the industry gained in the service of central stations, telephone systems, industrial plants and contractor-dealers, in co-operation with the manufacturers of practically all classes of electrical products. He has become a recognized authority on the broad problem of distribution, now become one of the most pressing issues before the industries of America.

Mr. Street was born in Massachusetts in 1877. He belongs to the Bankers', University and Williams Clubs in New York and the Siwanoy and Pittsfield Country Clubs.

Harry Engle Made Street Railway Commissioner at Youngstown

Harry Engle was appointed street railway commissioner of Youngstown, Ohio, for a term of four years by Mayor William G. Reese on Jan. 15. The appointment has since been confirmed by the City Council. Mr. Engle succeeds William A. Sause, who served as first commissioner for four years, taking office Jan. 16, 1919, when the service-at-cost ordinance became effective. Mr. Engle has been connected with public utility enterprises in various capacities since young manhood. At the time of his appointment as commissioner at Youngstown he was commercial agent for the Pennsylvania-Ohio Power & Light Company, Youngstown. Mr. Engle has appointed as his chief assistant A. W. Hartford, formerly manager Youngstown & Suburban Railway.

A. S. Davis Developing Plans for Power Expansion

A. S. Davis, who is assistant superintendent of power and lines of the United Electric Railways, Providence, R. I., was secured by his present employer on account of the plans for expansion of the power department which are now being carried out. Just previously he spent two years with Stone & Webster, Inc., principally on work in connection with the design of the new 130,000-kw. plant for the Hartford Electric Light Company. Before that he was for eight years supervisor of power plants for the Connecticut Company.

Mr. Davis began engineering work back in 1900, with Eaton, Chase & Company, installing steam and electrical machinery. After four years of this work, he entered Tufts College, graduating in 1908 with the B.S. degree. He then spent a couple of years with the J. G. White Engineering Corporation and one with the Electric Bond & Share Company, leaving to go with the Connecticut Company in 1911. He is a thorough and practical engineer, well versed in design and construction methods. He is right at home amid the bustle now in evidence at Providence, where new boilers to be equipped for burning pulverized fuel, a new turbine and much other new equipment are being installed.

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Public Represented

Messrs. Blackmar, Niles and Metz All Elected Directors of Interborough Rapid Transit

The New York Transit Commission recently announced that it has designated as representatives of the public of the city in the reorganized board of directors of the Interborough Rapid Transit Company former Supreme Court Justice Abel E. Blackmar of Brooklyn, to serve for a full term of three years; William W. Niles of the Bronx, to serve for two years, and former Comptroller Herman A. Metz of Manhattan, to serve for one year.

The new board contains in all eighteen members, the successors of six of whom will be elected each year. It is in pursuance of this plan that the members designated by the Transit Commission are assigned one, two and three year terms, so that a successor to one of the three will be elected each year for a full term.

Judge Blackmar was counsel to the first Public Service Commission appointed by Governor Hughes in 1907, but was made a Justice of the Supreme Court in the fall of the same year and at the ensuing election was chosen for the full fourteen-year term. He retired from the bench only a few days ago. He is thoroughly conversant not only with the rapid transit law, but with the organization of the operating companies and the statutory functions of the Transit Commission with relation to them.

Mr. Niles, who is a lawyer, is a member of the Bronx Parkway Commission, and in 1909 served as a member of the commission appointed by Governor Hughes to revise the city charter. He has been identified for many years with the public affairs of the Bronx.

Mr. Metz was City Comptroller during much of the early period of subway building. Although now a resident of Manhattan he has continued to serve as chairman of the transit committee of the Brooklyn Chamber of Commerce and is thoroughly conversant with the city's transit affairs. An abstract of the address on transit in New York which he made on April 12, 1921, before the New York Electrical League was published in the ELECTRIC RAILWAY JOURNAL for April 30, 1921, page 811.

Representation of the public in the Interborough board is one of the many concessions required by the Transit Commission as a consideration for its approval of the Interborough plan of readjustment developed during the summer and fall. This plan, which was submitted to the security holders of the Interborough and Manhattan companies under date of May 1 becomes fully effective with the present reorganization of the board. Under the provisions of the voting trust agreement, executed in pursuance of the plan the number of directors was increased from fifteen to eighteen in order to permit the inclusion of the representatives of the public and an amendment to the by-laws was also adopted providing that the three additional directors need not be stockholders.

Under the voting trust agreement the Transit Commission was authorized to determine whether the public representatives should be chosen by the commission itself, by the city government or by the two acting in conjunction. In making its announcement, the commission, however, stated that as the city government, through the Corporation Counsel, has been attacking the reorganization plan itself and has apparently no sympathy with its purposes, the selection of the first representatives by the commission alone seemed to it the appropriate method. Legislation will be asked requiring that the members representing the public to be chosen next year and subsequently shall be appointed by the Board of Estimate.

W. J. Bertke Vice-president and Manager at Sioux City

W. J. Bertke, until recently manager of the Sioux City Gas & Electric Company, was elected vice-president and general manager of that company and the Sioux City Service Company following its acquirement on Nov. 2 by interests identified with the United Gas Improvement Company, Philadelphia, Pa. Mr. Bertke has been connected with various properties controlled by the United Gas Improvement Company since his graduation from the University of Wisconsin in 1903. At that time he enrolled in the cadet course being conducted by this company on its property in Sioux City. After two years in this course he was transferred to the Wyandotte County Gas Company in Kansas as assistant superintendent and two years later he returned to Sioux City as superintendent of production. A year later he was transferred to the distribution end of the business and two years later he took charge of both production and distribution.

Mr. Bertke became assistant general manager of the Sioux City Gas & Electric Company in 1917, the position he held until his recent advancement. Mr. Bertke's recent promotion presents to him for the first time problems of electric railway management, but in handling these he will be able to call on H. L. Kirk, formerly manager of the company, who was made president, also as a result of the combination of the two companies under one management.

Mr. Anger Heads Car Meter Department

Edward W. Anger has been appointed superintendent of the newly-established car meter division of the Chicago Surface Lines in charge of the records of operation of Economy car meters, to be installed on all of the company's cars, also the preparation of studies and reports thereon. This new division will consist of about fourteen persons. Mr. Anger has been with the company about twenty-five years mostly in the engineering department.

Messrs. Insull, Budd and Jones Interested in Utility Courses

Martin J. Insull, president of the Middle West Utilities Company, Chicago, Ill., recently addressed freshmen and sophomores of the College of Commerce of the university on "Training for the Utilities Business" and "Public Utilities Offer a Business Career." Mr. Insull accompanied a number of public utility men to the University of Illinois at Urbana to confer with faculty members and students of the College of Commerce in regard to courses offered preparatory to entering public utility service as a lifework. Proposals were discussed for such courses and the improvement of the public utilities curricula in the university. Besides Mr. Insull, Britton I. Budd, president of the Chicago Elevated Railways and the Chicago, North Shore & Milwaukee Railway, and George R. Jones, secretary-treasurer of the Northern Illinois Utilities Company, made the trip to Urbana.

The University of Illinois has for many years been especially strong in its offerings of courses in electrical engineering, electric railway engineering and steam railway engineering. The College of Commerce is now cooperating with the College of Engineering of the university in selecting courses which will fit men to enter the accounting and business ends of public utility fields.

The visit of Messrs. Insull, Budd and Jones was made in appreciation of the work now being offered by the university, with an invitation being extended to these men of practical utility experience to suggest changes or improvements in the work now undertaken.

The three visitors are said to have pledged their support and aid in making the courses more valuable to prospective public utility men of the next business generation.

Wray Thorn Joins Garford Truck Organization

Wray T. Thorn, assistant engineer of cars and equipment Board of Supervising Engineers, Chicago Traction, has become connected with the Garford Motor Truck Company, Lima, Ohio. Since his graduation from Purdue in 1903 a great deal of Mr. Thorn's work has had to do with the development of the design of electric railway cars and it is the knowledge thus gained and his acquaintance with transportation problems that he will be able to bring to bear upon the work of the Garford Company. Mr. Thorn served the Chicago board for more than ten years and during this period acted as a general consultant in the design of new passenger equipment, his most important work along these lines being for the Kansas City Railways. He was a member for two years of the committee on equipment of the American Electric Railway Engineering Association. Mr. Thorn was the author of a series of articles on the development of Chicago's street cars published in the issues of this paper for Sept. 23 and 30, 1922.

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Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Board Witholds Censure

Coal Commission Is Unwilling to Express Its Conclusions Until All Facts Are Weighed

In its effort to be absolutely fair and to avoid placing responsibility before the blame is proved, the President's Coal Commission has brought out a report which is certain to be a disappointment to the consumers of coal and to many members of Congress. In the coal trade itself there is a very evident sense of relief. In the average investigation of this kind it is customary to have some harsh things to say to operators, wholesalers and retailers, even before it has been established that they are guilty.

The Jan. 15 report has all the indications of a desire to avoid expressing conclusions until all the facts can be weighed. As a consequence, it may be predicted that the smaller consumers and a certain element in Congress will feel that the report is colorless and that the commission is not reaching the seat of the trouble. It does not express an opinion as to whether or not current prices are just. It does not say whether or not the miners are receiving a higher rate of wages than the consumers should be called upon to pay. No one is accused of profiteering. The report indicates in a general way something as to the spread between the cost at the mine and the delivery cost of coal, but it gives no clue as to who is responsible. Labor, transportation, overdevelopment, storage and other matters are discussed, but little is said about the business factors in coal. For that reason it is certain that some of the gentlemen on Capitol Hill will conclude that the commission has written "Hamlet" with *Hamlet* left out.

Commission Purposely Deliberate

The more constructive thinkers both within and without the industry seem to be agreed that the commission did well in making haste slowly. Even those who are expressing much disappointment with the report are inclined to suspend final judgment as to the possibility of the commission bringing out something concrete at a later date.

A careful analysis of the report shows that there is little material in it which could not have been written on the first day that the commission sat. Nevertheless the presentation of this material is regarded as very valuable because the wide publicity will contribute greatly to the popular understanding of the entire subject. The report must be regarded more as a statement of the problems of the commission rather than a contribution to their solution. Not one shred of new statistical information is contained in the document. From a constructive point of view, this failure is regarded as the most serious because the report as it stands holds out no assistance to the New York conference. An unusual opportunity was offered to get material of a statistical character before that body, but this seems to have been made impossible by the mixup over the cost forms.

A significant feature of the report is the indication that the commission is not inclined to allow the coal industry to blame all of its ills on the transportation systems.

Commonwealth Edison Buys Parsons Turbine

A 40,000-kw. Parsons turbo-generator has been purchased by the Commonwealth Edison Company for use in the new Crawford Avenue station in Chicago. The set ordered from C. A. Parsons & Company, Newcastle-on-Tyne, will operate at a throttle pressure of 550 lb. with a total steam temperature of 725 deg. F., and after passing through the high pressure end of the turbine the steam will be reheated to the initial temperature. The turbine will be used in the new plant along with other turbines which will be mainly of American manufacture. The station is designed to have an ultimate capacity of 500,000 kw. This is the second turbo-generator of the Parsons manufacture that the Commonwealth Edison Company has purchased, the first being a 25,000-kw. set secured in 1912 and installed in the Fisk Street station, from which satisfactory operation has been secured. Sargent & Lundy of Chicago are engineers in charge of the design with Merz & McLellan, London, acting as advisory engineers.

President Herr Sees Bright Prospects Ahead

E. M. Herr, president of the Westinghouse Electric & Manufacturing Company, says that activity in the electrical industry in 1922 was not of such large proportions as seriously to embarrass the companies supplying electrical energy, but that it was great enough to call for extensions to many plants and to make evident to many more that their reserve capacity is gone. The extensions already made to existing power plants have been so limited to immediate needs that in several instances, even before the new apparatus has been completely installed, additional orders for greater capacity had to be placed. This, together with the increasing interest in railway electrification, gives promise of an active demand for electrical products during 1923.

As Mr. Herr sees it the needs of the world are so great that in spite of the halt in liquidation of war-time wages and prices it is probable a large volume of business will be done during the coming year. This should be especially true of the electrical manufacturing business, the uses for whose product are developing rapidly and should continue to do so for some time to come.

The development of higher voltages in electric power transmission and the collateral development of means of control and interconnection of such transmission lines into so-called "superpower zones" give promise of great economic results in this extremely important field.

Mexican Electrification in Prospect

Alfred Crewdson of Manchester, England, and British associates who own the Coahuila & Zacatecas Railroad are making preparations to electrify that line which runs between Saltillo, Mexico, and the mining town of Concepcion del Oro, 78 miles, with a branch line from San Pedro to Avalos, 17 miles. The railroad was built some years ago, primarily to serve the Mazapil Copper Company, Ltd., which is owned by the same interests. This company owns copper mines at Concepcion del Oro and Mazapil, and operates a smelter at the former place and another one at Saltillo. The railroad is of 3-ft. gage. Stephan Phindler, electrical engineer for the Mazapil Copper Company, Ltd., is now making the surveys and estimates for the proposed electrical installation.

The project involves the building of a dam and water storage reservoir and the erection of a hydro-electric plant. The advisability of changing the gage of the line to standard width and extending it through the State of Zacatecas is being considered. The road now connects with the National Railways of Mexico at Saltillo, but there is no interchange of cars because of the difference in gages of the two lines. R. H. Jeffrey is vice-president and general manager of the railroad at Saltillo.

Metal, Coal and Material Prices

Metals—New York	Jan. 16, 1923
Copper, electrolytic, cents per lb.	14.625
Copper wire base, cents per lb.	16.75
Lead, cents per lb.	7.60
Zinc, cents per lb.	7.07
Tin, Straits, cents per lb.	38.75
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$8.75
Somerset mine run, Boston, net tons	5.125
Pittsburgh mine run, Pittsburgh, net tons	3.375
Franklin, Ill., screenings, Chicago, net tons	2.70
Central, Ill., screenings, Chicago, net tons	2.125
Kansas screenings, Kansas City, net tons	2.50
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.	6.35
Weatherproof wire base, N.Y., cents per lb.	16.50
Cement, Chicago net prices, without bags.	$2.05
Linseed oil (5-bbl. lots), N.Y., cents per gal.	93.00
White lead, (100-lb. keg), N.Y., cents per lb.	12.625
Turpentine, (bbl. lots), N.Y., per gal.	$1.55

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Rolling Stock

Beaver Valley Traction Company, New Brighton, Pa., expects to buy some new passenger cars in the near future.

Lima (Ohio) City Railway expects to have five new one-man cars in service by Feb. 1. Fifteen more cars will be placed in service during the rest of the year.

Indiana Service Corporation, Fort Wayne, Ind., has placed in commission six of the fifteen new cars ordered several months ago for use on city lines in Fort Wayne, Ind. The remaining nine cars will be added as they are received from the shops.

Interstate Public Service Company, Indianapolis, Ind., expects to purchase three combination dining and chair cars within the next few weeks. Each car will be equipped with two motors for multiple-unit operation in trains.

Louisville (Ky.) Railway lost fourteen double-truck cars, fifteen single-truck cars and six trailers in a fire late on Jan. 15, which partly destroyed its Fourth Street carhouse. President Barnes estimates the loss at $350,000. Other details about the fire are contained in an item elsewhere in this issue.

Signal Equipment

Morris County Traction Company, Morristown, N. J., is arranging to install an automatic block signal system on its lines which run from Lake Hopatcong to Maplewood and Elizabeth.

The Philadelphia & West Chester Traction Company, Upper Darby, Pa., has recently completed plans for increasing the terminal facilities at their Sixty-ninth Street Terminal, Philadelphia, Pa., where passengers are transferred to the lines of the Philadelphia Rapid Transit Company. Three new station tracks are being added, making a total of eight. The rearrangement of the yard involves the addition of thirty-five new switches, making a total of fifty-six, and ten new signals, making a total of twenty-seven. The interlocking plant will be electro-pneumatic employing color light signals. Alternating current is being used throughout for the forty-six track circuits as well as for the control and indication of the switches and signals. The machine will have fifty-five working levers in a seventy-nine lever frame. All interlocking apparatus is being furnished and installed by the Union Switch & Signal Company.

Track and Roadway

North Carolina Public Service Company, Greensboro, N. C., is placing steel cross-ties mounted in a base of concrete to support the rails on West Lee Street. The company is repaving that portion of West Lee Street which lies between the rails of the car track and a distance of 18 in. outside each rail.

South Covington & Cincinnati (Ohio) Street Railway plans to spend $300,000 this year in laying new tracks on various thoroughfares in Covington, Latonia and Ludlow, Ky. This announcement was made by W. H. Harton, general manager of the traction company, at a meeting of the Covington Board of City Commissioners. Mr. Harton also said that the traction company would start to lay new rails on Main Street in Covington and on DeCoursey Avenue in Latonia as soon as the weather permitted.

Power Houses, Shops and Buildings

Potomac Public Service Company, Frederick, Md., is making rapid progress in the erection of the $2,000,000 electric power plant which is being built along the Potomac River at Williamsport, Md.

Boston (Mass.) Elevated Railway is roofing in the large new storehouse near the Charlestown line at Sullivan Square, Somerville, Mass. It is hoped the structure will be ready for occupancy in the early spring. The building is three stories high, 120 x 40 ft., of reinforced concrete and fireproof construction.

Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind., has been granted permission by the City Council at Brazil, Ind., to run a high-tension line along two streets in that city, to connect the substation there with the Indianapolis high-tension line. At present Brazil obtains electric current from the station at Terre Haute and in case of a break in the line from that station the city is without lights or power.

Trade Notes

Consolidated Car-Heating Company, Albany, N. Y., has transferred L. S. Belding from the engineering department in Albany, to the sales department in Chicago, where he is under the direction of J. A. Robinson, general sales agent.

Stewart-Thill Company is the new name of the Walter L. Flower Company of St. Louis, district representatives of the Conveyors Corporation of America, Chicago. The personnel of the organization remains the same and offices will be continued at 312 Eighth Street, St. Louis, Mo.

National Railway Appliance Company, New York, N. Y., announces its appointment as agent for the Pittsburgh (Pa.) Forge & Iron Company for the States of New York and New Jersey and will be glad to give prompt and careful attention to all inquiries for the products of the latter company, which embrace bar iron, splice bars, track bolts, machine bolts, iron and steel car and locomotive axles, foundation bolts, arch bars, screw spikes, bridge bolts, plain and upset ends, links and pins, crank pins and tie plates.

Hardwood Manufacturers' Institute, Memphis, Tenn., has announced the appointment of Roy H. Jones as assistant to J. M. Pritchard, secretary-manager. During the war Mr. Jones was in Washington as manager of the Hardwood Emergency Bureau representing the lumber interests of Wisconsin and Michigan.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has announced the appointment of C. G. Taylor as director of purchases. He will have general supervision of the purchasing activities of all plants. C. G. Bunnell has been appointed purchasing agent of the East Pittsburgh Works to succeed Mr. Taylor.

E. C. Brandt, works manager of the Westinghouse-Krantz Works, has been appointed works manager of the new plant now being erected by the Westinghouse Electric & Manufacturing Company in Homewood, Pittsburgh. Mr. Brandt in 1905 entered upon the mechanical training course of the Westinghouse Electric Company and in 1907 began work for the company as a general mechanic and small tool designer. Since then he has held a number of important positions. He is a member of the Western Pennsylvania engineering Society and has written articles for engineering magazines and delivered a number of papers before engineering societies.

New Advertising Literature

General Electric Company, Schenectady, N. Y., has issued No. 1 of a series of messages designed to supply information on the products which it manufactures and to the scientific research back of their development. The first tells about Edison and National Mazda lamps.

Ohio Brass Company, Mansfield, Ohio has published a de luxe pamphlet (catalog No. 210) entitled "Imperial Headlights for Electric Railways. The booklet containing 252 pages with illustrations describes in detail the Crouse-Hinds luminous arc, carbon arc and incandescent for use in electric railway service.

The Dayton Air Brush Company, Dayton, Ohio, has issued a twenty-page illustrated catalog describing the Dayton air brush—what it is, what it does and why the manufacturer should have this equipment. The pamphlet contains a reprint of several letters written to the company which tell of the satisfaction these brushes give. The Dayton brush, according to the pamphlet, is for universal use and can be used for spraying and flowing all kinds of paints, enamels, varnish, shellac, kalsomine, disinfectants, gasoline, oils and all liquids for all purposes.

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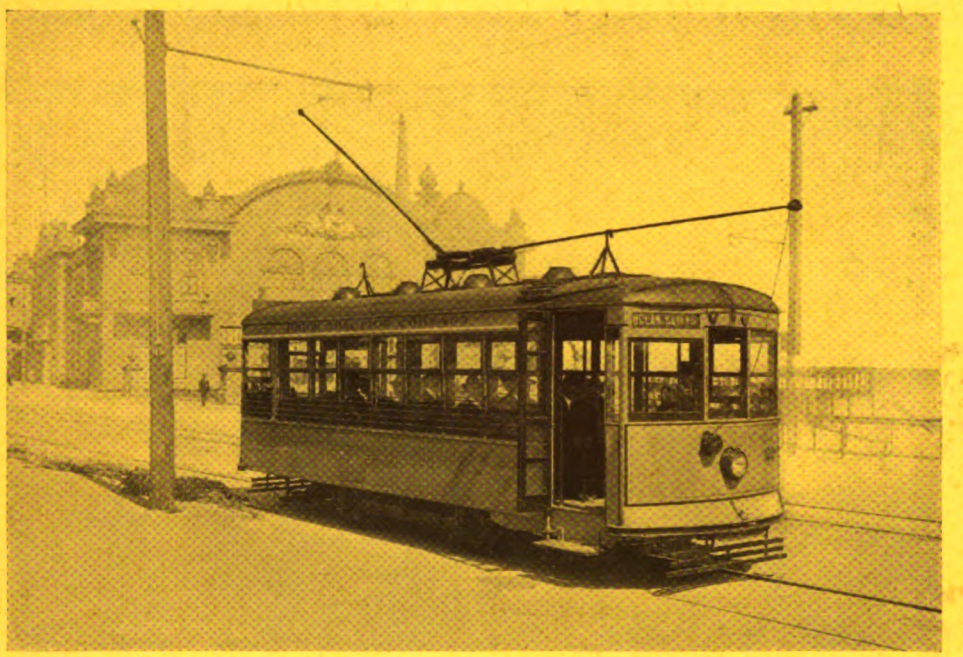

Birney Safety Car at Santa Cruz, California

The First Light-Weight Car

Today there are over 3600 Birney Safety Cars built by us in service in over 200 cities, and these represent many railways which have standardized on this type car.

The Birney Safety Car was not only the first light-weight car to be generally adopted, but it is the lightest weight car on the basis of its seated passenger load ever developed. Consequently, its most economical operating cost and low maintenance has proved attractive to railway officials interested in stimulating their business by more frequent service.

THE J. G. BRILL COMPANY
PHILADELPHIA, PA.

AMERICAN CAR CO. ST. LOUIS MO. — G. C. KUHLMAN CAR CO. CLEVELAND, OHIO. — WASON MANF'G CO. SPRINGFIELD, MASS.

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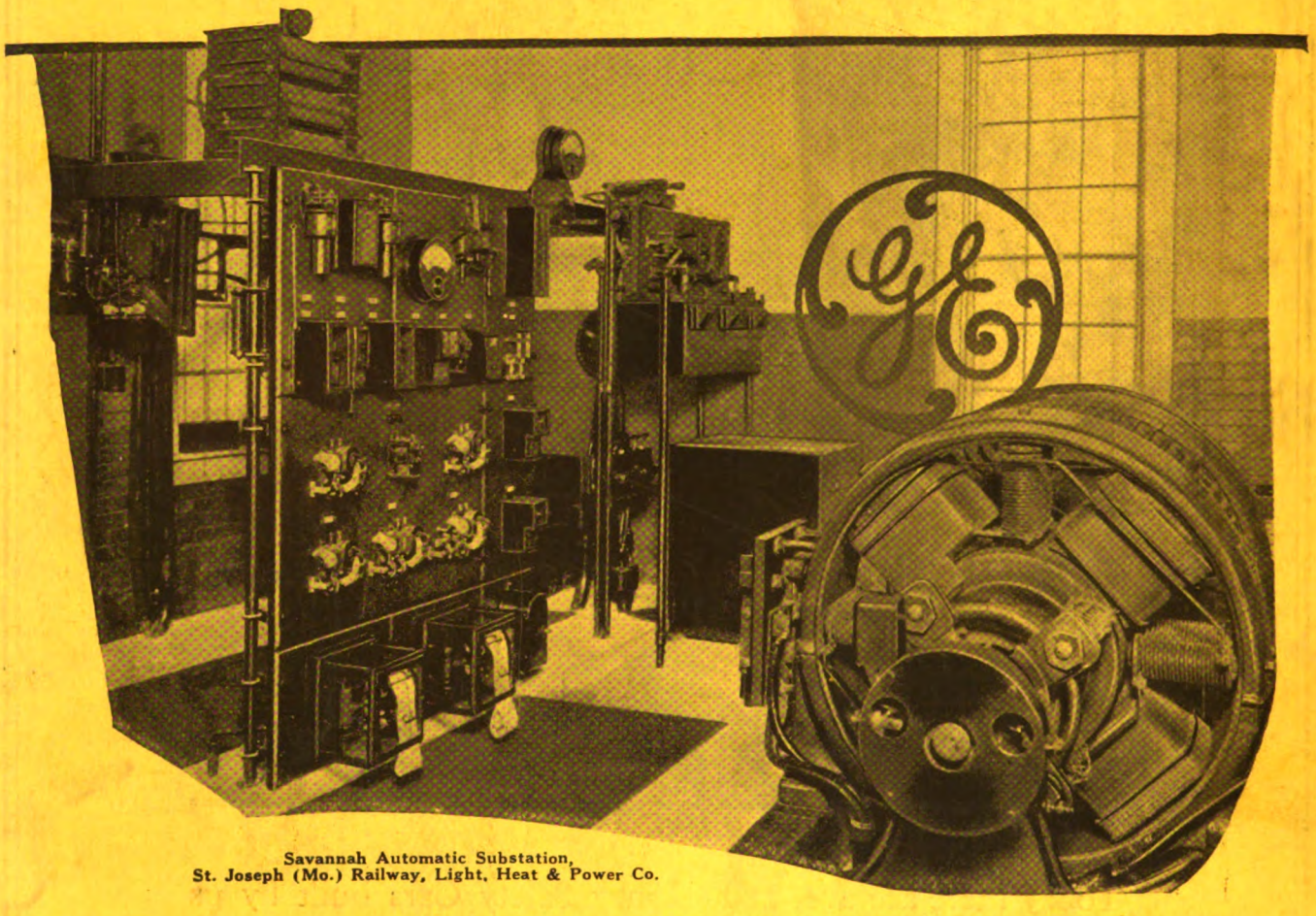
In 1923

Automatic substations will effect greater economies



Savannah Automatic Substation,
St. Joseph (Mo.) Railway, Light, Heat & Power Co.

No hands, yet they serve

Significantly indicating the trend of the times is the increasing application of automatic control to electric railway distribution systems.

Automatic railway substations have proved themselves in service. They are being preferred by many properties in the interest of greater economy and better schedules. Automatic apparatus—responding to power demands—insures a power supply which is adequate to meet traffic requirements.

There are now 165 G-E automatic control equipments for railway substations in operation or on order. This makes a total of nearly 130,000 kw. capacity, established since 1914 when the first automatic equipment was furnished.

General Electric Company

General Office
Schenectady, N.Y.

Sales Offices in
all large cities

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ELECTRIC RAILWAY JOURNAL

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Standard for Electric Railways

THE PANTASOTE COMPANY
PEOPLES GAS BUILDING, CHICAGO 11 BROADWAY, NEW YORK MONADNOCK BLDG. SAN FRANCISCO

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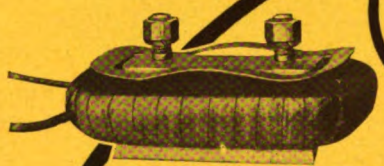
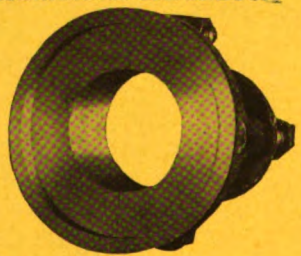
Operating Insurance

Armature Coil



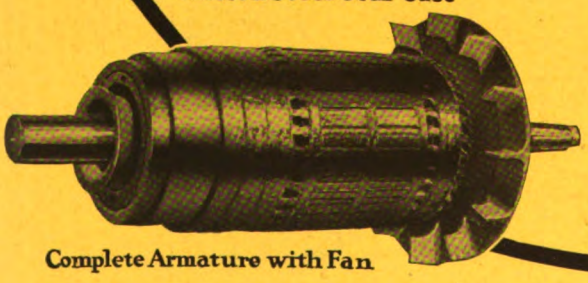
Main Field Coil and Pole

Commutator Coil and Pole



Axle Collar

Pressed Steel Gear Case



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is the most economical form of Railway Operating Insurance.

Your first thought in obtaining this insurance is, "What renewal parts should be bought to derive the most benefit?"

Your second thought will be, "What quality should be demanded to obtain the most service?"

If you give this subject the attention it deserves, you will consider:

1. The loss of revenue owing to laid-up cars due to lack of stock of renewal parts.

2. Additional maintenance expense caused by poor material and poor workmanship.

Then you will arrive at this conclusion:

"Westinghouse Renewal Parts for Westinghouse Equipments."

Westinghouse Electric & Manufacturing Co.
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ELECTRIC RAILWAY JOURNAL

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Company, Inc.

HENRY W. BLAKE and HARRY L. BROWN, *Editors*

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The Congestion Problem in the Downtown Streets

THE question of how to reduce congestion in the downtown streets of our large cities has led to an approach to this question during this month from two different positions, one in New York and the other in Boston. Both are most radical, but the time is approaching when radical measures will have to be adopted. Halfway measures may help for a short time, but are bound to be temporary only. Both proposals also are merely tentative suggestions. Nevertheless the fact that they are made indicates the serious nature of the situation.

One of these suggestions, contained in the report on city transit by Daniel L. Turner, printed in the issue of this paper for Jan. 13, declares in favor of a policy of excluding the street railways more and more from the center of the city in order to relieve traffic congestion in the streets. The same problem, as considered by the Massachusetts Department of Public Utilities in regard to the heart of Boston, brought another answer. This is that it is probably the automobiles which should be excluded, except when used for certain business purposes or during certain hours of the day.

It is obvious that two bodies cannot occupy the same place at the same time, so that unless additional highways are to be built, some of the vehicles on the streets will have to be taken away. When the question actually has to be settled, however, as to which vehicles to exclude the chances are that the one most economical of space per passenger carried will be retained, and the electric car is the one which can claim this merit.

Three Requisites of Success: Work—Thought—Character

THE goal of every ambitious man is success, although the success pictured by one individual for himself is entirely different from that which is the ideal of another. One wants a competence so that he can take life easy; another thinks he will be satisfied when assured that each of his children will have a good start in life; a third feels that he will not be happy until he is head of his department; and so it goes. All of this is natural and right, but many forward-looking people fail to realize that there is one, and only one, road to the success they desire, no matter what this success may be. The route lies through work—thought—character.

Modern industrial conditions make real work difficult. There is a marked tendency to get by with just as little of it as possible. Putting in time with little accompanying effort is popular. This not only makes the product of work expensive to the employer but deadens the ambition of the individual. If, however, the latter sees in work an opportunity to advance he will do that work as it ought to be done. The fact that so many people are indifferent to their own welfare makes the chance that much greater for those who are not.

But work is only part of the proposition. A man may work hard all his life and yet not get very far if he doesn't use his head. It is the alert but cogitating chap who forges ahead. He works along steadily, meanwhile studying how he can do more and better work.

One thing more. Work and study in themselves will bring results, but the real thing in the success line comes only to the man of character. This is made up of all of those things which appeal to men as right—thoroughness, loyalty, sympathy and the rest. This is what a prospective employer looks for first. When he gets a man of character who works hard with brawn and brain, that is the man he is looking for and he certainly picks a winner.

An Opportunity for Service to the Electric Railway Industry

THERE is no stronger appeal that can be made to any red-blooded man than to present him an opportunity for service, either to his community or to the industry which furnishes him his means of livelihood. If, therefore, the committees of the American Electric Railway Association, which are in reality committees of the electric railway industry, do not get a satisfactory response to the requests for data which they are sending out, it is because the service appeal in these requests does not get across.

At this season committees are reluctantly sending out questionnaires and requests for help. They would not do this if there were any other way out. You have, through the only centralized organization in the industry, laid certain responsibilities upon these committees, mainly the responsibility for collecting and interpreting the data of the industry for your own benefit. The requests should, therefore, be received in a tolerant spirit and every effort made promptly to comply with them. These committees have no axe to grind; even if they accomplish what they hope to, the results will be accepted as a matter of course. Their reward will be simply that of having done a good piece of work.

During the past few weeks the educational committee has asked for co-operation in carrying out a simple, practical program; the first step is the appointment by each railway company of a man to head up local educational activities and to apprise the committee that this has been done. Responses to this request are coming in, but more speed is necessary if the committee is going to get anywhere this year. The committee on welded rail joints, whose work is to be financed by the American Association, has asked for criticisms of its plans for testing, particularly of the design of the proposed rotary machine. None has as

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yet been received. Now is the time to lend a hand at this point, because it is important that no mistakes be made and that the work be inaugurated immediately.

Of course no one likes to get questionnaires, which are in many ways like bills from the tradesmen. They are, so to speak, a necessary evil. But as no one objects to paying his bills when they cover value received, so the questionnaire ought to be answered in the conviction that it too is a bill for value either received or to be received. If one will strike a balance between the value of the help which he has had from outside agencies, which has enabled him to do his work better, against the value of the time which he has taken in putting forth efforts to help others, he will realize that more than full value has been received for every effort expended. This is a universal testimony.

Of course the questionnaires are not perfect. Many of them contain "fool questions." This, however, should not blind one to the fact that the industry progresses through collection and assimilation of data and through co-operation. The data show what have been the results of previous practice; co-operation is pulling together to get better results in the future. In both of these elements of progress the questionnaire plays an important part.

It should be realized also that the committees are pushed for time. Their work must be done within the coming few weeks, hence promptness will be a great aid. Some kind of a reply should be made almost immediately; it is unwise to defer making it until time can be found to do the job as one would like to do it.

Akron to Provide Information on City Bus Operation

ONE of the most interesting and enlightening discussions of the bus in city service that has been heard was that presented before the Central Electric Railway Association last week by A. C. Blinn, based on his use of twenty-four buses in Akron, Ohio, as auxiliary to the street railway. After nine months experience, Mr. Blinn finds himself in a quandary whether the operation of buses is necessary for the local transportation requirements of any city. But he is convinced that the public demand for buses is not subsiding, and that their operation properly belongs to the established transportation company—the street railway.

One definite thing which Mr. Blinn's experience has developed is that there is yet much to be learned about chassis design before a machine is available that will stand up to the very severe requirements of urban service without undue maintenance expense.

A very interesting thing about the Akron experience to the railway and bus fields is the open-minded manner in which the bus question is being aggressively investigated. Every worth-while avenue of study and experimentation is being pursued to determine the best uses of the bus and the means to secure its most economical operation and maintenance. The results thus far have apparently demonstrated that buses cannot be operated with profit within the limits of a 5-cent fare, particularly when a free transfer to the car lines is given. But the study is going on in the hope that the accumulated data and experience will provide knowledge that will, to use the words of Mr. Blinn, "lift us from the wilderness and show us the right road, whether that road leads us into a land of buses or takes us back to the field of exclusive electric railway service." This attitude provides a basis of experience and development such that both railway men and bus protagonists may watch with confidence the results obtained.

Mr. Blinn's paper is briefly reviewed on page 165 in the report of the C.E.R.A. meeting, but will be printed in full in *Bus Transportation* for February.

The 5-Cent Fare Level Cannot Come Back Generally

THE present time is surely one of flux in the matter of fares. On the one side, the electric railways wish to maintain the higher scales which came only upon overwhelming proof of the need for them at the time granted. On the opposite side, we have the 3-cent newspapers (once 1-cent) and the 30-cent politicians clamoring for a return to the 5-cent flat fare regardless of higher operating costs.

In all this pother, we cannot overlook the fact that, in the smaller communities especially, no one has grounds to assume that any kind of fare reduction whatsoever will bring back the same degree of street car use per inhabitant. It can be granted that a change from the awkward 7-cent to the convenient 5-cent fare will produce more riders; but it cannot be said that such a reduction will produce as many riders per inhabitant as was the case, say, in 1914. The reason, of course, is the enormous use of the personal automobile.

In 1914 almost every working adult of a community could be looked upon as a potential twice-a-day customer of the street railway. In 1923, that is not so. Why should politicians assume that electric railways are so blind that they have not discovered that competition simply compels them to try any and every means for popularizing their fares and service? In one small city with a 10-cent fare the local newspaper man was very sure indeed that a 5-cent fare meant salvation. He was shown figures that clearly indicated that if the best 5-cent year of the past was repeated, the company would still be 25 per cent or more under the revenue actually coming from the 10-cent fare. Also, with hundreds more automobiles in workaday use, the restoration of a 5-cent fare under conditions equal to war-time prosperity would not bring back anything like the old maximum. The newspaper man was not convinced until it was suggested that he would make more money selling papers at 1 cent than at 3 cents!

This leads up to the question: What will the customer yield? If the headways are long, the distances short and the personal machines many, there seems to be no other recourse than to charge a high cash fare to the casual rider, and provide such ticket, weekly pass or monthly card rates as would attract a more consistent patronage. Experiences with the weekly pass and monthly card now cover sufficient time and properties to bring out some facts useful to both sides of the controversy.

Let us bear in mind that we cannot get an assured 75 cents to $1.25 a week out of people if we cannot give them better than fifteen or twenty-minute service and if the town itself has not enough evening and holiday attractions to induce use of cars for other than industrial riding. But whatever we do, let us fight to the last any attempt to restore the flat 5-cent fare to every size of town, every length of ride and every degree of patronage or lack thereof.

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New York, London, Paris and Berlin Transit Compared—II*

This Section of Mr. Turner's Report Compares Operating Conditions, Such as Fares, Types of Cars Used, Headways, Etc., on the Rapid Transit and Surface Lines in the Four Largest Cities in the World

By Daniel L. Turner
Consulting Engineer, New York Transit Commission

IN NEW YORK all of the fares are flat fares. It is a 5-cent fare on the rapid transit and trolley lines and a 10-cent fare on the Fifth Avenue bus lines. In New York the passenger can ride about 24 miles on a rapid transit line for 5 cents.

In London all of the fares are zone fares, on the rapid transit lines, tramways and buses. On the rapid transit lines operated by the "Combine" the ordinary fare varies from 1½d. (2.8 cents) for a mile ride to 12d. (22.6 cents) for an 18-mile ride, as compared with 5 cents for a 27-mile ride in New York.

On the tramway lines the fare varies from 1d. (1.9 cents) for a ride of one section of 0.6 mile to 5d. (9.5 cents) for a ride of twelve sections or 7.2 miles. For a ride longer than twelve sections the charge is 6d.

On the buses the fare varies from 1½d. (2.8 cents) for a ride of two stages of ½ mile each, or a mile in total distance, to 14d. (26 cents) for a ride of twenty-seven stages or 13½ miles total distance.

There is only one class of fare in London, except in the Metropolitan District, where a first-class fare is also charged. This fare is about twice the ordinary fare on the rapid transit lines.

In Paris the fares on the rapid transit lines or subway systems are flat fares, first and second class. It is 50 centimes (3.8 cents) for first-class fare and 30 centimes (2.3 cents) for second-class fare. For this fare a passenger can ride by transfer over the whole Paris subway system, including the lines of both companies, so that so far as the passenger is concerned, although two companies operate the subway lines, they are operated as one under the fare system. The hauls are relatively short on these systems as compared with New York and the London system; the maximum ride from the center to the outer limits of the city is less than 4 miles.†

On the tramways and buses zone fares are in force and there are first-class and second-class fares. The fares on both the tramways and the buses in Paris are the same. The routes generally have three sections, although in a few cases there are four or five sections. The fares are: for one section, 40 centimes first class and 25 centimes second class; two sections: 55 centimes first class, 40 centimes second class; three sections: 70 centimes first class, 50 centimes second class. The suburban tramways operating outside of the fortifications charge 12.1 centimes first class per kilometer of ride and 8.8 centimes per kilometer of ride for the second class. If one has paid his fare and then wishes to increase his ride, he must pay his fare all over again, just as if he was starting a new ride. For example, suppose he paid a one-section fare, first class, amounting to 40 centimes, then decided he wanted to ride two sections; he would have to pay 40 centimes more, or a total of 80 centimes for his entire ride, not 15 centimes more, or the 55 centimes for a two-section ride.

In Berlin, as in Paris, the practice is not uniform as to fares. The rapid transit lines and the buses use a zone fare, whereas the tramways use a flat fare. On the rapid transit lines there are two classes of fare, second and third class, and there are two zones. For a zone of five stations the fare is: second class, 3 marks; third class, 2½ marks. For anything more than five stations; that is, including all the stations on the line, the fare is: second class, 3½ marks; third class, 3 marks. Only two classes of cars are run.

On the tramway lines a flat fare of 5 marks is charged, but monthly and pupils' tickets are issued, which considerably reduce the fare to the users of the tickets. On the buses there are usually three sections to the lines and there is one class. The fare for the first section is 5 marks; for the second section 7 marks, and for the third section 8 marks.

On the Stadt-Bahn and Ring-Bahn lines operated by the steam railroads the fare is: second class, 4½ marks; third class, 3 marks. But this is a flat fare and will carry a passenger anywhere on the Stadt-Bahn or the Ring-Bahn, free transfers between the systems being exchanged.

Zone Fare Practice Not Uniform

Although zone fares are pretty generally in vogue in London, Paris and Berlin as compared with the flat fare in New York, it is to be noted that the practice is not uniform. London is the only city in which all the different types of facilities employ zone fares, Paris having flat fares on the rapid transit lines and zone fares on the other services, and Berlin having flat fares on the tram lines and zone fares on the other services.

All transit fares have increased greatly as a result of war conditions except in New York, where there has been no change.

I still believe that a flat fare must be maintained in New York City, particularly on the rapid transit lines, if the city's rapid transit system is to be effective in properly distributing its population. Such a flat fare, however, should not only include the ride on the rapid transit line, but should also include the ride on the supplementary facilities, the tramway and the bus lines, which are used as feeders or distributors for the rapid transit lines. But considering the surface facilities, that is the trolley lines and the bus lines, separately,

*Abstracted from the second portion of a report just presented to the New York Transit Commission. Mr. Turner spent last summer in Europe studying city transit conditions. An abstract of the first part of Mr. Turner's report comparing transit conditions appeared in the issue of this paper for Jan. 6, 1923.

†See maps in issue of Jan. 13, 1923.—EDITORS.

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I believe that a zone fare might be worked out to advantage. If a cheap short-haul fare were available on the tramway lines, and particularly on a bus line service, an enormous amount of short-haul traffic would be developed which is not now obtained by any of the transit systems.

In London, Paris or Berlin there are no free transfers from one line or system to another except on the subway system of Paris, which is a flat-fare system. Whereas in New York, although not as extensive as formerly, there is still a large amount of free transfer traffic.

TYPES OF CARS

On the London rapid transit lines two types of cars are in use. The cars used on the Metropolitan District lines, the shallow subway lines, are generally similar to those in New York in that they have three doors, one in the middle and two near the ends of the car, but there are no vestibules in these cars, and such end doors as are available are not usable by the passengers going from car to car, so there is no circulation between the cars. On the tube lines, however, the cars have two end doors entering into vestibules, some of the cars having middle doors. On the District line trains all the doors in the car are operated independently and are opened by the passengers leaving the train or entering the train. On the tube trains the doors are opened by guards stationed on the platforms, one guard serving two adjoining car platforms, which is similar to the system in use in New York on many of the trains. There are both wooden and steel cars in operation on the London underground system, the older cars being wooden cars and the newer cars being steel cars.

The Paris cars also have three doors, middle doors and quarter-point doors. An effort is made to use these doors for one-direction traffic only. That is, passengers are invited to enter by the middle doors and leave by the end doors, but the practice is not generally followed. Also, there is no vestibule on these cars and passengers cannot circulate from one car to the other in the train. The doors are not operated by any mechanical means, each door being operated independently, although I noticed on some of the trains that the doors of the car can all be closed by the guard simultaneously. Usually the doors are opened by the passengers leaving and entering the car, although where the guard is on the car he opens the door. On the Paris trains there is usually a motorman and three guards on a five-car train, one guard for each car. The central car is usually the first-class car on these trains. Both wooden and steel cars are in operation on the Paris subway lines. The most modern cars are very beautifully finished.

The Berlin cars have only two doors, near the ends. They also have no vestibule, so that there is no circulation between the several cars of the trains. They are operated almost entirely by the passengers entering and leaving the trains, as there is only a single guard on a five or six-car train. He rides on the first car, having a cabin beside the motorman's cab. The Berlin subway cars are composite cars—steel and wood, the substructure only being steel.

As stated in the first article, the general practice in London, Paris and Berlin is to permit the passengers to open the doors in leaving and entering the cars. This greatly shortens the station stop, because frequently the trains are almost unloaded before they come to a stop, and oftentimes passengers board trains after they have started to move. But the conditions of congestion on these lines is very different from that in New York. The station platforms are never crowded to the extent that our station platforms become crowded, so far as my observations went. In other words, there was no pressure of people on the platforms against the trains sufficient to prevent the passengers from easily getting off. In Paris a passenger is not permitted to enter a station when a train is standing at a platform, or even when a train is entering a platform. Frequently long queues of passengers extend up the stairways and way into the passages waiting for a train to depart and enable them to enter the platform. This same method of excluding passengers from a platform while the train is there is in vogue in London, particularly at some of the busier stations. It was not observed in use in Berlin, however. The result of the practice is that there can be no last-minute rushes to board the train, and it does facilitate the movement of trains under the conditions prevailing.

From one of the busy stations in Paris trains were observed leaving the station with passengers hanging out of the doors, on the second-class cars; very much like we see passengers hanging on the steps of our trolley cars. The first-class cars on the same trains would only be carrying small standing loads.

The dimensions of the cars in use are as given in the following table:

DIMENSIONS OF RAPID TRANSIT CARS

	Length	Width	No. of Seats	No. of Standing Places
New York: I. R. T.	51 ft. 4 in.	8 ft. 10 in.	44	*d*165
B. R. T.	67 ft.	10 ft.	*a*78	*d*225
London: Metropolitan District	49 ft.	9 ft. 8½ in.	48	*d*
Tubes	50 ft. 10 in.	8 ft. 11 in.	42	*d*
Paris: Motor cars	46 ft.	7 ft. 10¾ in.	*b*12	*be*121
Trail cars	42 ft. 10 in.	7 ft. 10¾ in.	*c*33	*ce*46
Berlin: Motor cars	41 ft. 11 in.	7 ft. 5 in.	30 to 35	*e*36
Trail cars	41 ft. 11 in.	7 ft. 5 in.	37 to 39	*e*36

(*a*) Ninety if only one door is in use. (*b*) Second class. (*c*) First class. (*d*) No restrictions as to standing. (*e*) Restrictions as to standing not strictly enforced.

There is considerable variation in the number of cars in the trains in the rapid transit systems of the various cities. For example:

NEW YORK

Interborough ..... 10-car trains
B. R. T. ..... 8-car trains

LONDON

Maximum on the Metropolitan District ..... 8-car trains
Mostly ..... 6-car trains
On tube lines ..... 6-car trains

PARIS

5-car trains

BERLIN

6-car trains

The train makeup with respect to motor cars and trail cars is also very variable. In New York the Interborough system varies from two motors to a three-car train to seven motors for a ten-car train. In the case of the B.R.T. trains, they are all motor cars. In London the makeup of the trains varies from one motor car to a two-car train to four motor cars to an eight-car train. In Paris most of the trains are five-car trains, and two motor cars are used, one at each end of the train. In Berlin there is a motor car for every two cars in the train.

The train interval in New York theoretically is placed at a minimum of one and one-half minutes, but in practice the minimum obtained on the express tracks is about one minute forty-eight seconds. The minimum interval is only reached during the non-rush hours when traffic congestion does not obtain. In London and in Paris the

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very minimum interval is about one and one-half minutes. In London as many as forty-two trains an hour have been operated past the Victoria Station. This has only been accomplished by employing what is called an "automatic hustler." This consists of a siren whistle which is blown by the platform man on the station as soon as the thirty-second stopping time expires. Immediately the train is started. It is a warning to passengers and train crews that the train is going to start forthwith. By using this device, the company has been able to reach its maximum operation per hour. The general minimum interval on these lines, however, is about two minutes. In Berlin the minimum interval is about two and one-half minutes. There is no express service operated in London, Paris or Berlin similar to the express service operated in New York over the four-track lines. They do operate in London so-called express trains which skip stations as some of the B. R. T. express trains do which are operated on the elevated system.

The express tracks on the New York system permit a higher average speed to be attained than on any other rapid transit system in existence, the schedule speed being 25 m.p.h. The maximum speed of trains on the local service is 18 m.p.h. At the height of congestion, however, in New York these speeds are not obtained. The speeds of the subway systems in London, Paris and Berlin are generally less than in New York. In London it is estimated to be about 16 m.p.h. on the average. In Paris the average speed is only about 12 to 15 m.p.h. and in Berlin somewhere between 12 and 15 m.p.h. is obtained. All these speeds include station stops.

Trains on the rapid transit lines in London and Paris do not operate all night. Usually the service is suspended from about 1 o'clock to 5 o'clock in the morning. Information as to all-night operation on the rapid transit system in Berlin is not available. In New York once a rapid transit service is inaugurated on a new line it never stops. Service is provided all day and all night on weekdays, Sundays and holidays.

On the rapid transit systems in New York the method of ticket control is in the transitory stage. The automatic turnstile is generally being substituted for the old ticket booth and ticket chopper box control. There are no turnstile systems in vogue in London, Paris or Berlin. The ticket system is used. In London, which has a zone fare system, a passenger purchases a ticket to his destination. This ticket is punched as he enters the station and is taken up at the debarking station. There are automatic ticket-selling machines installed at some stations, in which a passenger can deposit the necessary coin and obtain his ticket. In Paris, with a flat fare system on the subway lines, the ticket system is also used. The tickets are stamped with the name of the station where purchased, the day of month and time. The ticket is supposed to be used within the hour and is punched as the passenger enters the train platform. If he is a first-class passenger, he gets a ticket of one color; a second-class passenger gets a ticket of another color. If he is riding first class the guard on the first-class car, which is at the center of the train, inspects his ticket and punches it to be sure that a first-class fare has been paid. On the second-class cars the tickets are not examined. The tickets are not taken as the passengers leave the stations, but receptacles are provided into which they can throw the tickets away if they desire to do so. At most transfer points bodily transfer is used.

In Berlin, where the zone fare operation also prevails, a ticket is purchased to destination. It is punched on entering the station and taken up when the passenger leaves the station. It may also be inspected on the train.

In Paris two methods of indicating the routes are utilized in the cars. One is to place on the door jamb, just over the door handle, a list of all of the stations from terminal to terminal. The other type of sign is a triangular sign placed transversely on the car ceiling, with a diagrammatic map of the lines on each face, with the stations in bold figures and the transfer stations indicated. Usually one of these signs is placed opposite each door, so that each passenger on the car, by looking up, sees the whole route of the line clearly displayed, and sees the relation of the station to which he is bound to all the other stations on the line. The passenger follows the stations on the signs on the cars, and thereby determines when he is to get off; for generally there is no announcement of the stations by the guards, except in the London tubes, where the guards call off the stations just as on our lines.

Trolleys or Tramway Lines

In New York all of the trolley cars are single deck. In London and throughout England the double-deck cars are used. Most of the cars in London have the upper decks inclosed in glass, although some open-deck cars are operated. In Paris and in Berlin, single-deck type of cars are used exclusively, but trail cars are used in Paris and Berlin to take care of the rush-hour traffic. In some cases three-car tramway trains were noted, particularly in Berlin.

In New York the trolley car lines stop at every cross street except under a few special conditions and the cars stop on the near side of the crossings. In London, Paris and Berlin the practice is to designate the stopping points on the tramway lines. The distances apart vary, but there are always several blocks intervening. In London and Paris the stopping points are designated by special post signs. Usually on these posts there are signs which indicate the routes which pass and stop at such stopping points. The routes of the tramway lines are usually designated by numbers. In London and in Paris small folded pocket maps are supplied to passengers, upon which all of the routes of the tramway lines are indicated and described. Those in London are given to passengers free. In Paris the map costs the passenger a few centimes. There is another practice in Paris which is a very commendable one. At all of the stopping point posts a set of numbered tickets is posted. Each passenger tears a ticket off as he arrives at the stopping point. When the car stops the passenger is permitted to board the car in the order of the number which he holds, so that if there is not room enough on the car for all of the passengers those who come first are served first. Where the traffic accumulating at a point is too great to permit this system to be utilized, then the passengers are lined up in queues.

In New York there is no restriction on standing in any of the surface cars.

In London the double-deck type of cars generally in use seat seventy-eight and sixty-two respectively and limit the number of standees to ten and eight respectively. Standing is permitted only on the lower level.

In Paris the cars are of relatively small seating capacity, ranging from twenty-four to thirty-six. The twenty-four-seat cars permit twenty-five to stand; the thirty-six-seat cars, eighteen standing. These cars are all of the center-door type. When motor cars are operated alone, the front half of the car is reserved for first-class

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passengers and the rear half of the car for second-class passengers. When motor cars and trailers are operated together, the motor car is reserved for first-class passengers and the trailer for second-class passengers.

In Berlin the cars seat twenty and thirty and carry sixteen and twenty-one standing, respectively. I do not believe, however, there is any restriction on the number of standing passengers in Berlin.

The weight of the New York cars empty varies from 843 lb. per seat, for the New York Railway cars, to 500 lb., the minimum weight per seat, of the one-man cars. Compare these weights with the double-deck cars in London, which vary from 423 lb. to 390 lb. per seat. In Paris the weight of the cars varies from about 770 to 1,060 lb. per seat. These weights are large compared with the weights of the heavier New York cars. The weights of the Berlin cars are not available. It is very obvious, from the foregoing, that there is a great advantage in utilizing double-deck cars where it is possible to operate them, because of the possibility of reducing the weight per passenger to the minimum.

In New York the speed of the trolley cars through the most congested areas gets as low as 5 m.p.h., although it gets as high as 9½ m.p.h. in the residential districts. The slower speeds are slow as compared with the corresponding speeds of the tramways in London, Paris and Berlin. The speed attained in the outlying sections, however, compares favorably with those in the other cities mentioned. In London the tramway cars reach a speed of 8 m.p.h. in the congested areas and 10 m.p.h. in the residential areas. In Paris the corresponding speeds are 7½ m.p.h. and 8.4 m.p.h. respectively. It must be borne in mind, however, that in London and Paris the tramway lines do not operate into the most congested part of the center. In Berlin the speeds vary from 4.5 m.p.h. to 10.3 m.p.h. in the congested and residential sections, respectively.

OWNERSHIP AND OPERATION OF THE TRANSIT LINES

There are three companies operating the rapid transit lines in New York, and they operate about forty-seven routes all together, main-line and short-line routes. In London there are thirteen companies that operate about thirty routes. The deep tube lines are all operated independently, but there are a number of joint routes operated over the Metropolitan District lines. In Paris there are two companies operating twelve routes and in Berlin one company operating seven routes.

In London and Berlin the city owns and operates the tramway systems. In London I am referring to the tramway systems serving the municipal area. All of the other facilities, that is the rapid transit lines and the bus lines in these two cities, are privately owned and privately operated. In New York the city does not operate any of its facilities. But the city owns all of its new rapid transit facilities and leases them to private operators. All of the trolley lines and the Fifth Avenue Bus line are privately owned and privately operated. But Paris is the only city where city ownership of all the facilities and the operation of them by private companies practically prevails. There is only one exception to this universal progrem, and that is the Nord & Sud rapid transit line, a very small part of the Paris transit system. The Paris Rapid Transit lines are owned by the city and operated by one private company. The Paris tramway and bus lines are owned by the city and operated by another company. In other words, rapid transit operation is consolidated under one operator, practically, and surface line operation is consolidated under a single operator. There was talk of the possibility of both rapid transit lines and the surface lines being consolidated under a single operator. In other words, Paris has made the greatest advance in municipal ownership and private operation. Paris has practically attained what New York City is endeavoring to attain under the Transit Commission's plan.

Recent Pacific Electric Station

DUE to the growth of certain sections served by its lines, the Pacific Electric Railway has recently built several combination freight and passenger stations. One was described on page 119 of the issue of this paper for Jan. 21, 1922, and another on page 1205 of the issue of Dec. 11, 1920. Two other stations were recently completed, one at West Hollywood, the other at East Long Beach. Particulars of the latter follow:

Its length over all is 86 ft. 11 in., and width over all, 24 ft. 9 in. The height to the ridge of the roof is 19 ft. 6 in. There are loading and unloading platforms on each side, as well as an end platform convenient to the driveways. There is also a ramp approach for handling automobiles, heavy oil-well machinery, cable, etc. At one end is an open type waiting room, 16 ft. 2 in. x 24 ft. 9 in., while within there is an inclosed waiting room 10 ft. 9½ in. x 24 ft. 9 in. An outside drinking fountain is provided as in all recent stations of the company, and the building is equipped with the company's standard type of fire equipment, described in the issue of this paper for Aug. 26, 1922.

Late Design of Combined Freight and Express Station, Pacific Electric Railway

A National Museum of Engineering and Industry

THE joint committee on a National Museum of Engineering and Industry appointed by the four founder engineering societies of United Engineering Society is composed of Edward D. Adams and Charles L. Clarke of the A.I.E.E., Frederic A. Delano and Dr. George F. Kunz of the A.I.M.&M.E., Clemens Herschel and Nelson P. Lewis of the A.S.C.E., and Reginald Pelham Bolton and H. F. J. Porter of the A.S.M.E., the latter acting as chairman.

This committee in co-operation with the National Museum of the Smithsonian Institution at Washington, D. C., is formulating a plan for a great national museum of engineering and industry similar in character to some of the foreign museums.

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A Characteristic View in Sea Breeze Park

An Amusement Park that Pays

By Close Co-operation with Concessionaires in Park on Lake Ontario the New York State Railways, Rochester Lines, Has Made This Park a Recreation Center for the Population of a Large Adjoining Area—Admission to the Park Is Free

THE New York State Railways, Rochester Lines, owns a beautiful park known as Sea Breeze, located on the shore of Lake Ontario about 6 miles in an air line northeast of the business center of Rochester. On its eastern side Sea Breeze Park stretches along the historic Irondequoit Bay. It is about 28 acres in extent. The park is reached by a direct line from Main Street, Rochester, and by a line running to Glen Haven Park near the head of the bay, from which Sea Breeze can be reached by the launches of the Irondequoit Bay Navigation Company.

The efforts of the railway company to make the park attractive have made quite a reputation for it in western New York, so that it is coming to be known as the Coney Island of the region. People come from points as far distant as Oswego, located on the lake front 60 miles to the east. The Rome, Watertown & Ogdensburg division of the New York Central Railroad runs through the property, rendering it accessible to a large number of people, and a boat line connects it with Ontario Beach, a popular bathing resort 5 miles to the west.

Sea Breeze nearly adjoins Rochester's most important public park, the Durand-Eastman Park, wherein are extensive zoological collections and bathing facilities operated by the city.

No Competition with City Parks

The purpose behind Sea Breeze is to furnish an amusement center rather than a park in the usual sense, because the city has an admirable park system. Arrangements have been made with a large number of concessionaires by which amusement features of high grade are furnished, and the park is on a paying basis. On account of the accessibility of the park, it would at

One of the Open Air "Thrillers"

The Entrance to the "Jack Rabbit" Is Simple But Effective

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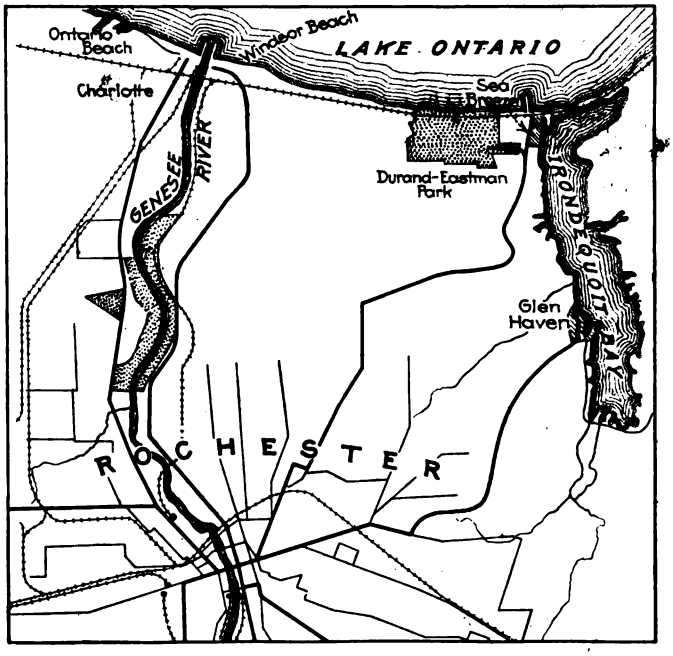


Outline Map Showing Relation of Sea Breeze Park to Rochester

first appear as if the company's policy of charging no admission would make its operation on a self-supporting basis difficult. The fact is, however, that a fair part of the persons patronizing the park reach it by the New York State Railways lines. The free admission plan, further, obviates the necessity for fencing in the park, which would render it less attractive and also impose many mechanical difficulties. As the company participates in the profits of the concessionaires, it benefits to some extent from the expenditures of persons who come by means of transportation other than the cars. The picture of a root beer stand, of Oriental characteristics, shows a typical concessionaire's structure.

The popularity of the park is indicated by the fact that as many as 25,000 people visit it on a pleasant Sunday, and it is popular also throughout the week for picnics and excursions. During July and August, 1922, 400,128 fares to and from Sea Breeze Park were collected, indicating that one-half this number of persons visited the park by trolley. The maximum number of fares on any one day was 20,131, on July 30.

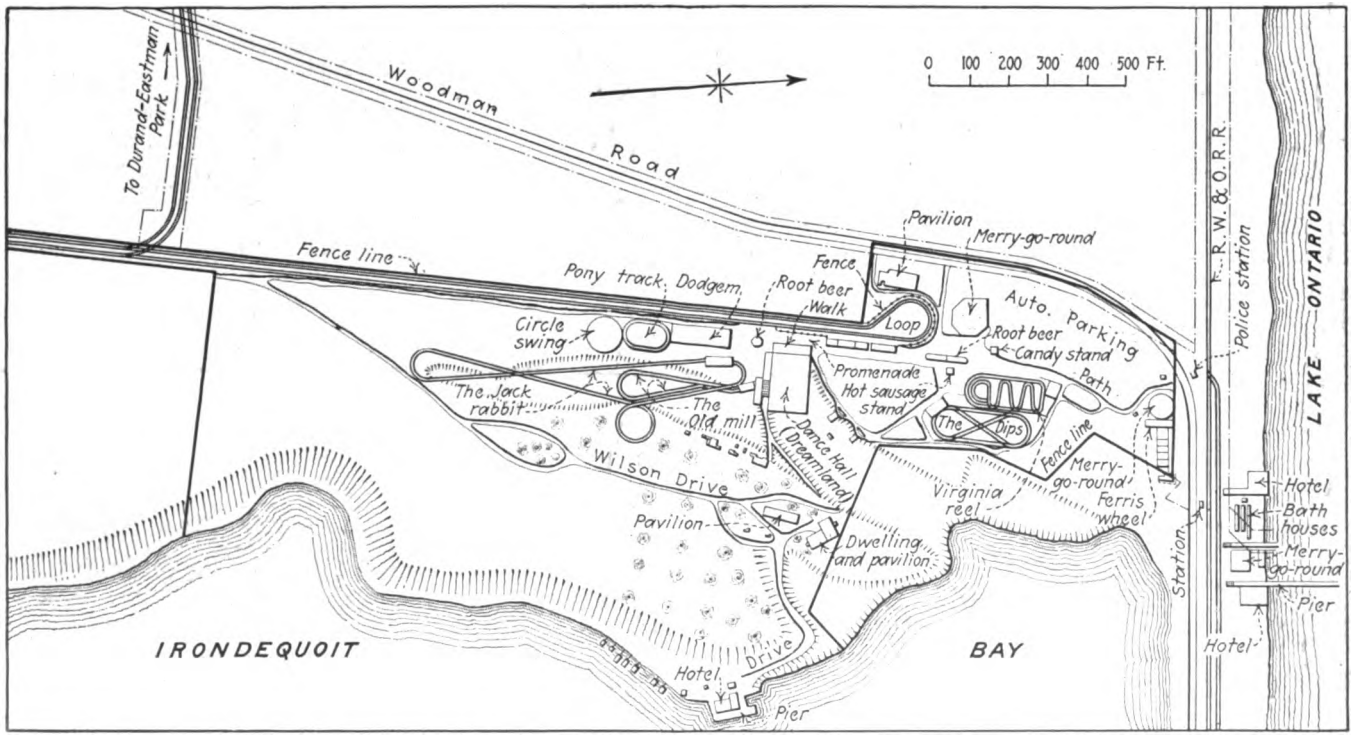
The fare from points in Rochester to Sea Breeze Park covers two zones. The city fare is 7 cents cash (or four tickets for a quarter) and the suburban fare is 10 cents for adults and 6 cents for children, with a reduced round-trip rate for adults of 15 cents. A parking charge of 25 cents each is made for automobiles, a liberal space for parking being provided as shown in the accompanying map. At the park the cars are unloaded at one point and loaded at another so as to avoid congestion.

Good Working Arrangement with Concessionaires

The concessions in the park are of the usual variety, but the company has been able, on account of the large profitable business and the use of a co-operative policy to secure attractions of unusually high grade. The topographical features of the site have been carefully utilized.

Interest centers in "Dreamland," the largest dance hall in western New York, 150 ft. x 110 ft. in plan. This is of pleasing architectural design and embodies the following unique features: The roof is built in semicircular form, covering the entire dance floor, which is sunk 2 ft. below the porch floor. The building was erected in a ravine on 30-ft. piles. It is thus possible for people in the park to view the interior from the ravine banks on both sides of the hall.

The company does not operate any of the park features, but rents privileges in general on a basis of a minimum rental plus a percentage of gross receipts. All construction work is done by the concessionaires. The contracts run from one to fifteen years, depending upon the amount of investment which concessionaires can make in developing their features. A few privileges are rented on a flat basis, but the general method mentioned worked out best for both sides. As the com-



General Plan of Sea Breeze Amusement Park, New York State Railways, Rochester Lines

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"Dreamland" Is the Name of the Large Dance Hall

At Sea Breeze It Is Like Being in the Woods

pany's property borders on the water, the concessions include privileges of renting rowboats and furnishing bathing suits and bathhouses.

A feature which some of the concessionaires have found desirable in connection with the charges is the use of the pay-as-you-leave plan. On entering a concession, patrons receive serially numbered tickets which are punched as they repeat their rides, etc. This, it is thought, increases the use of the facilities. Recently the concessionaires cut their rates from 15 cents to 10 cents, in recognition of the "reduced cost of living."

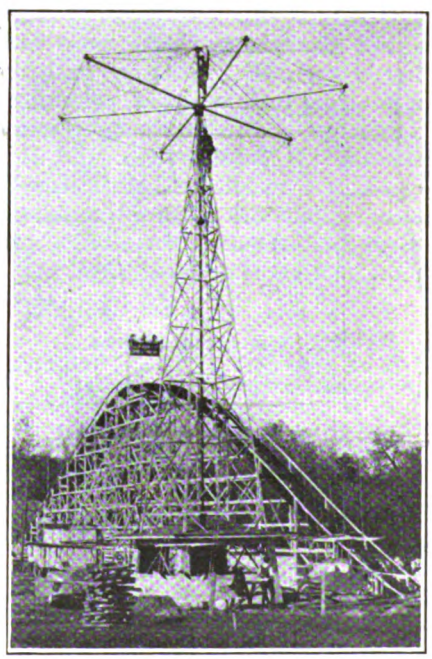
To permit the concessionaires to act as a unit, with regard to all matters affecting them collectively, they have organized the Sea Breeze Park Concessionaires' Association, which functions through an executive committee of three. This facilitates dealings with the railway company, particularly in regard to the furnishing of general attractions.

One of the most important factors in the success of the park has been the furnishing of free open-air "stunts" of a thrilling character. It was found that the public reacts to "thrillers," and as a consequence from ten to twelve of these are provided during the season. The engagements of the performers are usually of one week duration, and in general only one act is featured at a time.

One of the most popular acts was ski jumping, where the performers coasted down a greased incline and made sensational leaps over a rise at the bottom. Another success was a bicycler, who coasted down an incline and also made a flying leap. Expert diving proved to be an attractive act. A performer who won great applause was a sailor who climbed a tall flexible pole and did many chill-provoking acrobatic feats high in air.

The plan in all of these outdoor acts was to have the performer as high in the air as possible so that he could be seen by the greatest number of people. These open-air attractions cost from $750 to $1,200 per week, and they were arranged through several New York amusement booking agencies.

Advertising has played an important part in the success of Sea Breeze Park. The special acts are featured in the amusement columns of the daily newspaper of Rochester. The special acts are also advertised by means of posters on the car ends. A special attempt has been made to induce churches, fraternal organizations, and other bodies to hold their picnics at the park, as these not only furnish patronage for the amusements, but provide morning, off-peak traffic for the car lines. This business is so promising that the company may put on a special man to solicit picnic business next season.



Left—This Refreshment Stand Is of Oriental Design. Right—Two of the Popular Amusement Devices

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Intensive Public Relations Work

Manager of Ohio Interurban Road Calls to His Aid Many Known Helps and Some Previously Unknown in Effort to Restore Line to Popular Approval and Prosperity

WHAT is the dollars and cents value of good will to an electric interurban railway?

Can improved public relations spell the difference between a surplus and a deficit at the end of the year?

How much of a business getter is a friendly attitude on the part of the people toward an electric railway?

Is it possible to pull an almost defunct electric interurban railway out of the depths of a receivership on to the heights of prosperity largely by centering intelligent effort on the promotion of proper public relations?

The answers to those inquiries are undoubtedly sought by every electric railway operator in the country, but a newcomer in Ohio is actually experimenting in an aggressive way to get the answer. His name is John S. Bleecker.

With headquarters at Springfield, Ohio, Mr. Bleecker is acting as vice-president and general manager not only of the Indiana, Columbus & Eastern Traction Company but also of the Columbus, Newark & Zanesville line. To say that he has revolutionized these two systems since he has been in charge would not be quite accurate, but to state that he has adopted revolutionary tactics in attempting to put these two lines on a paying basis would be precise.

For example, Mr. Bleecker has just ordered the removal of each and every "Don't" sign from every car on his two lines and all other property owned by the companies. This order removes such signs as:

"Don't put your feet on the seats." "Don't smoke." "Don't spit on the floor." "Don't drink intoxicating liquor on these cars. "Don't loiter around this station."

It is Mr. Bleecker's opinion that whatever words of caution it may be necessary to give to patrons of his roads can be much better expressed than in the negative command expressed by "Don't." He also believes that the numerous "Don't" signs on the electric interurban railway company's property tend to drive patrons away rather than encourage them to continue their patronage.

Mr. Bleecker has done many other things since taking charge. For instance, each of his conductors has a personal business card, thanking car riders for their patronage and asking suggestions for improvement of service. On the reverse side of these "Thank You" cards is a small condensed time-table. So successful have conductors been in making friends with these cards that requests for similar cards have come from motormen on the lines. Here is a sample of the cards:

THANK YOU

We are very much pleased to have been able to serve you on your journey today, and hope that our service will prove satisfactory in every way.

It is our aim to render uninterrupted and dependable transportation, and your co-operation by telling others if we do, and us if we don't, will greatly assist in improving and maintaining the class of service you are entitled to.

We will appreciate your suggestions.

THE INDIANA, COLUMBUS & EASTERN TRACTION COMPANY.
CHARLES GERDES, Conductor.

One of the first things that Mr. Bleecker did upon assuming control was to try to notify the public, by every means possible, of the economics underlying interurban operation, the effect of motor vehicle competition, and other facts pertaining to the business of transportation. He did this in many different ways, employing newspaper interviews, hanging huge painted signs on the sides of the cars and displaying a series of "How Come" poster cards in the cars.

In the series of "How Come" cards he asked pertinent questions, such as:

"How come you can ride on this car at such a low rate of fare?"

and then immediately stating the answer beneath it, which, in this instance, was:

"Because the owners, the security holders, are content to forego any return on their money, but how long will they continue this generosity?"

Then, on the outside of a number of the cars, so that all might read, he painted in letters several feet high such pertinent and thought inspiring sentences as:

"Traction travel 3 cents per mile.—Highway travel ?"

Deciding that the only way to get business was to go after it, Mr. Bleecker arranged with the more important hotels in the larger cities of his lines to place in each guest's room in these hotels a card advertising the representative hotels in the cities touched by his lines and telling how to reach the cities and towns by means of the lines of the Indiana, Columbus & Eastern Traction Company. At present twenty-five hotels in seven cities are getting the company's folder service in approximately 6,000 hotel rooms, the occupants of which are potential I., C. & E. customers.

By means of employees' meetings and the distribution of pamphlets and booklets, Mr. Bleecker has sought to impress upon every operative in his company the necessity for knowing about the business in which he is engaged something more than the mere routine of his daily tasks. He has impressed upon the employees the spirit of being courteous and pleasing to the public and has shown them how the operators of the property, the employees and the public are mutually interested in the company's welfare. Scenes of interest along the company's route, too, are being pointed out by means of large illuminated signs. The wording of the sign of this kind at Camp Chase is shown.

Camp Chase—The west outpost of the Buckeye Capital. Land to the south was site of Federal prison during the Civil War

This stop is made by traction cars for conductors to register for clear track.

THE INDIANA,
COLUMBUS & EASTERN TRACTION CO.

Mr. Bleecker's attitude toward the newspapers has gained the friendship of these makers of public opinion. Newspapers are informed direct from the company's offices of every accident that occurs almost immediately after its occurrence and as speedily as the company executives learn of it. They are also told of any other thing that the company officials believe will be of interest either to the editors or the public at large.

Mr. Bleecker has made it a point to address meetings of the members of the Chamber of Commerce, Rotary Club, Kiwanis and other organizations and to point out to them their interest in co-operation with the electric trolleys. In short, Mr. Bleecker is omitting little and doing much to gain the good will of the patrons of his roads, in an effort to determine whether the key to prosperity for these roads is not concealed somewhere in that much discussed, universally applauded, but so infrequently well-handled matter of public relations.

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Richmond Valuation Report Published

Returns from Two Methods Followed Are Very Close, but Both Are Much Lower than That Found Two Years Ago—Accrued Depreciation, Overhead Charges, Deficiency in Earnings and Contractors' Profits Discussed

ON DEC. 30 John A. Beeler reported to the City Council of Richmond the completion of his valuation of the Richmond railway division of the Virginia Railway & Power Company. The valuations determined by him and those of Stone & Webster made some two years ago are given below:

Cost of reproduction new of the property as of Jan. 1, 1920, at prices of Jan. 1, 1914, prepared by Stone & Webster	$7,337,314
Cost of reproduction new of the property as of Jan. 1, 1920, at prices of Jan. 1, 1920, prepared by Stone & Webster	14,382,410
Historical appraisal of the property as of Jan. 1, 1920, including deficiency in earnings and going concern value, prepared by Stone & Webster	20,249,400
Cost of reproduction of the property new less depreciation as of Sept. 30, 1922, at prices of Jan. 1, 1922, prepared by John A. Beelgr	7,355,855
Accumulated historical investment in property as of Sept. 30, 1922, prepared by John A. Beeler	7,374,975

Mr. Beeler says that the extremely high figure of the Stone & Webster historical appraisal can be accounted for by its inclusion of $10,697,100 for deficiency in earnings and going concern value, items which do not appear in any other valuation, and that the 1920 cost of reproduction is high because of the abnormal prices on which it is based and the fact that no allowance is made for depreciation. It is a coincidence only that the three other valuations agree closely, as in the Stone & Webster figures based on 1914 prices there is no deduction for depreciation, and the two Beeler figures are based on entirely different principles. Mr. Beeler finds the par value of securities allocated to the property on the historical investment basis to be $10,413,131.

Reproduction Valuation

In his reproduction valuation Mr. Beeler used the same inventory as Stone & Webster with the exception of certain items. These account for a decrease of $271,613 for labor and material in the 1920 reproduction cost, and certain items in the overhead, which made the total figure $380,000 less.

In commenting on 1914 and 1920 bases for prices, the report declares that 1914 figures are much more difficult to check. Hence, their accuracy is more open to question. Many dealers do not retain in their files accurate quotations for such a long period of time, and in making an estimate there is no particular reason why a dealer should quote a low figure for 1914, especially since a comparison with the 1920 price will in any case show an enormous increase. As for 1920, the prices for that time approach the height of the inflation period following the armistice, when no railway attempted any large construction jobs, either for extensions or renewals. For this reason, the report declares, a valuation for rate-making purposes on a 1920 basis would be unfair to the public. A difference of 32 per cent was found in prices for labor and material between Jan. 1, 1920, and Jan. 1, 1922, prices.

In determining his final figures Mr. Beeler omitted the valuation of the power equipment, $352,849, by agreement with the company. He also omitted contractor's profit on land, right of way, rolling stock, crossings and fences, miscellaneous equipment, shop equipment, tools, furniture and fixtures, and materials and supplies, because with an operating company "a contractor would have little or no advantage over a railway, either as to cost or excellence of the work," and because "it is to the company's advantage to have a track maintenance and construction force available." A different practice was also made with regard to taxes and interest during construction. In the Stone & Webster valuation taxes during construction were figured on one-half of the entire property for a period of one year at the actual rate prevailing in 1913 and 1919 for the 1914 and 1920 appraisals respectively. In the Beeler valuation it is the contention that taxes would be assessed on only a portion of the physical property and that for the second year only, so that they would not become payable until after the commencement of operation in 1920, so this item has not been allowed. As for interest during construction, the report says:

> The above reasoning applies almost equally to the item of interest during construction. The money required would need to be made available only as actually used to pay the construction costs. Since a very considerable portion of these costs would apply in the second year, it would be necessary to have at the end of the first year sufficient money to pay for the construction work completed at that time and to provide for advance payment on material needed immediately. Such items as machinery, cars, etc., which are purchased complete, would be paid for on delivery or in some cases after delivery. This would mean that the interest period would be far shorter than one-half the construction period. We believe that a fair allowance would be to include interest at the current rate for three-fourths of the period of two years, but on one-half of the items of property only, with the exception that land is included for a full period of two years.

Contractors' services at 10 per cent were allowed by Mr. Beeler only for the following items: Grading,

TABLE I—ESTIMATE OF DEPRECIATION BY MR. BEELER

Acct.	Item	Reproduction Cost	Non-Depreciable Portion	Depreciable Portion	Per Cent Condition Depreciable Portion	Accrued Depreciation
104	Grading	$344,154	$137,662	$206,492	62	$78,467
105	Ballast	381,475	.....	381,475	81	72,480
106	Ties	223,219	.....	223,219	62	84,823
107	Rails and fastenings	652,368	130,474	521,894	62	198,320
108	Track special	258,812	15,529	243,283	62	92,448
110	Paving	628,215	.....	628,215	62	238,722
111	Track laying and surfacing	344,115	.....	344,115	62	130,764
112	Roadway tools	11,082	443	10,639	60	4,256
115	Bridges, trestles, and culverts	647,566	32,378	615,188	75	153,797
116	Crossings, fences, &c.	1,544	.....	1,544	60	618
117	Interlocking and other signals	2,434	.....	2,434	80	487
118	Telephone and telegraph system	3,764	753	3,011	80	602
119	Poles and fixtures	125,714	.....	125,714	52	60,343
120	Underground conduits	57,952	.....	57,952	80	11,590
122	Distribution system	314,775	125,910	188,865	79	39,662
125	Substation buildings	.....	.....	.....	..	.....
126	General office buildings	78,642	.....	78,642	88	9,437
127	Shops and carhouses	468,344	.....	468,344	70	140,503
128	Miscellaneous bldgs	67,133	.....	67,133	70	20,140
131	Substation equipment	.....	.....	.....	..	.....
132	Shop equipment and tools	53,508	2,140	51,368	67	16,951
133	Park and resort property	53,337	.....	53,337	50	26,668
135	Revenue cars	1,164,433	116,443	1,047,990	57	450,636
136	Locomotives	.....	.....	.....	..	.....
137	Electrical equipment of cars	695,349	69,535	625,814	59	256,584
138	Other rail equipment	24,350	2,435	21,915	49	11,177
139	Miscellaneous equipment	21,537	1,077	20,460	70	6,138
...	Furniture and fixtures	18,666	.....	18,666	70	5,600
	Total	$6,642,488	$634,779	$6,007,709		$2,111,213

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TABLE II—ESTIMATED COST TO REPRODUCE NEW LESS DEPRECIATION AS OF JAN. 1, 1922, BASED ON COMPANY'S VALUATION AS OF JAN. 1, 1920, PREPARED BY STONE & WEBSTER, INC.

(a)	Stone & Webster's estimated cost to reproduce new as of Jan. 1, 1920: Labor and materials, including supervision and omissions and contingencies		$10,163,262	
(b)	Adjustments:			
	Deductions for errors	$323,758		
	Additions account of errors	52,145		
	Net deductions for errors	$271,613		
	Deduction for transfer of power equipment to power department	352,849	624,462	
			$9,538,800	
(c)	Less 32% to adjust to Jan. 1, 1922, prices		3,052,415	$6,486,385
(d)	Allowance for contractors' services			156,103
(e)	Construction cost to reproduce new the physical property of 1920 inventory at Jan. 1, 1922, prices			$6,642,488
(f)	Net additions 1920 to Jan. 1, 1922			134,412
(g)	Total construction cost of physical property as of Jan. 1, 1922			$6,776,900
(h)	Net depreciation:			
	Depreciation on physical plant (Table I)		$2,111,213	
	Less amount available in depreciation fund		670,189	1,441,024
(j)	Net depreciated value of physical property as of Jan. 1, 1922, exclusive of land			$5,335,876
(k)	Right-of-way and land as per Stone & Webster's 1920 appraisal, corrected			477,687
(l)	Net value of property Jan. 1, 1922			$5,813,563
(m)	Additions for overhead expenditures:			
	Engineering, including preliminary	3.7% of (e)	$245,772	
	Administrative and organization	1.8% of (e)	119,565	
	Legal expenses	1.2% of (e)	79,710	
	Interest during construction	6.0%	376,261	
	Cost of selling securities, 5% of total cost		419,297	
	Interest on cost of selling securities		25,158	1,265,763
(n)	Value of plant as of Jan. 1, 1922			$7,079,326
(p)	Materials and supplies on hand Jan. 1, 1922			116,338
(q)	Total value of Richmond railway division as of Jan. 1, 1922			$7,195,664

bridges, trestles and culverts, underground conduits, general office buildings, shops and carhouses, miscellaneous buildings, parks and resort property. Another reduction in overhead was made by omitting an allowance for working capital, except that represented by materials and supplies on hand. In this connection the report declares that a street railway differs from a light and power company in that its service is conducted on a prepayment basis, so there should always be a cash balance available for current expenses where the cost of service is less than the revenue.

In determining the accrued depreciation, estimates were made of the useful life of each of the major parts of the equipment and their condition. The corresponding ages of the parts were obtained where possible from the records of the company and from the two the proportional amount of accrued depreciation has been calculated. The result is shown in Table I.

The overhead items total $1,265,763 or 17.8 per cent of the labor and material cost to reproduce new the physical property including land. Table II shows summary of the methods of obtaining this valuation.

Historical Investment Valuation

The starting point for the historical investment valuation of Mr. Beeler was the purchase of the property and some of its allied properties on May 5, 1909, from the receivers then in charge, for $8,100,000, which brought the total price of all the properties to $10,809,000. Of this latter sum the amount to be subject to certain existing mortgage and other liens attributed to the Richmond railway system was taken by Mr. Beeler at $4,413,440. Adjustments made since that time and allowed in the report are shown in Table III.

The report compares this figure with the historical appraisal of Stone & Webster of $20,249,400 and says that the latter, to get this figure, added $11,750,500 exclusive of cash and materials on hand for highly theoretical overhead expenses to what they call the "bare bones" cost of the physical plant. This is shown as follows:

Physical plant	$8,402,600
Added for general overhead	617,000
Cash and materials	271,500
Deficiency in earnings	9,463,000
Going concern value	1,234,100
Increment in land values	436,400
Total	$20,424,600

Referring to the largest item, the Beeler report says that this was determined by computing a return of 8 per cent on the physical plant, plus the investment in cash and materials, from which was deducted the net earnings after taxes, less an arbitrary allowance for renewal reserve, and as reliable earning figures were not available for several of the companies prior to Jan. 1, 1902, the statement starts with that year. Mr. Beeler finds, however, there is no evidence that the company had any losses, that the major portion of the plant was old when this "deficiency in earnings" was begun, and the rate is beyond anything allowed at that time for a return on a normal investment.

The going concern value in the Stone & Webster

TABLE III—RETURN ON ACCUMULATED HISTORICAL INVESTMENT, 1910-1921

Year	Average Investment and Working Capital	Adjusted Net Income	Rate of Return	Year	Average Investment and Working Capital	Adjusted Net Income	Rate of Return
1910	$4,505,585	$345,933	7.68	1918	6,519,716	347,507	5.33
1911	4,713,208	414,756	8.80	1919	6,621,127	184,382	2.78
1912	4,909,120	361,026	7.36	1920	6,847,305	204,307	3.00
1913	5,062,899	439,808	8.69	1920a	7,028,051	21,192	0.60
1914	5,267,567	406,089	7.71	1921b	7,123,419	66,264	0.93
1915	5,899,512	358,849	6.08				
1916	6,421,221	391,957	6.10	Total	$77,359,861	$3,928,700	5.32
1917	6,441,126	386,624	6.00				

(a) Six months period ending Dec. 31. (b) Fiscal years ending June 30, except 1921 ending Dec. 31.

historical valuation was figured on 15 per cent of the value of the physical property as determined by that appraisal. In discussing this, the Beeler report says:

> The addition of any amount of going concern value may be admissible in certain cases, but in our opinion it does not apply here. It may be applicable when considering light, power and certain other utilities or industrial enterprises, where a large and profitable business has been built by solicitation, advertising, salesmanship, or other effort involving work and expense, possibly over a long period of years. It may be applicable to some highly specialized industries with national reputation or valuable trade names or products. Possibly a utility that has for years been conducted with highly profitable results, paying continuously a large return on its investment or securities, may justly make claim for going concern value.
>
> There are instances of certain highly organized traction properties in densely populated districts, which by reason of physical limitations have practically no competition. Such properties with good management and good service may make claim to such an overhead with some degree of justification. These advantages, however, are not applicable to Richmond propery.

Securities Issued

Mr. Beeler considers that the securities which might be properly allocated to the Richmond railway division amount to:

First mortgage bonds	$5,117,920.92
Preferred stock	2,753,118.59
Common stock	2,542,091.08
Total par value	$10,213,130.59

He also points out that in the Richmond stock market the asked prices of these securities with the bonds at 85, preferred stock at 76, and common stock at 27, amount to $7,128,967.50, or very close to the values which he determined for the property.

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Association News & Discussions

C. E. R. A. Enjoys Louisville Hospitality

Members of Central Association Given a "Safety Dinner" by Louisville Railway—Meeting Brought Forth Informative Papers and Discussion on One-Man City and Light-Weight Interurban Cars, Automatic Substations, Buses, Etc.—J. P. Barnes Elected President

THE annual meeting of the Central Electric Railway Association last week resulted in a profitable, entertaining and enjoyable gathering. Well attended by both railway and supply members, the two-day session at the Hotel Seelbach in Louisville, Ky., was featured by the election of J. P. Barnes, president Louisville Railway, to the office of president of the association for the ensuing year and by the hospitality of his organization in arranging for the special and entertainment portions of the program. Not only did the Louisville Railway men take care of members adequately in this respect but they also furnished a considerable part of the meat of the program in the way of prepared papers.

As hosts the Louisville Railway people proved themselves second to none. The Southern spirit of hospitality prevailed throughout but reached its climax in the dinner and entertainment provided on Thursday evening, following the first day's session. The place was "Safety Hall," a large room in one of the carhouses set aside for a place in which to hold periodic safety meetings. Even here it was almost an entirely Louisville Railway affair, from a standard safety meeting dinner prepared and served by line and track employees, to the musical program developed from trainmen talent. If anything was evident at this dinner it was the fine spirit of co-operation and understanding that permeates the whole organization. Captain Evans, commander of the Great Lakes Naval Training Station, and his aid, Commander Ingram, were present and made very instructive talks on the Navy as an insurance. A third party in this local situation, where understanding seems to reign, is the people of Louisville, whose Mayor dwelled upon this desirable condition in his remarks at the opening session of the convention.

Departing from its custom followed for the past few years, the association decided this year to abandon the idea of holding the summer meeting on board ship while cruising the Great Lakes. Instead, the meeting place will be at Cedar Point, Ohio, on June 27-29. Thus the meeting will occupy only three days instead of a week as previously. A committee on arrangements has been appointed.

The first session on Thursday morning was opened by the address of President Samuel W. Greenland, Indiana Service Corporation, who reviewed briefly electric railway conditions in the central territory and urged greater initiative on the part of railway operators in spending money for bettering service and for experimentation for new ways of making car riding more attractive to the public. His remarks, published elsewhere, were followed by a paper and discussion on the economic need of the one-man car and another on publicity.

S. W. GREENLAND
Retiring President C. E. R. A.

REPORT OF SECRETARY-TREASURER

In presenting his annual report as secretary and treasurer of the association, L. E. Earlywine said that the membership comprises sixty-five interurban lines having a mileage of 5,371, four city lines, two lake steamer lines and 132 supply members. The assets on Dec. 31, 1922, were $7,718.

The receipts of the midsummer meeting on the steamer *South American* more than covered expenses, netting the association about $55. In addition to the regular committees, a special committee on rules and principles for safety and inductive co-ordination was active during the year. This committee co-operated with the Public Service Commission of Indiana.

The Central Electric Traffic Association held five regular meetings during the year and issued a total of seventy-five tariffs, including sixty-six joint excursion tariffs. The association is considering a joint party tariff for Ohio lines, a special baggage car tariff for Ohio lines, and a distance table and station list for the association territory. Among other committees, that on motor bus and motor truck competition and the committee on public relations have been active in curtailing buses and trucks operating in competition with electric railways. This was done by educational work through farmers' organizations and civic bodies as to the damage caused by this mode of transportation and the cost of maintenance of the highways. New plates have also been made for the official interurban map, which is now in print.

The Central Electric Railway Accountants' Association held two meetings during the year, and a special meeting of officers and chairmen of committees was held also. A special committee is at work compiling data on freight costs with a view to arriving at a reasonable basis for determining the elements which enter into these costs. Excellent results have been secured from round-table discussions, during which inter-line difficulties were adjusted and accounting problems cleared up.

The Central Electric Railway Engineering Council has held two meetings during the year in general session, in addition to which the four sections have held a total of twelve meetings. At the sectional meetings the questions submitted by the general council have been considered and the results of the discussions given by bulletin to the member companies in the respective sections. The council has endeavored to secure co-ordination of the work of the sections by sending out questionnaires covering the subjects discussed. The Engineering Council has demonstrated its great value to the association.

During 1922 there were twenty-one meetings of the various bodies comprising the association, in addition to the meetings of the general Engineering Council, the executive committee and other committees. Marked progress has been shown in the development of freight transportation over association lines, and a number of new carriers have become party to the joint tariff publications issued by the association.

LATER SESSIONS AND ELECTION

The afternoon session was given over to the meeting of the Engineering Council in charge of Harry Reid, Indianapolis, Ind., chairman. Papers on the effectiveness of various means of making emergency stops, operation of light-weight interurban cars and on automatic substations were presented.

In his annual report as chairman of the Engineering Council, Harry Reid, president Interstate Public Service Company, Indianapolis, Ind., gave details of the meetings of the general council and the local sections held during the year. The former were held in Indianapolis

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and on the steamer *South American*, while the meting places for the latter were Cleveland, Wheeling, Toledo, Louisville, Webster Lake, Indianapolis, Dayton, and Springfield. Some thirty-nine subjects were considered at the meetings. During the year questionnaires were sent out covering subjects under discussion, with fair results. In future copies of the questionnaires will be sent to heads of departments and to managers on each property. The need of the Engineering Council is greater co-ordination among the sections, which it is hoped to secure through general meetings of the entire council held in connection with the meetings of the C.E.R.A., through the general council itself and through questionnaires. Another subject of vital importance is standardization. The desirability of adopting the American Electric Railway Association standards as a basis, to be modified according to local conditions, is under consideration. Up to the present, all subjects discussed at the sectional meetings have been supplied by the general council. It is hoped that the co-operation of members may be secured in bringing out suitable topics for discussion.

On Friday morning the subjects of buses, motor trucks, safety work and franchises were treated in papers. Several of these papers are published elsewhere in this issue.

The final session ended with the election of officers for 1922. The nominating committee, of which Charles L. Henry was chairman, reported its selection as follows, the convention making the election by unanimous ballot:

President, James P. Barnes, president Louisville Railway, Louisville, Ky.

First vice-president, Harry Reid, president Interstate Public Service Company, Indianapolis, Ind.

Second vice-president, Frank R. Coates, president Community Traction Company, Toledo, Ohio.

The following members of the executive committee were also elected: S. W. Greenland, R. I. Todd, A. C. Blinn, H. A. Nicholl, C. N. Wilcoxson, W. S. Rodger, F. W. Coen, J. F. Collins, M. B. Lambert, G. T. Seely, J. A. Donahey and E. O. Reed. As second vice-president of the association Mr. Coates has become also ex officio chairman of the C.E.R.A. Engineering Council.

One-Man Cars

The first paper to be presented, "The One-Man Car an Economic Need" by Clinton E. Morgan, general manager Brooklyn City Railroad, was considered by everyone a most able discussion on the subject. Bearing out Mr. Morgan's contentions, E. M. Walker, general manager Terre Haute Traction & Light Company, Terre Haute, Ind., said that electric railway operation is essentially an economic problem. At first unit costs were reduced by increasing the size of the units at the expense of increasing headway. However, the more general use of automobiles has introduced another element which makes this kind of solution no longer practical. Mr. Walker said that in Terre Haute there are enough automobiles at the present time for the total population to ride in them simultaneously. When conditions became acute in Terre Haute Mr. Walker said the problem was approached purely on an economic basis. The introduction of the one-man car was made by using the man power available at that time to increase service. Immediately the earnings arose almost vertically to a new level. For the past three years there has been no appreciable change in car-miles and no more than a 1 per cent variation in earnings. He went on to say that total one-man car operation is now accepted by people as the conventional kind of electric railway service. As proof of this he cited the fact that no comments have followed the omission of the lettering from the car dashes saying that the car was of the one-man safety car variety.

In regard to collisions, he said there had been an increase over those of two-man operation but the greater number is attributed largely to the increase in automobiles from 4,000 to 10,000 in the past few years. Mr. Walker said the attitude of his men was the same as that indicated in letters written by employees and read by Mr. Morgan. Each operator, being in complete charge of his car, has developed the "business-of-his-own" idea, and this conception of a car operator's job has reacted most favorably toward safe operation and courteous treatment of the public. In fact, Mr. Walker claimed that he now receives no complaints on account of discourtesy.

The one-man car experience of the Pennsylvania-Ohio Electric Company was related by Richard N. Graham, manager of railways. His discussion is presented elsewhere in this issue.

In regard to safety-car operation on the line of the Indiana Service Corporation, Fort Wayne, Ind., S. W. Greenland said that it had been impossible for him to tell the saving effected because of other changes made in operating practices at the same time. A 40 per cent increase in riding during the past year has also made any comparison difficult. However, he emphasized the importance of advising the public as well as the company's employees just what one-man operation means so that neither will think a saving is being effected in which they do not participate.

Publicity Discussed by Newspaper Man

An interesting talk on the subject of publicity was then given by Arthur Krock, editor in chief Louisville *Times*, who said that the railway company which looks upon its affairs now as being a matter of private business might as well be running an ox cart from the Round Table to Camelot, for the chance it will have before a twentieth century public. Railway companies supply a necessity of modern life and have a right to live and to earn, but for this right they should render good service to the public and exchange with the employees a comfortable living for loyal and efficient labor. The task of the railway executive today is to convince the public and the company employees that a railway company should pay a fair return on stockholders' money, as well as on workers' services.

Newspapers welcome all the actual news of a railway business which affect the capacity of the railway for public service, but the information to be acceptable must be news. Some companies have employed trained newspaper men as publicity agents. This is an excellent step, but the work of such a man should be watched. Any attempt to supply a newspaper with selfish items, designed to influence instead of to inform, is ill-judged and would bring upon the business a harmful reaction. Instead, the papers should receive real news for their news columns and sensible arguments for their advertising columns, and incredibly good results follow. Human interest items are what the papers want, as to how the companies are trying to better the conditions of their employees, what their safety records and goal are, who is the best dancer at the motormen's ball, the members of the crew against whom no complaints of discourtesy have been made, the reasons for the discharge of men, what tied up the line during the rush hour, the most amusing complaint ever received, did any woman ever forget her baby and remember her dog when she got off the car, etc. Answers to these and like things will interest the public, cost the company nothing and gain much for it.

Then there is another class of interesting information, in regard to the property, such as action by the board of directors, financial statements, forthcoming maintenance work and what it will cost, whether operating costs are going up or going down, etc. Often news which would otherwise be acceptable in the papers is held out because the space has to be given to a very important article on a national event. This condition should be recognized by the companies.

In the discussion which followed this talk, E. R. Kelsay, Toledo, Ohio, explained that misunderstanding is at the bottom of all difficulties in public relations. He claimed that the general manager is qualified to be the best publicity man, because, by being a good mixer, he can disseminate the correct kind of information. Knowing the value of constructive information, those in active contact with the management of railway affairs should grasp every opportunity to explain the comforts and improvements of their service. In this connection he urged that railway managers should make it easy for reporters to see them. It is possible, he claimed, to get good results from copy furnished by the national association, provided that it is rewritten and some local and humorous interest injected. Because of its appeal to human interest, he said that safety is the greatest adjunct of

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publicity. In conclusion he summarized his remarks by saying that publicity is a game of being friendly.

Continuing the discussion on this subject, W. H. Sawyer, president St. Louis & Suburban Railway, East St. Louis, Ill., expressed his faith in the good results of co-operating with newspaper men because they are the best informed people of a community and are the clearing house of facts and information. Publicity, he said, must be backed by performance, and good public relations are essential to successful performance. His experience has been that publicity is proper for what is being done or actually attempted, but not for what is going to be done. Because of the importance of this work every railway should have a publicity department to which the same study and supervision is given as to the transportation and engineering departments. Mr. Sawyer emphasized the fact that a hostile and lasting reaction will follow an attempt to broadcast insincere propaganda.

Committee Appointed to Study Emergency Stops

The paper on "Emergency Stops," by H. C. DeCamp (printed elsewhere in this issue), and the discussion following, resulted in the introduction of a motion to appoint a committee of five to study the sections in the rule books regarding the methods recommended for making emergency stops and to suggest revision of them according to information to be developed by tests. This motion was passed. In this connection, J. P. Barnes urged that a series of tests be accurately and elaborately made so that the results will be conclusive. Further, that the data obtained should be put in such a form that they are dependable and can be used as positive evidence in court. He also advised that the co-operation of the various state commission engineers should be obtained to lend official recognition to whatever decision is reached.

There seems to be no general agreement, even among railway men, as to the best way of making emergency stops according to H. A. Nicholl, Anderson, Ind. Some time ago trial runs were made on the Union Traction line to settle these diversified opinions. The method of argument was laid aside, and each man was allowed to make his stop in what he thought would be the quickest way. The result was it was found that a stop can be made in the shortest space with emergency air and sand. However, he said that the idea still persists in the minds of most people that reversal of the motor is the best way to stop the car, and it is exceedingly hard to convince a jury that applications of emergency air and sand were the most effective measures that could have been applied.

As a factor affecting the rate of braking, Prof. D. D. Ewing, Purdue University, said that the speed at which a car is traveling introduces a wide variation in the rates of retardation possible. He had computed that brake equipment which would retard a car at the rate of 6 m.p.h.p.s. at comparatively low speed would retard at only about 1 m.p.h.p.s. at 60 m.p.h. S. D. Hutchins, Westinghouse Traction Brake Company, Columbus, Ohio, suggested that an air brake man should be appointed on the committee, and this was concurred in.

Light-Weight Interurban Cars

The next paper, that on the operation of high-speed light-weight interurban cars, by E. B. Gunn, Lima, Ohio, was printed in abstract on page 135 of last week's issue. In connection with a statement by Mr. Gunn that considerable trouble was at first experienced from nosing of the cars, C. E. Morgan said that nosing could be corrected by shortening the swing links on one truck and not on the other in order to break up the synchronism that occurs at a certain speed. Another effective method is to bring the links closer together at the top and separate them further at the bottom.

In answer to a query as to what the increase in receipts was due, Mr. Gunn answered that the increased business resulted largely from an hourly instead of a two-hourly schedule and because of the new, well lighted and ventilated equipment with comfortable seats and low steps. The seat covering is green plush and the seats themselves are spaced at 40 in. For the first nine months of 1922 Mr. Gunn said the Western Ohio Railway was operating at a loss of about $4,000 a month and for the last three months, or since the introduction of the new light-weight cars, the revenue has been running about $2,200 per month ahead. These cars were described in ELECTRIC RAILWAY JOURNAL for Sept. 30, 1922, page 517. As a proof of the fact that the new cars and the more frequent schedule were responsible for the increase in business, Mr. Gunn cited the facts with regard to the Cleveland Limited business, a run on which the old cars are still in use. On this line he said that for the last three months there has been no increase at all.

Mr. Blinn Gives Data on Bus Operation

An extremely valuable paper on city motor bus operation was read by A. C. Blinn, vice-president and general manager Northern Ohio Traction & Light Company, Akron, Ohio. In this paper, which will be published in full in the February issue of *Bus Transportation*, the author gives the detailed cost of operation and maintenance, earnings, etc., and discusses at length some of the problems that have arisen in connection with the maintenance of buses in the city service in Akron, made severe by the frequent stops and the heavy grades. These conditions have developed the fact that the present day bus chassis is hardly equal to the severity of the work imposed upon it under Akron conditions. Mr. Blinn explained some of the special things that have had to be done as a result of experience, things which will greatly interest any electric railway man contemplating the use of buses.

Mr. Blinn's ideas about the possibilities of bus operation are indicated by the two or three paragraphs quoted herewith. He said:

> Having gone through nine months of bus operation in the city of Akron, the service being auxiliary to the city system of the Northern Ohio Traction & Light Company, I stand today in the wilderness of transportation problems and wonder whether this Star of Bus-ism will yet lead us into the valley of despair or onto the road of success. I am not yet ready to subscribe to the growing theory that buses are indispensable in a city's transportation system, and most assuredly I am not convinced of their economy. It will take more than our experience to prove the advisability of using buses as feeders. I am more ready to agree that they are successful as a temporary substitute for a needed railway line into a partly developed territory.
>
> I do not mean that we plan to curtail our bus operations. I do not say that we will not establish additional lines. In all human probability we shall continue our bus development. I am convinced that the public demand for bus operation is not subsiding and I am just as firmly convinced that operation of buses properly belongs to an established transportation company—the street railway—and not to an irresponsible operator. I subscribe to the belief that if the public actually wants bus transportation, the public ought to have it, but the public should pay the cost and that cost must embrace full redemption of the investment.

After discussing the manner in which data are being sought, and giving the cost figures as found to date, Mr. Blinn went on to say:

> The figures and records will, undoubtedly, enable us in time to reach definite conclusions as to the value of different pieces of material and apparatus. They will, we trust, lift us from the wilderness and show us the road, whether that road leads up into a land of buses, or whether it takes us back to the field of exclusive electric railway service.
>
> For the present, we can only say that we know the buses cost more to operate per passenger carried, that they will not handle the crowd, that they are less reliable, that they really move no faster, that they are more flexible, and that in spite of the crowding, poor ventilation and harder riding there is a popular clamor for them that must be met, and met by the established street railways.
>
> But of the future—oh, that we could look with wisdom through the years that lie in waiting. Who knows but the public demands of today may again swing to the modern electric car, carrying to the scrap pile the vast investment now going into the passenger bus. Already along the paved streets of our own city come murmurs from the people who depend upon us for transportation, that the bus will only do in an emergency. We can only move with care lest we find a dangerous place in this bus pathway that may enmesh us in the tangled transportation web of financial loss. Therefore, I repeat, just as the public demands bus transportation, just so it should be furnished by us, but just so must the public pay the full cost, including amortization of the investment.

The twenty-four buses operated in Akron are operated as a part of the city railway system, the same 5-cent fare and universal transfer applying to buses as to cars. On this basis the per cent of operating cost to gross revenue for the nine months has been 98.89 as compared to 86.82 per cent for the street cars. The total earnings per bus-mile were 24.53 cents as against 33.12 cents for the railway. The average speed was 8.49 m.p.h. as against 8.8 m.p.h. for the street cars. The outstanding item of expense to which attention was directed was that for maintenance, which amounted to 1.12 cents per passenger carried for buses as against 0.41 cents for the street cars.

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The maintenance was divided up thus: 14.8 per cent of the gross revenue for chassis maintenance, 2.52 per cent for body maintenance, 6.15 per cent for tires and 0.63 for miscellaneous. The depreciation allowed was 2.35 per cent per month for the buses as against 0.5 per cent for street cars. The operation for the nine months has resulted in a gross revenue of $78,253, giving a loss of $12,928 for the period.

The only discussion on buses was some further information added by Richard N. Graham, in regard to the interurban buses operated by the Pennsylvania-Ohio Electric Company. He stated that a license fee $50 per bus in each of four cities reached was charged so that the total of $200 per bus must be paid annually in addition to the state license. All the cities require a $25,000 liability insurance, but a $75,000 policy is carried by the railway on its buses and even then the premium is considerably less than the cost of accidents on the electric lines. In connection with earnings, he said that the gross each month had been about 34 cents per bus-mile.

Don't Minimize Safety Work

A paper on "The Safety Chairman and His Duties" was then presented by N. W. Funk, safety chairman Louisville Railway. It will be published in a later issue of this paper.

Bearing out Mr. Funk's contention that the idea of safety should be sold to the people and that the railway safety officials should co-operate with the local council, Mr. McClain, of the Louisville Safety Council, added that there would never be a finer opportunity to dispel old ideas in the public mind about the traction lines than by showing a sentiment toward safety work. This work reflects the pulse of the public's attitude toward a company. In concluding he urged that every company should make the man in charge of this work responsible to the president or vice-president.

Mr. Humphrey Talks on Franchises

Churchill Humphrey, assistant general counsel Louisville Railway, then made a very interesting talk on the historical antecedents of the present day regulatory franchise. He showed that the origin of the franchise grant dated back to the time whereof the memory of man runneth not to the contrary, and that it was, in its earliest form, a grant of a privilege on the part of a king, usually very profitable to the king. Mr. Humphrey predicted that the common fixed-rate franchise will disappear within our lifetime and that all utilities will operate on a permit extending indefinitely as long as the utility performs its service properly. He concluded his talk with a statement of his view of the relation of the utility to the government, saying that it is one of service but not servility.

M. B. Lambert, Westinghouse Electric & Manufacturing Company, on behalf of the committee on education of American Electric Railway Association, sent a message to the Central Association, urging that the executives and department heads give serious consideration to the great importance of promoting education among electric railway employees on a broad basis. He emphasized the fact that in many instances the principal problem in this connection is to educate the executives on the value of education.

W. H. Sawyer, East St. Louis & Suburban Railway, and fourth vice-president American Electric Railway Association, also brought a message from the national association on co-operation between the national association and the sectional associations and between different sectional associations. He pointed particularly to the mistake he believes is being made in that the information compiled by the national association is not being fully utilized. He urged the sectional associations to capitalize upon this also.

Railways Must Take Bold Action in Studying Their Problems*

Bolder Gambling with New Expenditures for Increasing Service and More Radical Experimentation Are Recommended by S. W. Greenland in His Annual Address

IT IS a bit difficult to attempt a review of the traction situation for the year 1922. The hardships during the war which all of our properties suffered left their marks so strongly that we are sometimes unable to see just what has been happening in the meantime. If these troubles have helped us to get across the single idea that there can be no fixed selling price for any electric railway ride, I think they have been worth while and I believe that idea is across with the majority of our public. It now remains for us to measure up to this changed condition.

We have talked so much about service that it is up to us to produce the goods; first to justify the increases we have had, and second, because it really does pay to give good service. It is my belief that the public is so fully sold on getting real service and being willing to pay for it that it is time for us to be somewhat bold about gambling with new expenditures for this service. If this means for the larger systems the building of the much-needed extensions and the double-tracking of certain lines, new cars of front-entrance and center-exit type, augmented by first-class one-man cars, and for the smaller systems good one-man cars with the use of electric switches, and independent crossing watchmen, these things should be done.

The possible variation in fare offered by the weekly pass, which may be adapted in price to fit the particular local conditions, employment of extra street collectors to assist at the busy loading points during the rush-hour periods, employment of more inspectors for determining turn-back service, and in fact a general revamping of our ideas that a thing could not be afforded, in my opinion, is going to be necessary if these higher fares are to be continued.

I do not mean, of course, that all of these things can be done at once or that all of the important extensions which some of our political friends would like to have us make can be made even within the next few years. I do mean that our fundamental viewpoint that we are a mistreated, broken-down industry, suffering from the inroads of competition of the new economic factor—the automobile—plus the unreasonableness of our public officials, must be forgotten altogether.

I was very much pleased with the attitude taken by the national association on these various points at the annual meeting in October. For instance, it was only two or three years ago when we were short-sighted enough to still view the possible bus and truck competition as a bugaboo, which should not be allowed or should be fought in the old fashioned cut-throat and legislative manner. The new view—that what we are really selling is transportation, whether it be a 5-cent or a 50-cent ride, must fully obtain, if we are going to serve our various communities. If the bus is to have its place in both urban and suburban service and the auto truck in freight and express service, we should be in the business of operating these buses and trucks.

This does not mean that we should not help in our legislative body to have these vehicles pay their proportionate share of taxes for the use of the highways, which are built out of general funds. We should remember, if this is a service that is necessary and we are attempting to serve the complete transportation needs in our territory, that any unfair burden which we attempt to place on this class of service now will be with us when we take this larger view of selling transportation.

It may be that there are almost no economic distances where either passengers or goods can be hauled more cheaply with the motor car of some description. While from our investigation, particularly of the rural bus lines, we are not enthusiastic as to the money-making possibilities of some of this service, it may be that this more convenient and more flexible service can be rendered at a rate which will support it. In any event, I believe that it is our duty to study this situation carefully, not only on paper, but to make some investigation and some experiment toward proving what can be done

*Abstract of presidential address read at annual meeting of Central Electric Railway Association, Louisville, Ky., Jan. 18 and 19, 1923.

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with this new form of flexible transportation.

As far as city lines are concerned, we are convinced that with proper work the public is willing to pay rates where city lines can be put on a self-sustaining basis.

My view, I regret to confess, on the interurban situation is not quite such an optimistic one. Practically all of the roads with which I am acquainted have had a very pleasant increase in business in 1922, just enough to overcome what has rapidly been crystallizing into a strong belief that perhaps after all the interurban lines were an economic luxury rather than a necessity. Here, again, I believe that if this class of our service can be pulled out of the fire at all it can be done only by the aid of some rather bold action. Most of us are operating the same old cars with which we started some fifteen or twenty years ago. With the heavy, stiff-riding car, dark as to lighting, often narrow as to seats and short as to leg room, we must really admit that we have not made much of a bid for this traffic, except in frequency of schedule and the fact that we land our passengers in the center of the city.

There has been considerable development toward the lighter weight interurban car of easier access, really better riding qualities even with reduced weight and more comfortable seating space. The splendid saving afforded by the power reduction in the use of these cars is a first-class incentive toward their purchase. The real additional incentive, I believe, however, should come from our desire to furnish a better lighted, better ventilated and generally more comfortable vehicle in which to haul our passengers. This kind of a car with increased service and publicity, which will indicate that we do not think that we are going into our grave, but are furnishing the quickest, most comfortable method of intercity transportation, will come close to solving our passenger problem on the interurban lines.

The freight business on our interurban lines is considerably more of a problem. We have been attempting to segregate our cost for freight and express business so we can tell something about what profit we are making on this portion of our service. On our own system there appears to be a very meager amount left over operating expenses to apply as return on investment. It is true, however, that we have assigned a fair proportion of maintenance and overhead charges in computing the cost of this service, which charges we could probably not dispense with if the freight and express service were discontinued. This means that the net result of operating freight business is better than our actual cost analysis showing. The principal item of cost, which cost must be reduced, is the handling at the terminal. I believe that a study of this association of terminal costs of freight business with a view to co-operating to reduce them would be a very desirable work for the association members.

I think that the inherent difficulties of hauling four or five-car trains through our city streets will soon become an important factor in determining what can be done in the freight and express business. Our various franchises over the territory covered by the properties of the association's members are different in this respect as in most others. We cannot expect to be allowed to haul through residential and business districts long trains of freight cars without arousing the antagonism of the public we serve.

This is, of course, a problem for each local company, but inasmuch as through business is getting to be such an important factor in our freight service and in the end is a very profitable portion of our business, I believe that it is wise for us to take a broad view of this problem. The difficulties which any one of our member companies may encounter will have their immediate effect on through business from connecting lines and in the end have its final effect on public opinion in the other communities.

I think, however, this is just the time when we should not be carried away with too much enthusiasm, but we should continue to study our problems and make experiments with a somewhat bolder front than we have ever done in the past, practicing the rigid economies that we have learned so well in the past and at all times keeping before us the fact that we are assisting to a greater degree than any other agency to build up the communities and the territory we serve.

The One-Man Car an Economic Need*

Statistics Show It to Be Safer than Two-Man Cars, Preferred by the Employees, and a Real Contribution to Railway Development

By Clinton E. Morgan
Vice-President and General Manager Brooklyn City Railroad

IN ANSWER to a recent questionnaire sent by the American Electric Railway Association to companies using one-man safety cars 109 replies were received and give very interesting figures as to the results obtained by the use of this type of car as compared with the two-man type. They are shown in the accompanying table.

ACCIDENT DATA PER 100,000 CAR-MILES BASED ON REPORTS FROM 109 COMPANIES

	With One-Man Car	With Two-Man Car	Reduction of One-Man over Two-Man %
Number	32	45	29
Cost	$7,541	$10,699	34
Personal injuries	44	83	47
Collisions with other vehicles	196	207	5.17

To the question put to these same 109 companies, "Have you had any accident which could be traced directly to the fact that the cars were operated by one man only?" seventy-eight companies reported "No" and six companies reported "Yes." Twenty-five companies did not reply to this question. In all cases, the six companies reporting "Yes" also stated that these accidents were due to the failure of the operator to obey the rules of the operating company, which again brings in the human element.

Electric street cars are safer and, with one-man operation, more economical to a community (taking paving and street congestion costs into consideration) than any other developed mode of mass transportation. Hence, it is an economic error to oppose one-man safety cars. If the principle that more than one man is desirable on a safety car equipped with power brakes and safety devices is sound, the same principle should equally apply to the automobile, particularly to auto buses and trucks, that is not so equipped.

Approximately 11,500,000 motor vehicles are registered in the United States, of which, we will say, 9,300,000 are in daily use. Are any of these vehicles equipped with safety devices similar to those found on the one-man safety cars? Will one of these vehicles stop with brakes applied and sand on the track or roadway and make the stop in emergency if the operator takes his hand off the steering wheel or his foot off the control apparatus? The obvious answer is "No," but in the case of the one-man safety car the equally obvious answer is "Yes."

This is another of the many reasons for the advancement of the one-man safety car, and it should be impressed on those who, for some reason, stand in the way of this economic necessity.

These one-man safety cars of the lighter type were first applied to the thinner lines of traffic, particularly in the outer parts of the cities, where traffic, both automobile and street cars, moved at a higher rate of speed. This led to a slight increase in car collisions with other vehicles, and accounts for the small reduction of 5.17 per cent in such accidents. It must be borne in mind, however, that we have an ever-increasing number of automobiles, many of which are operated by inexperienced drivers.

The reason for the success of the one-man safety car is the improvement in service to the car rider, freedom from boarding and alighting accidents and a general reduction in accidents, all of which have brought about increased riding by the public. Further advantages have been found in the lowering of maintenance costs, reduction of labor

*Abstract of paper read at the meeting of the Central Electric Railway Association, Louisville, Ky., Jan. 18-19, 1923.

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costs, reduction in power costs and acceleration of car speeds. In this connection it should be noted that the expenses incurred in producing the car ride is paid by the car rider. These costs include street paving and taxes, which have also increased abnormally in the last decade, and in the end the car rider is the one who suffers from lack of adequate service if the fare does not meet the cost of service.

If the railway companies are in a position to produce the car rides for the price paid by the car rider, then they are in a position to furnish adequate service. Likewise, it is an economic necessity that the railroad company produce this ride at the lowest cost possible. The natural result of improved service with more frequent headway is less crowding, higher speed and more comfort given by the one-man safety car. New designs of lightweight, large double-truck cars with double passageways are being developed with provision for operation by either one or two men. There is an unquestioned demand for this type of car in congested city service, where the use of two men will facilitate the handling of the peak rush-hour loads more satisfactorily and permit provision that during the off-peak riding these same cars shall be operated by one man, thus producing one unit that can be used during all hours of the day. Savings clearly result, for there are very few cars operated between 8 p.m. and 6 a.m. that take in enough money to pay the men operating them, let alone the payment of the other costs such as power, maintenance, etc.

We must not lose sight of the fact that the electric railway, like every other manufacturer, has overhead expense. In spite of everything, this cost is ever present. If the manufacturer is to succeed he must use his plant and make it earn steadily and consistently. This also applies to the transportation companies, as the car rider is vitally interested in this overhead cost. As the public becomes educated to the benefits derived from the use of the one-man safety car, I predict that it will demand a further application of this principle, not only to the street railway service but to heavier transportation such as subway, elevated, interurban and suburban lines.

With the introduction of these cars in Brooklyn, we have more than shared with the public the savings brought about by their use, and in many cases we have increased the service with the installation of these cars from 50 to 100 per cent; some, however, only 10 per per cent and others 20 and 30 per cent, depending upon the conditions surrounding the traffic requirements of each line. The public in general has responded to this increased service by increased patronage and from investigation I feel that with the adoption of this type of car there has been an average increase in service to the car riders of approximately 30 per cent on the street railways throughout the country. This policy is also being applied to the subways of New York City, where a ten-car train can now be handled by one guard in addition to the motorman, and many such trains are operated with one guard handling three or more cars. All of this has been done with no let down in the safety of operation.

In some local communities numerous difficulties have been created by misguided political, civic or labor leaders, a few honest in their convictions, but erring in judgment through unfamiliarity with the facts and through prejudice inspired by other motives.

From the standpoint of employment, I can say for the Brooklyn surface lines, and I think that the same condition prevails throughout the industry, that there has been no case in which even one motorman or conductor has been laid off or retired from service as a result of the introduction of the one-man safety car. In fact, today we are short approximately 150 men to bring our force of car operators up to normal operating strength. We have in Brooklyn 256 one-man safety cars in addition to 175 cars designed for one-man-two-man operation, making a total of 431 safety cars. With us the runs to which the one-man safety cars are assigned are now regarded by the men as the preferred runs, not alone on account of the operators receiving 5 cents per hour more than the rate paid those working two-man cars, but on account also of many other advantages clearly shown in statements made by employees. Two of these statements I quote:

> I have been in the employ of the various companies comprising the Brooklyn Rapid Transit System for the past eighteen years and during my term of employment, having operated all types of cars, do hereby certify that I have been operating the standard type of one-man safety car for over two years and can truthfully state that I now prefer operating a safety car more than the old type two-man car.
>
> My reasons for preferring the safety car is that the safety car is directly under your own control, and your ability to move over the road on schedule is not governed by the actions of the conductor on the rear.
>
> I do not feel any ill effects from operating safety cars and the work involved is not any more than can be safely handled by one man.
>
> Personally, I feel that I could operate any size car having safety car features on any line regardless of the traffic carried, and still run on schedule.

Another:

> I have been in the employ of the various companies comprising the Brooklyn Rapid Transit System for the past ten years and during that time have worked as motorman and become familiar with the various types of cars used on street surface railroads.
>
> Since last February I have been operating a double-truck car on the Sumner Avenue line which was reconstructed with safety car features for one-man operation.
>
> I can truthfully state that I like working a safety car better than the old type of two-man car. The work keeps my mind occupied and I now feel a lot better upon completion of my day's work than I did when working as a motorman only.
>
> The work involved is no more than can be safely handled by the average man, and the car appeals to a man who wants to do his work properly for the reason that he is wholly responsible for the way in which the car is operated and he is his own boss. From personal contact with the men at the depot, I have come to the conclusion that those who object to safety car operation are the lazy fellows who want to get full pay for doing as little work as possible.

This general sentiment is expressed by the other car service employees.

Summarizing the one-man car situation, as gathered from the decisions of various utility commissions throughout the United States, it appears that this type of vehicle, although opposed at first as an innovation, has rapidly grown in favor as improvements in safety and service appliances have been made. It appears also that, while the two-man car may be desirable in places where traffic is heavy or other local conditions make the presence of two men desirable, the one-man safety car will not only continue to fill an important place in railway operation but the further development and application of this principle, embodied in the one-man-two-man type of safety car, has established a further means of providing more frequent service to the car rider as well as aiding in the solution of serious financial and economic difficulties of the electric railways and the car-riding public.

One-Man Car Operating Figures from Youngstown*

By Richard N. Graham
Manager of Railways, Pennsylvania-Ohio Electric Company, Youngstown, Ohio

THE Pennsylvania-Ohio Electric Company operates three interurban lines radiating from the city of Youngstown. At the terminus of each of these lines are located comparatively small communities in which city operation is conducted. These communities are New Castle, with a population served of about 60,000; Sharon, with a population served of about 40,000; and Warren, with a population served of about 30,000. One-man operation was commenced in September, 1918, and the number of one-man car-miles in the three communities has increased from 15,000 in the month of December, 1918, to 188,000 in December, 1922. At the present time only one line in any of these communities is served with two-man cars. In December, 1918, there were seven one-man cars operated. In December, 1922, there were forty-two. The total passenger revenue in these towns in December, 1918, was $53,136; in December, 1922, $69,025. The man-hours operated in these towns in December, 1918, were 43,266, and in December, 1922, 26,395. The revenue per man-hour in December, 1918, was $1.23; in December, 1922, $2.62, making an increase of revenue per man-hour of 113 per cent. In noting this increase of revenue per transportation man it must be taken into consideration that the average fare in 1918 was less than 6 cents and in 1922 about 7 cents, but the fact that with an increased revenue there was a reduction of nearly 40 per cent in man-hours certainly illustrates the efficiency and economy of one-man cars.

In addition to forty-two standard Birney one-man cars operated in these communities, we are operating a number of rebuilt double-truck cars, which have been fully equipped with Birney safety devices and are operated with one man. Of course the use of the

*Discussion on C. E. Morgan's paper, "One-Man Car an Economic Necessity."

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Birney lightweight car has resulted in operating economies even more pronounced than the reduction in man power. In New Castle, a great deal of our track is twenty years old and in the course of paving operations it would be necessary to install new track if the old and heavy equipment were to be used. With the light Birney cars it is entirely practicable to rehabilitate the track where new paving is done and thus avoid very large capital expenditure.

In Sharon, with the continued use of the large car with an increase in car mileage, it would have been necessary to install new substation equipment, which need was removed by operation of the Birney car.

For the year 1922 the cost of lubricating, repairing and inspecting all safety cars amounted to 1.7 cents per car-mile, which is about 60 per cent of the same cost of two-man equipment in use. In all our communities served by the Birney car they are favored by public opinion and the extension of their operation has been made with the full co-operation and consent of our trainmen.

I have reserved for the last word our experience in accidents. In 1918, including our interurban lines, our accidents were as follows:

	1918	1922
New Castle	41	12
Sharon	64	34
Warren	37	25
Total	142	71

The reduction in the total number of accidents was exactly 50 per cent. Since during these years we have carried on consistent and elaborate prevention work, we do not pretend to say that this improvement was due to one-man cars, but with this record in view we are absolutely certain that the use of one-man cars has not added to our accident hazards.

The Use of the Interurban Bus*

By Installing a High-Grade "Coach" Service Between Youngstown and Warren the Pennsylvania-Ohio Electric Company Has Killed Bus Competition and Built Up a New and Increasing Traffic

By Garrett T. Seely
Vice-President and General Manager the Pennsylvania-Ohio Electric Company

THE Pennsylvania-Ohio Electric Company has for many years operated a 15-mile suburban line between Youngstown and Warren, following the main public thoroughfare alongside the Mahoning River. The line for its entire length is situated in the heart of the steel manufacturing district and extends through a large part of Youngstown, Girard, Niles and Warren. Of the total length of 15 miles, 11.4 miles is on city streets, the distances on city streets being as follows: In Youngstown, 3 miles; in Girard, 1.7 miles; in Niles, 3.7 miles, and in Warren, 3 miles.

In the short distances between cities, the electric railway is on the main highway and none of its length is on private right-of-way.

Youngstown has a population of approximately 140,000, Girard nearly 10,000, Niles 13,000 and Warren 27,000. The electric railway line throughout its entire length, with the exception of a short distance in Warren and 3 miles in Youngstown, is single track. In addition to the disadvantage of having so large a part of its route in city streets, the electric railway line describes a circuitous loop through the business district of Niles.

A regular all-day headway of twenty minutes is maintained on this suburban line from Youngstown to Warren. On the same track, there is a shorter suburban service operated to Girard on a twenty-minute headway, thus furnishing ten-minute service to Girard. From the terminus of the line in Youngstown to the city limits of Youngstown, a route distance of 3 miles, a frequent service is given by the Youngstown Municipal Railway with safety cars. As a result of the large proportion of single track, large proportion of the line in city streets, frequent through service and additional service to Girard and the city limits of Youngstown, the through service from Youngstown to Warren and from Warren to Youngstown is slow, the service between the two cities being given by seven cars on a headway of twenty minutes and one hour and ten minutes for the trip.

Why the Coach Service Was Inaugurated

There has been a persistent demand for quicker service between these communities. The Erie Railroad parallels the electric railway and, on account of the frequent through service between Pittsburgh and Cleveland by way of these cities, is to a certain extent in competition with the Youngstown, Niles and Warren electric railway line. A great deal of the local travel in the valley avails itself of the steam railroad facilities. The steam trains make the trip from Youngstown to Warren in thirty-five to forty minutes.

In March, 1921, bus competition commenced on this line and gradually increased. Several makes of buses were used. The fare on the buses ranged from 25 to 40 cents. That on the electric railway from Youngstown to Warren is 30 cents, with a 10-cent intermediate fare between towns, fourteen zone tickets are sold for $1, three being good between Youngstown and Warren and making the through fare 22 cents with tickets.

The buses made the trip from Youngstown to Warren in approximately 50 minutes, twenty minutes less than the electric cars. This not only diverted traffic from the cars, but increased the riding habit between the communities. These buses were, however, more or less noisy and inconvenient; the schedules were poorly adhered to; the drivers were not uniformed or markedly courteous, and, in general, the bus service, given as it was by a large number of independent parties, lacked discipline and responsibility.

To compete successfully with the buses and prevent further interference with electric railway patronage required that the running time of the cars be reduced. The expense of doing this would have run to a million dollars, and even then the limited service possible after such expenditure would be given subject to such disadvantages of franchise provisions as to stops as would slow up schedules and this at low rates of fare.

As limited service could be given with gasoline cars with very much less original expenditure, without restrictions as to stops that would destroy efficiency, and with fares that could be fixed to pay the cost of services, it was determined to give this limited service. For this purpose it was decided that vehicles should be secured in which there was abundant room for all passengers to sit comfortably, which would be attractive and clean, which would be free from mechanical noises, which should run strictly according to definite schedules and in which the passenger would not have to scramble for a seat. This decision was made in January, 1922, and service was inaugurated on Aug. 1, 1922.

The Engine Speed Was Kept Down

The White Model 50 bus chassis was adopted, but with a modified straight bevel gear, single reduction rear axle with gear ratio of 4.25 to 1. This axle was adopted because, as the 15-mile trip was to be made over a good road with very few stops and without heavy grades, its adoption cut down the engine speed at the usual traveling speed of the vehicle, thus reducing wear and tear on the engine and body and reducing vibration. Through collaboration with the Bender Body Company of Cleveland, a limousine type of body was developed, seating eighteen passengers on cross seats. The driver is separated from the passengers with a glass screen as in the ordinary type of passenger limousine, and all passengers have plenty of elbow and leg room. The seats are beautifully upholstered in a special variety of embossed leather, which is exclusive with the Pennsylvania-Ohio vehicle, and the fittings of the limousine in the way of carpets, curtains and other accessories are of the highest class.

To distinguish the new vehicles from the often forlorn and decrepit-looking vehicles called buses they are called coaches. While the coaches were being manufactured an intensive advertising

*Abstract of paper presented at annual meeting of Central Electric Railway Association, Louisville, Ky., Jan. 18 and 19, 1923.

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campaign was carried on throughout the entire territory of this company, calling attention to the coach service that was being inaugurated.

A half-hour headway was decided upon and five coaches built, four for regular service and one to serve as a spare. In the meantime, drivers were selected and trained, the original selection of seven drivers being made from 239 applicants. A chauffeur's uniform of gray whipcord was selected and a cap bearing the insignia "P-O." Each driver was provided with two suits so that the uniforms could always be kept neat.

Fare Fixed in Accordance with Quality of Service

The fare between the terminal cities was fixed at 45 cents, double the ticket fare on the electric railway and higher than the fare of the opposition buses. The service was successful from the start. By the first day of October, the opposition buses had disappeared from the field. The receipts from the coach lines since the inauguration of the service have been as follows: August, $8,986; September, $9,283; October, $12,580; November, $11,329, and December, $13,707.

Immediately after service started, two additional coaches were purchased for this line; in October, three coaches were purchased for similar service on another line of the company, and two additional coaches purchased in November brought the fleet up to twelve coaches.

The business of the bus operators previously on this route was from 25 to 40 per cent less during the cold months of the year than during the warm season. This is not true with the coach service, although the spring business will probably be greater than the present business. Now the service is on a 15-minute headway from 12 a.m. until 6 p.m., on a half-hour basis in the mornings and on a twenty-minute basis in the late evening. On Saturdays, Sundays and holidays the service is fifteen minutes throughout the greater part of the day.

Ticket offices are maintained in both Youngstown and Warren and ticket sales are limited to the seating capacity of the coach. Tickets are on sale at all times in advance for any trip. At both terminals a seat chart is maintained for each trip during the day, and all tickets are stamped with the leaving time of the coach. Unused coach tickets are redeemable at any time at any ticket office of the company. During December, the ratio of receipts to possible receipts was 50 per cent; that is, if every seat on every trip had been paid for, the receipts would have been double the actual receipts secured.

The Coach Business Is Largely New Traffic

As to the effect of the coach line upon the electric railway line, the following figures are of interest: The receipts from the Youngstown-Warren electric railway line for December, 1922, were $30,632, which was an increase of $43 over December, 1921. This company operates two other suburban lines of approximately the same length as the Youngstown-Warren line. On one of these, the receipts for December were $1,098 more than the year before, and on the other $1,150 more. The Youngstown-Warren line could, therefore, reasonably have expected from $1,000 to $3,000 in December. Evidently, then, the coach business created a new traffic, representing in excess of $10,000, or 33 per cent increase over existing traffic. A limited street car service would hardly have produced such an increase.

Many of the patrons of the new service are women, in a large number of cases representing families which own automobiles. Many are officials of industrial concerns who prefer the coach service to using their own cars on a crowded highway and being compelled to find parking space. That the coach service has developed interchange of traffic between cities is indicated by the fact that the large stores in these communities in their advertising stress the fact that the coaches stop at or near their stores.

There is no prejudice against the company for furnishing this transportation; in fact, its permanence and responsibility attract patronage.

Our original installation of tire equipment comprised 36 x 6 pneumatic tires carried on Budd Michelin disk wheels with dual wheels in the rear. None of the rumored disadvantages of dual wheels has developed in practice, the wear on the tires being very uniform. After five months of operation we can expect an average mileage of near 20,000 per tire with 36 x 6 tires in our service.

We have changed several of the coaches to 34 x 5 tires with good results. We have had few delays or interruptions to service on account of tire trouble, and only two or three cases of puncture on the front wheels. In case of a puncture or other trouble on one of the tires on the rear wheels, the vehicle can run on the other tire to the terminal, where the wheel can be changed.

Until severe cold weather set in, we were getting about 8 miles per gallon of gasoline. In order to keep the vehicles comfortable during the cold season the engines are allowed to run continuously. This cuts down the mileage per gallon of gasoline, but we do not need to use wood alcohol or other anti-freeze solution in our radiators.

Our public is outspoken in praise of this coach service, and the giving of the service by our company has improved our public relations in all the communities served by the coaches. The feeling on the part of the public as a whole is that the company is making every effort to give the maximum possible transportation service and it shares with the company a natural pride in a rather unusual transportation venture.

Marketing Your Own Commodities*

The Fundamental Idea Expressed Is that When Transportation Which Should Be Provided by the Electric Railway Is Furnished by Other Agencies, the Latter Are Not "Marketing Their Own Commodities," but Another's

By R. H. Wyatt
General Superintendent Louisville & Interurban Railroad, Louisville, Ky.

It was my privilege recently to ride over the property of the Kentucky Traction & Terminal Company, which serves the Blue Grass section. This section is noted throughout the United States for its beauty and for its fertility of soil. In such a community there is a large volume of commodities to be exchanged and transported between the producer and the consumer. It is the mission of the transportation company to perform that service, but in this, as in many other localities, the service is being performed either by the trucks of the merchant or by some truck company which parallels the lines of the transportation company for many miles. Thus the business of the transportation companies has been reduced to a great extent. One-man freight cars are being operated on this particular property, so light is the traffic. This is a case of a merchant marketing, as a side line the commodity which justly belongs to the transportation company.

The truck operator, whose right-of-way belongs to and is paid for by the public, will doubtless quote rates which compare favorably with those of rail lines, and the shipper will freely accept the service, believing that he has a "snap." However, when he adds to his freight bills his road tax and his road repair bills, which are greatly increased by reason of truck operation for private gain, then the shipper will possibly realize that his freight bills are not what they seem.

Coming closer home, I will give you a local experience. Some time ago, one of our largest manufacturing plants purchased a fleet of high-class motor trucks to distribute its products throughout adjacent communities. Until that time the firm had been one of the largest customers of the local transportation company.

When the new delivery service was brought to our attention, we immedi-

*Abstract of paper presented at annual meeting of Central Electric Railway Association, Louisville, Ky., Jan. 18 and 19, 1923.

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ately dispatched our freight solicitor to ascertain the cause of this development. Upon gaining an audience with the traffic manager, our representative asked if it was rates or the lack of service that prompted the large expenditure of money by his company to enable it to perform a service which had hitherto been handled by our company. The traffic manager replied that both rates and service had been entirely satisfactory and admitted that the truck deliveries would cost more than those by traction. His company, however, had concluded to try the delivery of its own commodity as an advertising campaign. This is the case of a mercantile business marketing, as a side line, the commodity of the transportation company.

As to truck transportation, I do not intimate that it has no field. As a feeder of rail lines it has a big and profitable field; but this field is only as a feeder and not a competitor of the railways.

Full and Semi-Automatic vs. Manual Operation for Substations*

A Statement of the Principles Involved, Showing that the Interurban Railway Application Is Simpler than the Urban, but that Labor, Feeder Copper and Incidental Savings in General More than Offset the Fixed Charges on the Additional Investment

BY CASSIUS M. DAVIS
Railway Engineering Department,
General Electric Company, Schenectady, N. Y.

AUTOMATIC and semi-automatic substations were introduced primarily as a means of conserving labor. They have lived up to expectations in this respect and have given a good account of themselves from an operating point of view. They offer a new economic means of effecting many improvements in operation in addition to the reduction in labor expense. Schedule speeds can be increased at a minimum expense, improvement in distribution and conversion economics are made possible, additional capacity for new load centers can be provided in a most economical manner, etc.

The purpose of this paper is briefly to present some of these principles, none of which is new, and to suggest their application in making a comparison between manual and automatic control.

There are several important differences between interurban and city systems, primarily because the interurban represents essentially a lineally loaded system while the load on a city system is distributed over an extensive area. A single substation on an interurban system usually feeds only a given length of a single route, while in the city one substation may feed portions of several routes and the length of feed is indefinite.

AUTOMATIC CONTROL FOR INTERURBAN SYSTEMS

On the average interurban railway the cost of the labor conserved by the use of automatic control is considerably in excess of the fixed charges on the additional equipment. This applies to both single-unit and two-unit substations, although, of course, to a lesser extent in the two-unit case. Automatic control for a single-unit substation yields a gross return of from 25 per cent to 40 per cent on the investment. On this account it is possible to strike a new balance between the substation spacing and the amount of feeder conductor, with a possible substantial saving in feeder copper.

Where it is necessary to improve the voltage conditions on the trolley, balance can be struck between the fixed charges on the necessary additional copper and the annual operating expenses of additional automatic substations to accomplish the same result. The result is frequently greatly in favor of the substations. For example, as against $650,000 in feeders the desired end is obtained on the North Shore line by the use of automatic substations for about one-quarter this amount. The fixed charges on the substations would come to only about one-third those on the feeder copper.

As an advantage incidental to the use of automatic substations the track drop will be reduced and the distribution efficiency increased. This has a bearing upon the mitigation of electrolysis, which is of greater importance in city service than on an interurban line.

There are two features in the control itself which must be borne in mind when considering the economics of substation location, first the load limiting resistor, and second the possibility of shutting down during light-load periods.

The resistor performs the three-fold function of replacing the ordinary overload circuit breaker, limiting the output of the substation and transferring part of the overload to adjacent substations, all of particular importance in interurban service. The functioning of the equipment makes each substation a reserve for its neighbors and thus becomes an important factor in the selection of the size of substation equipment. There are some 500-kw. units now in operation which, under manual control, would be entirely inadequate and would have to be replaced by 750-kw. or 1,000-kw. units.

As to the second feature it is possible to adjust the control so that a given substation is in operation only when a substantial load can be carried. The load factor and conversion efficiency are thus improved and the running-light losses, which amount to from 3 per cent to 7 per cent of the machine capacity, are eliminated.

Further, elimination of labor affects the design of substation buildings. Cheaper, and in some cases smaller, buildings can be provided. Windows can be practically done away with, space and conveniences for operators can be omitted and no provision need be made for heating.

THE PROBLEM OF THE CITY SYSTEM

On city systems the problem frequently takes the form of a comparison of a few manual substations with many automatics. The city may be divided into load zones and the comparison simplified so that, in effect, one manual may be compared to three or four automatic substations.

The first basic assumption to be made is that the substation apparatus and direct-current distribution plant, *per se*, are equally reliable in operation, requiring no more reserve equipment for one scheme than the other. If one scheme offers certain advantages over the other during times of emergency, these must be capitalized according to the best judgment of the operating department.

Similarly the same average trolley voltage must be used throughout the comparison. The trolley voltage not only affects the speed of the cars, and with it the platform expense, but also the distribution losses and the total power output of the substations. Furthermore, the trolley voltage assumed affects the amount of feeder conductor required and therefore the capital expense. If it is impossible to assign the same trolley voltage to both schemes, then the differences resulting must be estimated and the equivalent capital expense debited to the proper scheme.

Another basic assumption is an equality in both schemes of track and negative return drop, and a final one is that the load on the system and the area covered by the same must be the same for both schemes.

The underlying principle in the application of a multiplicity of small substations is that, compared to a single large station, the amount of positive copper required is theoretically in an inverse ratio to the number of substations. The limit toward which this principle leads is that number of substations which permits the elimination of all feeder conductor, the entire load being carried by the trolley.

In the practical application of this principle it is impossible to realize the theoretical saving in positive conductor due to the many local conditions such as non-uniformity of load distribution, methods of sectionalizing the trolley, use of negative feeders to avoid unnecessary electrolysis hazards, proximity of other points of power supply, insur-

*Abstract of paper presented at annual meeting of Central Electric Railway Association, Louisville, Ky., Jan. 18 and 19, 1923.

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ance against interruption of service, local city ordinances, building restrictions, etc. It serves then primarily as a criterion by which to judge how well any proposed scheme has been laid out.

The next principle is that the number of substations in operation can be made proportional to the load, maintaining the conversion efficiency at a maximum.

The direct-current distribution efficiency remains the same regardless of the number of substations, if the same average trolley potential is maintained and the load is evenly distributed. Actually the distribution efficiency will be slightly higher since feeders will parallel the trolley wire even where calculation would indicate the average voltage would be maintained without supporting feeders.

The alternating-current distribution system, if laid out for uniform voltage drop, would have the same efficiency regardless of the number of substations. This cannot usually be accomplished and a slightly lower efficiency results in practice which offsets the gain in efficiency mentioned in the preceding paragraph.

The peak load on a city system does not appear simultaneously at all parts of the system but only at a few relatively widely separated localities. It then gradually shifts to other parts of the city. Hence the greater the number of sources of power the shorter the feeds to load peaks will be and consequently the more efficient will be the entire system of direct-current distribution employed.

Another principle is that the number of substations selected and their locations must be such as to produce the most economical operating results. An aggregate of several small substations cost more than a single substation of the same total capacity. The difference, however, is offset by the smaller amount of positive and negative conductor required in the former scheme. By means of automatic control the small stations can be operated with a minimum of labor; they can also be operated with a minimum of light load losses.

A final principle concerns reserve capacity. In a single large manual substation at least one machine, equal in capacity to the largest, must be held in reserve. Thus there is always one idle unit upon which fixed charges must be carried. With a multiplicity of small substations, however, each acts as a reserve on all those surrounding it. The reserve is included in the normal capacity and is always an active reserve earning a return on the investment.

The comparison between manual and automatic control for metropolitan systems is necessarily close, the more so the denser the traffic. It is difficult to make specific statements which are of value in connection with city substations as a class.

Emergency Stops*

Some Practical Suggestions as to the Emergency Use of the Motors in Dynamic Braking, with Particular Reference to Interurban Operating Conditions

BY H. C. DE CAMP
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THE best practice for making emergency stops to avoid accidents is a subject which has not received the attention it should, judging from the lack of information to be found in rule books and railway publications.

In the standard code of rules for city operation, issued by the American Electric Railway Transportation & Traffic Association, Rule No. 260 states:

> Motorman must not use the reverse to stop a car except to avoid accident or when the brake rigging is disabled. Motorman must not reverse when the brake is set, but must release the brake and throw reverse simultaneously and when the reverse handle is thrown in position, apply current one point at a time, otherwise the fuse will melt, or breaker release. Sand should be used when making an emergency stop.

Now, in interurban operation such a stop would not be fully effective, if the operator followed the rule literally. When emergency air is applied on a heavy interurban car it takes six or seven seconds after the brake handle is placed in release position for the brakes entirely to release. If the operator should reverse at the same time, the wheels would lock and the car slide for a considerable distance.

Under the heading "runaway car" we find Rule No. 261 as follows:

> While descending a grade, should it not be possible to stop a car equipped with two motors by means of the brake, or by reversing in the usual manner (due to lack of current on car), the motorman must, with his controller still reversed, advance cylinder to the last position. In the event of the car being equipped with four motors, the act of reversing will cause it to stop. Should a car equipped with two motors start to roll backward while ascending a grade, due to lack of current on the car and inability of the brakes to hold it, the controller cylinder must be advanced to the last position. Should the car be equipped with four motors, the reverse set in the forward position will stop the car.

If one were to interview operators of electric cars, he would find a wide range of opinion, notwithstanding the above rules, as to how emergency stops should be made. Some believe that emergency air and sand should be used, some would reverse and some would use both air and reverse. It might be well, therefore, for this association to take some action to determine the best method to be followed, under various conditions, both for interurban and city services.

In making an emergency stop, even under ideal conditions, it is not always possible to prevent an accident, but the desire is to bring the car to a stop in the shortest possible distance. For example, an interurban car weighing thirty-five or forty tons, running at a speed of 40 m.p.h. on a straight and level track, will travel approximately 420 ft. before it will be brought to a stop. Obviously, if an automobile or other obstruction appeared upon the track 200 ft. ahead of the car, an accident could not possibly be prevented.

Occasionally an accident occurs to a car on a steep grade, in connection with which it is stated that the operator lost control of the car and it jumped the track at a curve or switch, resulting in serious injury or death to passengers. As there are four methods of stopping an electric car when it is equipped with air brakes and three when air is not used, it does not seem reasonable that such accidents should occur if proper instructions are given to operators. In order, from the standpoint of making a quick stop, the methods are: emergency air and sand, reversal of the motors, dynamic braking or "bucking" the motors, as described in Rule No. 261, and hand brakes. Unfortunately, on a large number of properties where air brakes are used exclusively, the hand brakes are not in as good an operating condition as they should be, owing to lack of use.

When an emergency stop is made with air and sand, the sand is applied regardless of the condition of the rail, in order to prevent skidding the wheels, when the speed of the car is materially reduced.

In reversing the motors, the number of points of power to be given should be determined by actual test of the various types of equipment on the property, in order that the breaker will not be released, as this would cause delay to reset it. Besides, even if the breaker did remain in, the draft of too much power might tend to lock the wheels, causing them to skid, with loss of effectiveness of the stop.

When dynamic braking is resorted to, after other means have failed, the following procedure might be followed rather than that covered in Rule No. 261:

On a four-motor equipment using K control, the reverse handle must always be in the opposite direction from that in which the car is moving. If the car is moving forward, the reverse handle would be pulled backward and the main controller handle left in the off position. In the same situation, with a two-motor equipment, after the reverse handle has been pulled backward, the main controller handle should be moved to the last point. Under these conditions, the car will be brought to a sudden stop and if going down a grade, will not stand still, but move at slow speed, not sufficient to cause much damage, but such as to permit the operator to block the wheels.

When the car is headed up grade, with the reverse handle in the forward position, and it tends to run backward, the reverse handle would not be touched, as it would be in the opposite direction from that in which the car is

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moving. In a two-motor equipment, the reverse being left in the forward position, the main controller handle would be moved to the last point.

When dynamic braking is resorted to it is also best to instruct the motorman to throw out the breaker. The trolley may be off the wire, and, in the case of a two-man car, while the motorman is trying this method, the conductor might be trying to put it on. The sudden restoration of the line current, while the motors are generating, might damage the equipment to such an extent that the stop could not be made.

Where cars are equipped with pneumatic or electric remote control, using trolley current for operating the switches or contactors and thus requiring that the main controller handle be placed on the first point before the reverser will be thrown, some mechanical means should be provided to throw the reverser by hand, as both the air and current may be off at the same time. Otherwise this method of emergency stopping could not be used.

In both interurban and city service, where air brakes are used exclusively, it is good practice to make one or two safety stops with the hand brakes, in a round trip, to assure the operator they are in good condition.

In view of what has been said, it might be well to appoint a committee to make exhaustive tests, under all conditions and with all kinds of equipment, so that specific rules could be promulgated for the proper instruction of operators of electric cars, so that when emergency stops are properly made, accidents can be minimized if they cannot be prevented. Then it would be well for operating officials to demonstrate to their men the methods recommended, as this would be more effective in practice than oral or printed instructions.

Automatic and Semi-Automatic Substations for Electric Railways*

A General Review of the Subject with Illustrations to Show the Sources of Savings Which Result from Non-Manual Switching—Full Automatic Control in General Appears Preferable

BY C. A. BUTCHER
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THE function of a railway substation is to apply a reliable source of power to a certain portion of the system. The traffic department considers the power supply reliable if it enables it to maintain satisfactory schedules. The engineer's problem is to insure such reliability by the most efficient means.

Is automatic operation more or less reliable than manual operation? There will be two answers to this question—yes and no; but the affirmative answer will, without a doubt, be by far the more general.

Measured by past standards, most manually operated substations are considered reliable, therefore the expenditure for equipment to convert them for automatic operation must be justified by economy. The major saving is, of course, that due to the elimination of operators. Comparing this saving with fixed charges on the capital investment required for the automatic features will, everything else being equal, determine whether or not the change should be made.

A study was recently made to determine whether it would be economical to equip the substations on a certain system with automatic switching. Each station is equipped with two 300-kw. units, and the first thought was that the fixed charges on such equipment would probably offset the gain to be realized by the saving of operators' wages. The hourly wage rate for operators averages 51 cents, and in some cases the hours of duty overlap. In several stations, as high as thirty man-hours per day are required.

The analysis, covering a group of five stations, shows that the total cost of automatic equipment installed is $80,000 and the net saving in labor, after allowing for periodic inspection of automatic stations, totals $20,050. Allowing 15 per cent per annum to cover maintenance, insurance, interest, depreciation and taxes, there remains a net yearly saving of $8,050.

REDUCING POWER LOSSES

In another station, not included in the group of five, two old low-speed, engine-type, double-current generators are operated as synchronous converters. As such, they do not compare favorably in efficiency with converters of modern design. With an average load of 40 per cent the efficiency of the old machines, based on original conditions, is approximately 83.5 per cent. On the basis of twenty-eight machine-hours per day total for the two units, the annual conversion loss at 1.5 cents per kilowatt-hour is $4,047.

A single 500-kw. modern synchronous converter is adequate for the service at this station. On a comparable basis it will operate for twenty hours per day at an average load of 45 per cent. At this load, the efficiency is 94 per cent. The annual conversion loss would be $1,471.

The cost of automatic switching and a new converter operated from the present transformers, all installed, will be approximately $15,000. Allowing 15 per cent for annual charges and $300 per year for periodic inspection, the annual charges total $2,550. Added to the power saving of $2,576 there will be a labor saving of $4,500 per year, or a total of $7,076. The net annual saving of $4,526 will pay a return of 30 per cent on the investment.

WHEN IS SEMI-AUTOMATIC SWITCHING JUSTIFIED?

Started manually, a semi-automatic substation runs until shut down according to some schedule by one of a number of different methods, such as by a time switch, by momentary interruption of the alternating-current supply, or by an attendant who enters the station for that purpose. Such operation requires that the equipment include all of the protective devices essential to a full automatic equipment, such as those which operate to prevent open-phase running, excess temperature of machine or transformer windings, overheated bearings, operation with open shunt field winding, etc. Complete automatic operation of the direct-current equipment is, of course, essential.

Since the station runs continuously during its scheduled period of operation, there will not be the saving in light-load losses such as would be effected by a full automatic equipment; however, load requirements may be such as to make this item negligible. The item of attendance is not entirely eliminated, and, as the following comparison will show, the cost of the additional equipment required for full automatic control is such that the attendance item is quite apt to exceed the fixed charges on the additional investment.

The following is a comparison of the investments in the three classes of switching equipment for a 300-kw., 60-cycle converter substation operated from a three-phase, 22,000-volt supply circuit. The investment in each case includes a high-tension oil circuit breaker.

	Investment	Fixed Charges 15 per Cent	Operation	Annual Charges
Manual	$2,385	$358	$3,600	$3,958
Semi-automatic	3,460	519	900	1,419
Automatic	5,950	893	300	1,193

	Semi-Automatic	Automatic
Investment in excess of manual switching	$1,075	$3,565
Additional fixed charges	161	535
Operating saving per year	2,700	3,300
Net saving	2,539	2,765
Return on investment, per cent	236	80

The cost of full automatic switching in excess of semi-automatic switching is $2,490. However, the full automatic station shows an additional yearly saving of $226, which represents a return of 9 per cent on the additional investment.

While the returns from full automatic switching do not appear so attractive as for semi-automatic, and the investment required is greater, the actual difference in capital required is

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quite small compared with the advantages obtained from full automatic equipment.

In case of an interruption of the alternating-current power supply, all semi-automatic stations on the lines involved will shut down and it becomes necessary for an attendant to restart each one.

As the capacity of the stations under consideration increases, the advantage in first cost favoring semi-automatic switching becomes materially less, because the cost of additional full automatic control features remains practically constant except for the cost of the electrically-operated starting and running switches. The advantage is of consequence only for the control of units of 500 kw. capacity or less. Since units of this rating are used mostly in interurban service, it is evident that only in such service will the unattended, semi-automatic station have a probable application. In this field, it will be limited to those stations from which a temporary interruption of service is not of service consequence.

Automatic Features in Attended Stations

The features of semi-automatic stations may be applied to large manually operated stations to great advantage. For example, automatic control of the direct-current switching equipment and especially of the feeders insures a minimum of interruption to service from faults which occur in the direct-current distribution system. General application of protective devices provides adequate protection to the station equipment and eliminates much of the hazard of the human element.

Since substations of 1,000 kw. capacity or higher are general only on the larger railway systems in which an interruption of service is of serious consequence, there will be few who will advocate unattended semi-automatic operation of such equipment. A proposal covering semi-automatic switching consisting of full automatic control of the direct-current equipment and all of the various protective features for a number of large stations supplying suburban service was recently made.

By means of a rather complete signaling system, also proposed, a single operator, regardless of the station of the group in which he might be, would receive a warning signal of any change which might occur in any of the main and feeder circuits at any station. By the manipulation of a selective system similar to that of the ordinary machine telephone switching, he would be able to determine from which station and by what device the alarm was set into operation.

An automobile and good connecting roads provide for covering the distance between any two stations of the group in a few minutes.

If the operator should determine that a direct-current feeder circuit breaker has opened, he would know that when the fault in the load circuit has been cleared this circuit would be automatically reclosed. However, if the reclosing should not take place in reasonable time, he would notify the line department of the circuit involved. Since the feeder equipment proposed is of a type which only opens on short circuit, and not on overload, the operator would feel sure that an outage of any duration is being caused by a grounded trolley or feeder.

Should he determine that a machine has shut down, he would go to the station to restore service by restarting the machine if his investigation showed that the conditions causing the shut down were transient.

It is proposed that each station shall be supplied from separate alternating-current circuits so that only due to a general disturbance would all stations be shut down simultaneously. Following such general disturbance, it would, of course, take considerable time to restore all of the stations to service. The study made indicates that the investment in the necessary equipment should be a profitable one.

Switching Equipment for New Stations

In cases where it has become necessary to abandon obsolete direct-current generating stations, the purchase of power from large modern central stations and the installation of converter equipment located at the most economical points of distribution are productive of a saving in power. This is due to the reduction of losses in generation and distribution. The obvious location for a single substation replacing a generating station would be at the load center or as close to it as possible. Where the capacity involved is not such as to require more than two units, automatic operation of such a station effects additional saving by eliminating the necessity for operators. Where the capacities involve more than two units, economy is effected by the installation of a number of smaller automatically controlled stations at such locations as will permit of the maximum reduction of investment and power losses in the power system as a whole consistent with good operation.

Supervisory Control Is a Recent Development

Supervisory control systems, using the principles and the highly developed devices of machine telephone switching, provide simple and efficient means for placing the supervision and control of any number of stations in the hands of a single dispatcher. By the combination of automatic switching and supervisory control, even the most complex switching arrangements may be successfully controlled without a station attendant.

There are no general solutions to the many problems involved and in no two cases are the conditions encountered the same. Therefore, each proposition must be considered separately. The correct choice of switching will be that which best meets financial, economical and operating conditions.

New York Association Holds Midwinter Meeting

THE regular midwinter meeting of the New York Electric Railway Association was held at the Hotel Commodore, New York City, on Jan. 25. There were morning and afternoon sessions, with a banquet in the evening. Owing to the crowded condition of the columns of this paper this week, due to the report of the Louisville meeting of the Central Electric Railway Associaion, it is possible to print in this issue only two of the papers presented at the New York meeting. One of these was on "Selling Principle of the Weekly Pass," by Walter Jackson of Mount Vernon. This paper was discussed in person by W. H. Boyce, New Brighton, Pa., and E. M. Walker, Terre Haute, Ind. S. W. Greenland, Fort Wayne, Ind., sent a written communication. In addition the following papers were presented: "Lubrication of Railway Motors," by L. M. Clark, New York; "Fundamental Principles of State Motor Vehicle Common Carrier Regulation," by D. C. Fenner, New York; "Insulation of Catenary and Other Power and Railway Systems," by Arthur O. Austin, Barberton, Ohio.

Mr. Clark's paper appears in another column of this issue. The papers by Messrs. Fenner and Austin with the discussion on them and an extended report of the other features of the meeting will be published in the issue of next week.

Earlier in the day there was a special meeting of the auditors and claim agents of a number of the New York State companies for the purpose of perfecting an organization whereby they might meet frequently and discuss problems with which they might be confronted. A chairman was elected and two meetings a year will be held.

The Banquet

The principal speaker at the banquet of the evening was Hon. Carl D. Jackson, former public utility commissioner of Wisconsin and at one time president of the Association of Public Utility Commissions, who condemned the plan of returning to local regulation in New York State. He said that forty-two states in this country now have state utility commissions and that their utility laws are based largely on the laws of New York State and Wisconsin which were pioneers in this legislation. He said there are four principles which should be followed in the relation of the utility to the public. The first of these is that service is the principal thing which the public desires. The second is that service should be rendered at as reasonable a rate as possible with justice to the public and utility. The third is that competition as a regulator is wrong and wasteful, and the fourth, that efficient regulation demands a supervision of security issues of utilities. All regulation embodies these principles.

Finally, these principles should be enforced by an impartial body. The city could not do this because it is an

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interested party to the question of rates. Jurisdiction must be by the state. Mr. Jackson then gave examples from Wisconsin, showing objections of city regulation. At the present time, in any state, such a step would be backward and against public interest. Mr. Jackson also said that it would be most reactionary and disastrous to return to local control of utilities.

American Engineering Council

THE annual meeting of the American Engineering Council, the operating body of the Federated American Engineering Societies, was held in Washington Jan. 11 and 12. Mortimer E. Cooley was re-elected president of the federation and J. Parke Channing, Calvert Townley, Philip M. Moore and Gardner Williams were elected vice-presidents. Among the topics considered on which resolutions were adopted were improvements in the Patent Office, better conditions for the development of water powers and engineering education.

The principal addresses at the banquet on Jan. 11 were by Ambassador Caetani of Italy, Calvin W. Rice and Elmer A. Sperry. Mr. Rice reported on his South American trip and urged an interchange of engineering education between the United States and the countries of South America. He declared that Verne L. Havens had performed an invaluable service in bringing the engineers of Latin America and those of the United States closer together. Mr. Sperry told of progress made by the engineering professions of Japan and pointed out that there is much that American engineers can learn from members of their profession in the island empire.

Prince Caetani, who is an engineer, spoke about the work which Italian labor had done and could do in developing the engineering, industrial and agricultural enterprises in this country. He also gave statistics of electrical enterprises in Italy and said that by electric transmission systems the water power in the Alps, where the water is plentiful in summer, is being used to supplement that in the Apennines, where water is plentiful in winter and rather scarce in summer.

American Gear Manufacturers' Association

THE seventh annual meeting of the American Gear Manufacturers' Association will be held at the Hotel Cleveland, Cleveland, Ohio, on April 19, 20 and 21.

At a recent meeting of the executive committee of this association, A. W. Copeland, president of the Detroit Gear & Machine Company, was elected to fill the vacancy on the committee caused by the death of John B. Foote, president Foote Brothers Gear & Machine Company, Chicago. Mr. Copeland's membership on the committee will continue until the annual meeting of the association in April, when this position will be filled by election.

Lubricating Railway Motors*

Cleanliness Is Quite as Essential as the Use of a High Grade Lubricant —Water and Dirt Must Be Kept Out of Bearings to Obtain Efficient Service

By L. M. Clark
Vice-President Railway Improvement Company, New York, N. Y.

THERE is probably no piece of machinery that is subjected to more severe service and more abuse and given relatively less care than a railway motor. The earlier types were designed to be lubricated by grease. Later on, motors were brought out adapted for oil lubrication, and in a more or less makeshift manner the older motors were converted over. Generally speaking, the new design was a compromise between the top-feed principle of the earlier motors and the bottom-feed extensively used for truck journals. Large openings were located in the sides of bearings and housings provided with cavities extending some distance below these openings. The housings were filled with saturated waste, intended to be in contact both with the shaft or axle, through the bearing openings, and a supply of oil contained in the bottom of housings. Partitions in the housings afforded a means of measuring the depth of the oil. Spring-actuated, felt-lined, flanged covers closed the tops of the housings. This general arrangement has remained practically unchanged for over twenty years.

We are told that lubrication consists of the separation of adjacent bearing surfaces by a film of oil. Logically, there should be nothing in the oil that would cause bearings to wear excessively. Let us assume the operators of such motors use good oil and plenty of it, and yet the bearings wear out. Why? Not because they are deficient in material or workmanship; not because they are improperly lubricated in so far as the quality and quantity of oil is concerned, but because dirt, grit, wheel-wash and other foreign substances enter the bearings.

How do all these foreign substances get into the bearings? Mostly, by reason of loose-fitting covers, weak springs, defective gaskets and, not infrequently, lost covers. Furthermore, every time a cover is opened for inspection or oiling more dirt gets in, and a whole lot of it too. When the interiors of housings are being inspected, it is not an uncommon occurrence to observe the packing waste reposing on the top of a dirty motor frame, and this same waste is put back into the housing, with perhaps a dash of oil to assist in washing the dirt down into the bearing.

Wheel-wash is a disastrous element, and most difficult to contend with, particularly with side-feed motors. During rainy weather, and especially when operating over tracks submerged in water, it is almost impossible to keep it out. When water gets into a motor housing, the capillary function of the packing waste immediately ceases, it quickly becomes glazed, and there is no further lubrication until these conditions are corrected.

One of the bugbears of railway motor lubrication is the glazing of packing waste, which intercepts the flow of oil to the bearing. Glazing is caused by dirt clogging the capillary paths, by contact with water or by insufficient saturation. This trouble is so prevalent that many companies feel justified in using the lower grades of packing waste, which is false economy. Packing waste will never become glazed so long as a clean film of oil is maintained on the shaft or axle. By eliminating dirt and water, and keeping it properly saturated, a good grade of wool waste will require no attention for many years.

Wool, in its ordinary twisted yarn form, has a capillary lift of approximately three inches with the average oil used for motor lubrication. Cotton ranges from 5 to 6 in., dependent upon the degree of twist. This difference is due to the relative size of the capillary paths in the two materials. Some companies use mixtures of wool and cotton, based upon the theory that cotton adds to the saturating capacity, and makes for better results. It is not the greater saturating capacity, but the increased average capillary lift that overcomes certain difficulties. Some motor housings are constructed where the distance from the bottoms to the bearing openings is as much as 5 in. With wool waste having an approximate lifting capacity of but 3 in. it is obvious what happens when less than two inches is contained in such housings.

The rate of oil feed through wool or cotton varies radically according to the height of capillary lift. For example, the housing of a side-feed motor is filled with 3 in. of oil. The first quarter inch will feed out within twenty-four hours, the second may last four days, the third two weeks. This clearly brings out a condition of too much oil at the start and not enough later on. Bearing temperatures have much to do with the rate of feed. As the temperature increases, the viscosity of the oil becomes less and the rate of flow through the capillary paths of the packing waste correspondingly greater.

The function of lubrication is to prevent abrasion of the bearing surfaces and to assist in conducting the heat generated. Fundamentally, oils for motor lubrication should possess a high coefficient of adhesion, so that the film will not slip away from the bearing surfaces, and inversely a low coefficient of cohesion—frequently referred to as

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internal friction—so that the constituents of the oil may be readily moved among themselves, as it were. High cohesion is detrimental to good lubrication because more power is required to turn the moving parts. The range of viscosity should not be too great, and the viscosity at the normal maximum running temperatures of bearings should be as low as is consistent with insuring a continuous film between the bearing surfaces. This at once brings out the desirability of using a lighter grade of oil in cold weather. Heavy oils possess a high coefficient of cohesion, and they increase bearing temperatures materially. Heat indicates a translation of energy, and in these days of power economy more attention should be given to the question of lubricating oils.

Many electric railway operators seem to think they are securing satisfactory lubrication so long as hot bearings are not prevalent. Hot bearings are a disease, and in most cases are directly due to mechanical defects. Obviously, inadequate lubrication will aggravate such troubles, whereas good lubrication will tend to lessen them. By the use of mild abrasives mixed with suitable oils, a mechanically perfect bearing can be worn entirely out in a few hours without causing it to run hot. The elimination of hot bearings does not by any means spell perfect lubrication.

With regard to bearings, we all appreciate the desirability of good materials, accurate workmanship, smooth finishes, correct clearances, alignment and similar details. There are, however, two points that are frequently overlooked. First, chamfering the inside edges of waste openings is absolutely essential to insure the flow of oil around the shaft or axle. The chamfering should be liberal, not a mere breaking of the edges but a thirty-degree cut-back of at least three-sixteenths inch. Second, the provision of one or two grooveways between the waste openings through to the flange ends of bearings to assist in conducting oil to the faces of flanges, which are the most difficult parts of bearings to lubricate.

Where means are provided for keeping the packing waste continuously saturated to the proper degree, the top-feed principle of lubrication gives the best results. There is no tendency for the packing waste to settle away from the shaft or axle, and smaller quantities are required. By utilizing the combined factors of capillarity and gravity, the waste openings in bearings can be made much smaller. This is very desirable, both in point of increased bearing surface and in maintaining rotundity of solid bearings that are pressed into the housings.

Split bearings are a necessary evil, the chief difficulty being that of keeping them tight in the housings or frames. Dowel pins and keys serve to hold bearings in position for a time, but eventually they become loose and troubles result. Means should be devised for locking axle bearings securely in place, with a sufficient range of take-up to compensate for irregularities in the bores of housing or frames. The welding up and reboring of motor frames is an expensive job, but much of this is avoided where bearings are efficiently lubricated.

In the past, too little attention has been given to the grade of labor employed to oil motors. The job is a dirty one; it is frequently done at night and under conditions that are anything but agreeable. From the standpoint of relative importance, an oiler should be one of the best paid employees. Better than this, however, is a system of lubrication where the human element becomes a negligible quantity; a system that will eliminate all dirt, wheel-wash and other destructive agents, and automatically supply clean lubricating oil in quantities commensurate with the work which bearings are called upon to perform.

The Selling Principle of the Weekly Pass*

Particulars Are Given of Various Installations Beginning with Racine in 1919—The Pass Has Developed Off-Peak Riding and Won Many Automobile Owners to the Cars

By Walter Jackson
Fare and Bus Consultant, Mount Vernon, N. Y.

THE adjective "selling" has been chosen purposely to stress from the start that the unlimited ride, transferable weekly pass stands for something much more than a new rate. It is a change from the non-salable flat fare to the salable differential fare. The very points in which the weekly pass differs from the blanket transportation used abroad emphasize this selling principle. The foreign season ticket is seldom available for a shorter period than one month, so that it cannot be used to make a wide appeal. It is restricted (theoretically) to use by the original purchaser, and it is so unscientifically priced as a rule that it is looked upon as an evil rather than as a sales leader in the merchandising sense. Contrast this with the American weekly pass. It can be bought for the shortest calendar period—one week—so that any consistent rider of the smallest means can enjoy its advantages. The purchaser does not have to sign his name to formidable documents, but can buy the pass on the car as easily as a single ride. It is not only transferable, but transferability is one of its big selling points. Finally, the company reminds the purchaser of the value of unlimited riding in every way, instead of regretting that he is on the cars four times a day.

If the differences between the foreign and American season tickets have been correctly set forth, then the latter embodies a new selling principle. This is borne out by experience. In two generations the foreign season ticket has failed to achieve one-half, even one-third, the popularity in riding and revenue ratio attained by the American weekly pass in two to three years. There are installations, like Youngstown and Tacoma, where practically half of all the rides and more than one-third of the revenue comes from pass riders.

The Origin of the Weekly Pass

The weekly pass first saw the light at Racine, Wis., a city of some 60,000 population, in August, 1919. There were two reasons that led the writer to suggest such an innovation: The first was that it would benefit safety car operation immensely through cutting down the transactions with odd fares, tickets and transfers; the second was that it would tend to equalize inequalities between long and short-haul riders in a city with distances too short and headways too long to make use of a zone-fare system.

The idea behind the second point was that if we sold a person unlimited transportation the one living close in would take more rides (as in going home for lunch), while the person living further out would be too far away from home to go to lunch, even when luncheon riding cost him nothing. Of course, the passenger thinks in terms of trips and not of miles, so that in actual practice the short-haul man is satisfied that as he is taking more rides than the long-haul man he is getting a square deal whether he gets more miles or not.

This brings up an objection to the pass that used to be considered a crusher, namely, that a person on a pass would ride so much as to put the railway into bankruptcy. These objectors must have been thinking of the year 1900 or so, when people rode on the trolley cars for the novelty and pleasure of the thing. What really happens is this: The pass buyer learns to use the street railway in exactly the same way as he uses the elevators in a building, namely, as a service. He no longer has to figure whether it will be worth while to pay fare for this or that short ride. He does ride oftener, therefore, to serve his convenience and to save his time; but he certainly does not ride for fun or to spite the railway.

The transferable feature of the pass has not justified the fears of the objectors, either. When a pass-holder goes off to work in the morning, the pass will probably stay in his pocket until he comes back. The only exception is that of the business man who may turn it over to his errand boy. Even this is unimportant, for the errand boy is not traveling in the rush hours and it is a safe bet that most of the money he used to get for car fare never got as far as the car—let alone the company's treasury.

*Abstract of paper presented at midyear meeting of New York Electric Railway Association, New York, Jan. 25, 1923.

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In every community there are a number of artisans, workmen, agents, solicitors and others whose work takes them to different parts of the city, but they make up but a small percentage of the total riding. Beside, in these days almost all such persons have been doing their business in cheap automobiles. If, as has actually happened, we induce an insurance agent to give up his auto for a car-pass, we are getting back business that would otherwise be lost. Let the agent ride fifty times a day if he wants to. He does all his business riding in the off-peak hours, so he costs us no more than if he rode only twice a day.

The Economic Basis of the Pass

Now as to the pricing of the pass: If we were in the good old days, when the public had either to take a car or walk, we could not think of going below the price of three ticket fares a day or say twenty a week. By ticket fares is meant, of course, whatever rate the fairly frequent rider is enjoying. Naturally, the pass riders are drawn from the ticket class and not from those who ride so seldom that they find it better to pay the maximum or cash fare. But as we are not living in monopoly days, we must consider quite a variety of factors that should influence the price we set for the pass.

In the most favorable instance, as in Terre Haute, the price of the pass equals twenty fares. We did not have to make any great bargain to draw traffic. The 5-cent fare and a 60 per cent increase in service through safety cars had continued to increase the trolley car habit despite an increase in private automobiles. In Terre Haute so many people already had the habit of using the trolleys four times a day that there would have been risk of loss if less than twenty fares had been charged for the privilege of unlimited riding. Belief in the twenty-time rate has been justified by the facts. Revenue is running 6 per cent ahead of the more prosperous period of 1921 and early 1922, and there are 1,600 pass buyers in a town of 75,000.

The next highest pass rate is that of Racine, the pioneer installation. At first it cost practically eighteen times the ticket rate of 5.5 cents and then slightly more than seventeen times the 5.83 cents ticket rate. Two and one-half years' experience make this installation of exceptional interest. The pass was installed when business was good, and the writer figured that once Racine sold more than 1,000 passes it was on the right side. This figure was attained within a month and from 2,200 to 2,300 are now sold. The pass brings 20 per cent of the revenue and about 35 per cent of the riding.

The course of the weekly pass in Racine is pretty good proof that it is not a short-lived novelty. In fact, the depression following the boom proved that the pass rider is the most persistent. When cash and ticket revenues fell off 30 to 35 per cent, pass revenue dropped only 10 per cent. This is because pass riders are naturally provident and also because they include the clerical and professional classes which do not lose their employment as suddenly as a factory workman. The pass also attracts the very people who would be most likely to use an automobile, if the car ride had not been made so cheap and pleasant for them.

In Fort Wayne the pass was installed at a price equivalent to sixteen times the ticket fare. Recent months show as high as sixteen per cent revenue over the same period of 1921, though, of course, not all of this increase should be credited to the pass.

A number of installations charge prices equivalent to fifteen or fourteen times the ticket rate. This is a satisfactory multiplier in communities where there is a lot of private automobiling with a consequently large number of pick-ups, or in places where there is some jitney competition.

The lowest price charged for a pass is that of Tacoma, which is equal to 12½ ticket fares of 8 cents. This low price was fixed because traffic had failed to increase over pre-war figures despite a liberal increase in service. The attempt of the administration to flood the town with 5-cent jitneys in its desperate effort to force the railway to go from 10 cents cash and 8 cents ticket to 5 cents flat was another factor. At any rate the people of Tacoma consider the pass such a wonderful bargain that more than 12,000 a week are sold—which means that more than 12 per cent of the total population are passholders. More than 50 per cent of the riding is done on a pass. In the rush hours practically three persons out of every four have no occasion to stop at the farebox—a wonderful condition for safety car operation.

The Pass Increases the Car-Riding Habit as Expected

The sales thought back of the pass was that if we gave a wholesale rate for wholesale use and also relieved the patron of all figuring per trip and fare-handling operations we would get him to use the cars with the same fine sense of abandon about cost that he was displaying in running an automobile. The writer's idea of a wholesale rate is one that compels the spending of a fixed sum in a fixed period. When we sell cut-rate tickets without a time limit and without confining their use to one person at one time, we are not sure the ticket buyer is a truly wholesale customer. The weekly pass settles that question so clearly that wherever installed it quells the demand for a lower fare—if it does nothing else whatever. The steady rider is entitled to enjoy a 5, 4, 3, 2 or even a 1-cent fare if he gives us $1 or more a week and does not take more than two rush-hour rides a day. By the same token, the non-steady rider should pay 10 cents if necessary, while the semi-occasional rider is entitled to some ticket rate in between.

Almost everywhere the pass rider tends to take four gross rides a day. After allowance is made for the transfer trips in these rides, we find that the net rides range from twenty to twenty-five a week. So the pass rider has gotten to a 5-cent fare or less and enjoys a frictionless ride at the same time.

The pass does more than to increase the riding of the passholder. Since a person can take but two rush-hour rides, the rest of his rides are off-peak. Most of the off-peak rides are on account of entertainment. People do not usually go to entertainments alone. If the passholder goes out oftener, so does his sweetheart, or wife, or children, or chums—and for most of these there is paid a fare that would not have come otherwise. Also, if a passholder wants to ride four or five blocks, the non-passholder has to trail along via car and thus another fare is created. Every passholder is a business solicitor who brings anywhere from three to five or more companion fares per week. This is why it is safe to figure on an even break as regards the passholders themselves.

Pass Versus Jitney and Automobile

Although the Racine pass had no occasion to kill jitneys it proved capable of preventing them when the hard times came; and at Kenosha, the second installation, it helped to root them out. Observation of this led the Youngstown Municipal Railway to try the weekly pass as a last hope against the 250 jitneys then rife in Youngstown. In a few months, more than half the jitneys were wiped out, the company's revenue advancing more than 30 per cent, while its usefulness to the public — as measured by customers — advanced more than 50 per cent.

The reason why a pass can kill the jitney is that it offers something that cannot be duplicated by the individually owned automobile—it grants blanket transportation. Only a corporation having vehicles throughout the community can offer a ride in any direction for any distance any time. The person who has signed up to buy unlimited electric railway service lets the jitney go by; the person who buys one ride at a time under the old system took whichever vehicle offered itself first. This reduces the jitney operator's revenue below the point of subsistence in spite of freedom from operating responsibility. This is so simple that it sounds too good to be true to some who still prefer to pin their faith on ordinances that turn out the jitney one year and bring it back the next.

The most unusual fight between car pass and jitney bus is offered by Tacoma. In that city the Mayor demanded a cut to 5 cents from the prevailing average fare of 9 cents, namely, from 10 cents cash and 8 cents ticket. To enforce his threat he imported twenty-eight buses that had found the going too hard after the railway consolidation and fare reduction at Spokane. These buses began business on a large scale in the very same week that the $1 pass was introduced. Then the war began.

At first the 5-cent buses carried 9,000 to 10,000 people a day. These

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were largely casuals who would have paid a 10-cent fare on the cars. On the other hand, the $1 pass rate appealed to the industrial rider. In the first week, July 24-30, the railway sold 7,094 passes; in the eighteenth week, Nov. 20-26, 11,274. As the list of pass riders lengthened, the jitneys picked up less and less traffic during the rush hours and at night, when passholders are out with companions, in spite of the fact that they were charging only one-half the railway cash fare formerly paid by 45 per cent of all riders. By the end of October, the buses were cut down to sixteen in number and were reported by local newspapers as giving most unreliable service. By that time, also, their business had been cut to less than 4,000 riders a day. In December but twelve jitneys were left.

The Pass and the Private Automobile

And now we come to the real ghost in the closet—the private automobile. What can the pass do about that?

The pass can and has done something to minimize the losses due to the private automobile and its carriage of others beside the man who drives to his office.

The first thing we ought to consider is that a man drives his own car because he thinks it is pleasant to move fast and to have control of the means of locomotion. He may be wrong about the greater speed after making allowance for opening the garage and for parking, but he certainly is right as to the pleasure one feels in controlling instead of being controlled. That seems worth the difference in the cost of car and auto riding.

The weekly pass has been found to appeal to the autoist for like reasons. He does not have to think of the cost of each ride; it is prepaid. He can board the cars as often as he pleases without fussing for change, tokens, transfers, etc. He acquires the feeling that he really controls the cars, for they stop at his beck, and all he has to do is to display his sign of ownership—the pass. Then, too, the pass so vividly contrasts the cost of unlimited car riding against unlimited auto riding that he is made "furiously to think" about his extravagance. That is why Youngstown, Fort Wayne, Tacoma and other pass operators are sure that some brands have been snatched from the burning.

The pass also recovers many pick-up riders. The misplaced good-nature of auto owners is a mighty serious thing in the small and medium-sized town. If we can get hold of the man who is picked up say every third or fourth trip, we are getting someone who will yield the same weekly revenue whether he rides or not. There is such an independent streak in most of us that once a pick-up rider has a pass he does not linger along the curb waiting for a gasoline Samaritan.

In short, if the pass succeeds in getting back automobile users, it is because it places such strong reliance upon the selling principle of making it as easy, instead of as hard, as possible for the customer to do business with us. If the railway manager himself had to pay 7, 8, 9-cent and similar ungodly fares day after day, there would be greater willingness to move toward their practical abolition.

The Pass on Zone-Fare Systems

The writer believes just as firmly in differential fares based on distance as he does in differential fares based upon revenue guaranteed for a fixed period. In our smaller cities, the distances are too short and the headways too long to make a zone fare practicable as a revenue getter. The person waiting for a car would, too often, be able to walk far enough to get the basic rate. In our larger cities, however, we should have a short-haul fare for the many pick-up rides that are possible in a city having a business-amusement district a mile or more in length as well as a number of self-contained neighborhood centers.

The San Diego Electric Railway is a splendid example of a zone fare developed along right lines. Since Jan. 1, 1921, this company has had a basic or one-zone fare of 5 cents, and a two-zone fare of 6⅔ cents monthly commutation, 7½ cents on a four-tickets-for 30-cent basis and 10 cents on straight cash. The revenue increases were far greater than similar companies could show for flat-fare increases which drove away the short-haul rider, and the company actually gained riders without the stimulus of war or post-war activities. The San Diego plan was worked out by E. J. Burns, now assistant general manager of the company, and its success was due not only to knowledge of correct principles in zoning but to a well-conceived system of informing the public in advance.

In the desire to make its service still more popular and easier to buy, the company commissioned the writer to see whether the weekly pass could be used to supplement the zone-fare system to advantage. As of Jan. 1, 1923, the company installed a $1 pass good in both the inner and outer zones of San Diego, a $1.25 pass for three suburban routes and a $2 pass for a fourth suburban route. The thought in closing up the two city zones was that there would be a tendency for the average number of miles ridden per pass to approach the same figure whether the rider was a one-zoner or two-zoner. To illustrate: Both classes are at liberty to ride home to lunch without paying fare, but only the person who is ten to fifteen minutes from his home can undertake to do so. It is quite possible for three trips a day by a two-zoner to equal five trips a day by a one-zoner. Of course, there is a limit to this equalization, and that is why we added the $1.25 and $2 passes.

It is worth mentioning that in adopting the passes, the San Diego Electric Railway has retained all existing cash, ticket, round-trip and monthly commutation fares. It takes the selling attitude that the customer is entitled to pick the class of riding goods he wants, even if it does make a little more work in the accounting department. An electric railway, it believes, exists to sell rides as the customer wants 'em—not to oblige the worthy auditor.

Of course, the first application of the zone pass was on the Beaver Valley Traction Company in February, 1921. On this property, which is divided into 5-cent zones running across country and through towns with a maximum of 13,000 population, the pass has proved wonderfully popular at the rates of 85 cents for one zone, $1.60 for two zones and $2 for any number of zones. From a sale of 446 passes equivalent to $515, it has gone to 1,215 passes (week Dec. 4-10) equivalent to $1,532. The management has figured that about three-fourths of the pass sales are extra revenue due chiefly to the companion fares of the pass riders.

In both the Beaver Valley and San Diego installations the first idea was to make it easier for the passenger to patronize the company, particularly on one-man cars. The simplification of the fare transaction has been accompanied by a gain in revenue on the Beaver Valley and we hope that like benefits will come to San Diego.

Another zone-pass installation is that of the Houghton County Traction Company. This railway could hardly expect increased revenue in a period of poor copper business and decreasing population. It has at least achieved this result: The fare per trip has been cut almost in two for its most faithful patrons without a sacrifice in revenue. This, as the French say, is at least a success of esteem.

The Pass Is Not a Cure-All

It has already been intimated that there are other worth-while fare plans besides the weekly pass in its various forms of a twenty-four hour pass, school pass and off-peak pass. There is the zone fare; the off-peak hour ticket rate; the monthly service charge plan of Mr. Schaddelee; the many combinations possible with merchants and amusement interests, etc. The only plan that has no merit in the writer's eyes is the one that used to be the standard of America—the flat fare charging the same rate for any distance, for any degree of patronage and for any time of day. If the weekly plan promises to make great headway, it is because of its simplicity and selling lure. It can help the sick to get well but it cannot raise the dead.

Continuous Publicity Is Absolutely Necessary

As said at the opening of this paper, the weekly pass is not a mere change in rate. Its possibilities cannot be properly exploited unless it is tied in with every ride-making possibility in the community. Let this exhibit of placards and posters speak for itself in proving that the ride can be sold and that this is the way to sell it.

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American Association News

Executive Committee

THE executive committee of the American Electric Railway Association met at Louisville Friday, Jan. 19, at the time of the annual convention of the Central Electric Railway Association. Numerous routine matters were acted upon and several important steps looking toward greater activity of the association work were approved. On recommendation of the finance committee, the executive committee approved a plan to rent more office space to provide for the work of the Committee of One Hundred, additional space for *Aera*, and to provide storage space, the association being now deprived of storage space in the basement which had been placed at its disposal heretofore. The net increase in expense to the association will be $2,400 a year.

The committee approved the recommendation of Secretary Welsh that Fred J. Dell be employed to take charge of the campaign for funds of the Committee of One Hundred, to act as director of exhibits for the association and to be responsible at the association headquarters for carrying on the work of the membership committee. Mr. Dell formerly served as secretary of the old manufacturers' association in 1916, and it is felt that a good share of his salary will be offset by the amount that is now paid yearly to an outside director of exhibits.

Reporting for the committee on national relations, C. L. Henry reported on various activities of the Washington office. He also said that Ralph R. Bradley had prepared a brief for presentation before the Interstate Commerce Commission in the matter of whether the transportation act of 1921 applies to the electric railways, as being engaged in the general transportation of freight, the brief covering the case of the Chicago, North Shore & Milwaukee Railroad as a test.

Progress reports were also presented for the committee on midyear meeting, publicity committee, the committee on company and associate membership and the midyear dinner committee. Consideration was given by President Emmons and the committee to the appointment of the A. E. R. A. committee to take part in the award of prizes in connection with the Charles A. Coffin foundation.

An invitation was received from the Wisconsin Utilities Association to have a representative of the American Electric Railway Association speak before its annual meeting in March. After discussion, W. H. Sawyer was appointed, with J. P. Barnes as alternate.

The executive committee took action on Referendum No. 40 of the United States Chamber of Commerce. The first question submitted was "Do you favor a federal department of education with a secretary in the President's Cabinet?" The vote on this was "No." The second question was: "Do you favor enlarging the present Federal Bureau of Education?" The vote on this was "Yes." The third question was: "Do you favor Federal aid to the state on the basis of equal financial support from the state in promoting education?" The vote on this was "No."

Proposal to organize metropolitan chapters of the American Electric Railway Association as a means of bringing all electric railway people in any one center into a common organization for the interchange of information and for the fellowship of it was presented to the committee by C. E. Morgan. After some discussion of the subject a motion was passed to appoint a committee to investigate the proposition and the committee named was C. E. Morgan, chairman; J. P. Barnes, F. R. Coates, W. H. Sawyer, C. R. Ellicott and Martin Schreiber.

The committee then took up the discussion of the proposed amendment to the banking act in New York to provide for making public utility securities legal investments for savings banks and other fiduciary institutions. As drawn at present, this amendment would exclude electric traction securities, and it was felt it would be a very unfortunate thing if it went through in its present form. A committee to look into this subject, appointed by President Emmons, subject to their acceptances, are: J. H. Pardee, B. C. Cobb, Randall Morgan, H. L. Doherty and S. Z. Mitchell.

Mr. Henry reported on the presentation to the United States Coal Commission of the brief prerpared by the joint fuel committee of the national utility associations. Mr. Henry said that in appearing before the commission he had suggested that the railroads should not have the power to confiscate coal and said that after consideration the commission seemed to concede the point that railroads should have to store coal just the same as any other industry. He said there was no indication of relief on the price of coal.

The recommendation of the Transportation & Traffic Association that the American Association co-operate with the National Safety Council by joining and giving its full support was approved by the executive committee. The recommendation of the T. & T. Association that a committee be appointed to study employees' welfare work, including pensions, bonuses, etc., was disapproved. The plan suggested by the T. & T. Association that the meetings at the annual convention be condensed into three days, Monday, Wednesday and Thursday, in order to give one day free for visitation at other affiliated association meetings and for studying of the exhibits, was approved. The executive committee also decided to suggest to all the affiliated associations that, so far as practical, they follow the same plan, presumably staggering the "day off."

The next meeting of the executive committee will be held on Feb. 15, the day before the midyear meeting, in Washington, D. C., at the Hotel Willard, 2:30 p.m.

Those in attendance at this Louisville meeting of the committee were: President C. D. Emmons, C. E. Morgan, L. C. Datz, L. E. Gould, C. L. Henry, Robert I. Todd, J. P. Barnes, W. H. Sawyer, F. R. Coates, A. W. Brady, Leslie Paul for H. B. Shute, Secretary J. W. Welsh, Labert St. Clair and J. W. Colton.

Committee on Location and Exhibits

PRESIDENT C. D. EMMONS announced the appointment of the following committee on location of the next annual convention and exhibits at the last executive committee meeting:

C. E. Morgan, vice-president Brooklyn City Railroad, Brooklyn, N. Y., chairman; George Keegan, Martin Schreiber, A. L. Kempster, D. W. Pontius, H. B. Flowers, E. J. Burdick, J. F. Hamilton, A. T. Perkins, F. G. Buffe, S. W. Greenland, B. J. Fallon, Harry L. Brown, A. M. Robinson, J. C. McQuiston, L. W. Shugg, Thomas Finigan, L. G. Parker, E. B. Meissner, C. L. Van Auken, A. F. Old, John M. High, John F. Ohmer, W. J. Hurburt, W. J. Pine, Thomas Casey, L. J. Drake, A. L. Price and L. E. Gould.

Committee on Company and Associate Membership

MEETING in Louisville at the time of the Central Electric Railway Association convention, the committee on company and associate membership of the American Electric Railway Association began its work for the present year. The very excellent work done by this committee heretofore was reviewed and plans were laid for carrying on the line of endeavor started. Considerable time was spent in going over the list of companies which are prospects for membership in the association, for the purpose of eliminating such prospects as were found upon analysis to be already included under some syndicate membership. It was planned that Chairman W. H. Sawyer would write a personal letter to all the companies who were found from the revised list to be real prospects, to ascertain if possible what chance there was of bringing that company in. Considerable effort is to be concentrated on the many small companies which are not included in the association, to which the association has the most to offer in the way of helpful service. Those present at the meeting were W. H. Sawyer, East St. Louis, Ill., chairman; H. M. Wilson, F. R. Coates, E. M. Walker, Leslie Paul for J. C. McQuiston, H. L. Brown for H. H. Norris, E. F. Gould, G. R. Lyman, S. M. Curwen, Secretary J. W. Welsh, Labert St. Clair and J. W. Colton.

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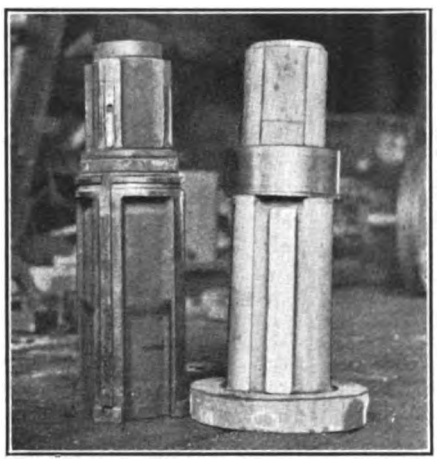
Maintenance of Equipment

Discarded Armature Cores Reclaimed

A Specially Constructed Spider Is Used by the Cleveland, Southwestern & Columbus Railway for Reclaiming Armatures Which Otherwise Would Have Been Scrapped

ARMATURE cores that have seen a good many years active service and almost as many in discard at the shops of the Cleveland, Southwestern & Columbus Railway are being given a new hold on life by the use of a new specially constructed spider. This spider, which was largely the design of W. R. Goodnight, master mechanic, makes it possible to use the unworn bearing area in the bore of the laminated core. The cores were taken out of service because the four ribs of the old spider had worn longitudinal grooves in the bore and consequently the use of a new spider, with its relative position the same as before as determined by the keyway, would not make a tight fit. The new spider occupies a position one-eighth of a turn advanced from that of the first, so that the entire contact of all four ribs is along the area formerly untouched. As the keyway in the old spider was cut in one of the ribs, a different method of keying the core to the spider had to be devised. It was done by having the new spider cast with an extra rib of smaller dimensions between two of the main ribs and in it the keyway is cut. To maintain the balance another of equal dimensions is cast in the opposite side.

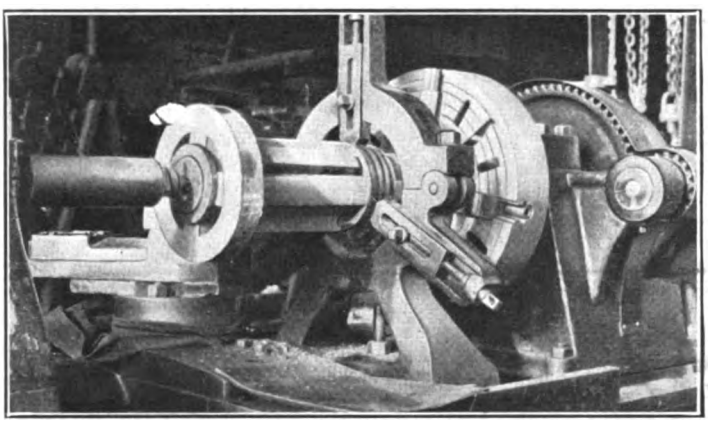
Cores reclaimed in this fashion have been found to perform their duty entirely satisfactorily in service. Fifteen motors have been operating for some time with armatures so reclaimed from the scrap pile. It is expected to reclaim twelve more in the same way at a cost about one-sixth that of the price of new laminations. This work has been done on Westinghouse 93, 112 and 304 motors, for all of which the same pattern is used, although there are some minor differences in the machinery.



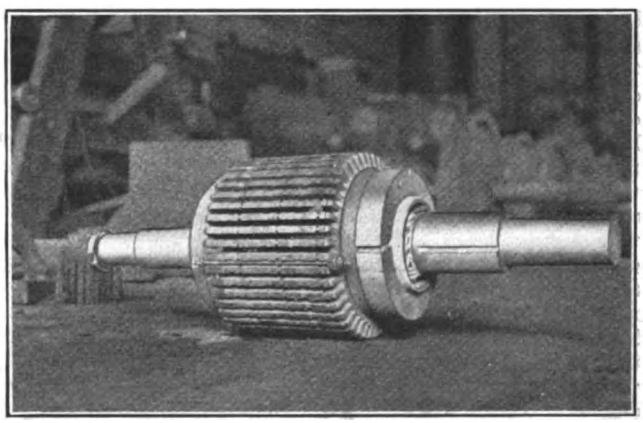
Old and New Type Spiders. Note Special Keying Rib and Integral End Ring

While the fifth keying rib is the feature of this spider, several other improvements are also incorporated in its design. The plate on the gear end has been cast integral with the spider. It is not removable and held in place by lugs as the original spiders were built. The continual breakage of these lugs was the reason for making that change. Another improvement is the use of a threaded ring instead of a snap ring to hold the core on the spider. This construction does away with the uncertainty regarding the pressure along the spider holding the core. A third minor change is the cutting of a full length keyway for holding the commutator. This was done to eliminate the trouble incident to setting the commutator when it had to be pressed half way on the shaft before the key was engaged. Much trouble was caused because the commutator would turn enough in being pressed on so that the key and keyway would not line up.

In the accompanying illustration it will be noticed that plates with teeth like those of the laminations were placed on each end of the core. These were used to make a more rigid core and to form a better protection for the windings, since all the teeth on the laminations near the end were bent out. To make room a few of the laminations had to be removed, of course.



Machining Specially Designed Spider for Use with Discarded Armature Cores



Reclaimed Core, Showing Special Ring for Compressing Laminations and Threaded Instead of Snap Ring

Repairing Worn Controller Shafts

The Sandusky shops of the Lake Shore Electric Railway repair the drum shafts of G. E. C-36 controllers to obtain additional service. This is the type used with multiple-unit equipment and is operated with a small handle that fits over the end of

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the shaft and has two small pins which enter holes drilled in the end of the controller shaft. These holes become elongated from use so that the drum may lag or be advanced a notch from the position indicated by the handle. This play makes it difficult for a motorman to accelerate his car properly. In these cases the end of the drum shaft is cut off, the shaft drilled and tapped and a new piece screwed in. The joint is pinned to prevent the new piece from unscrewing at any time.

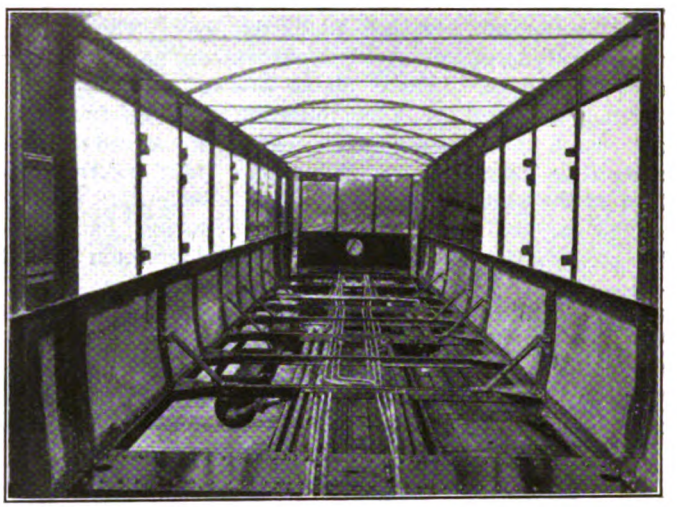
Features of the Youngstown & Suburban Cars

Seating Forty-four, They Weigh 28,640 Lb. and Are So Constructed as to Gain Low Center of Gravity—Arranged for One-Man, Two-Man Operation

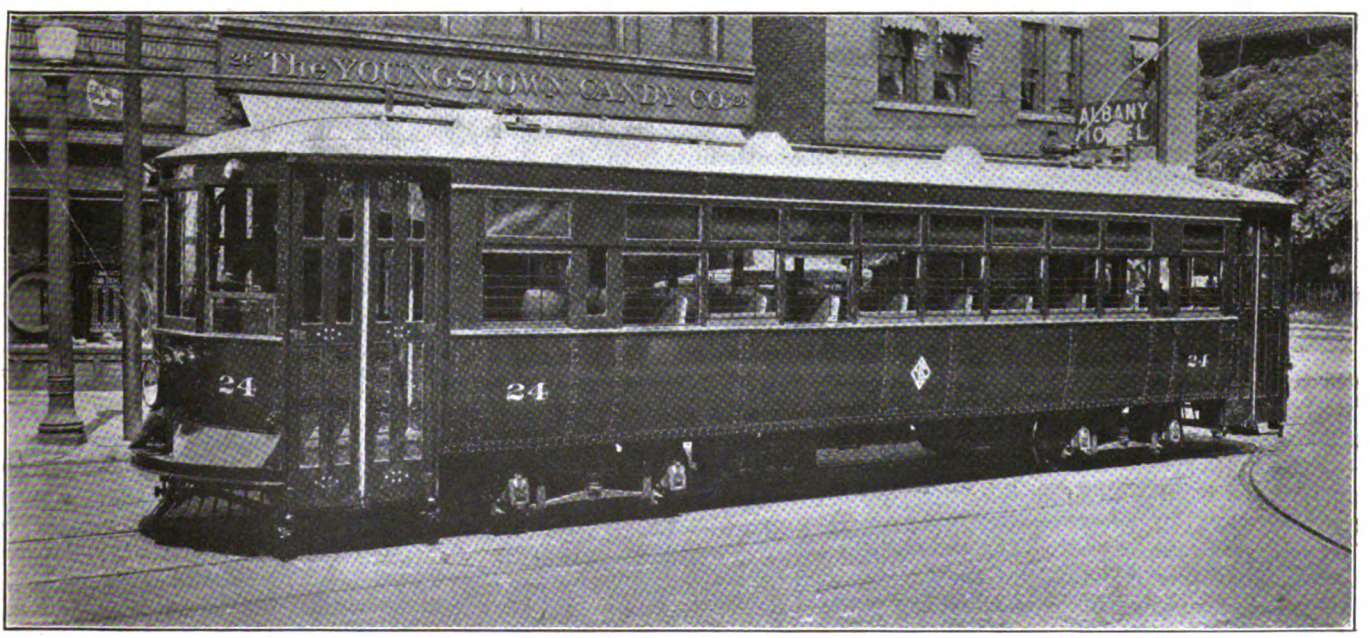
JOHN A. DEWHURST
Railway Engineer Day & Zimmermann, Inc.

ONE of the important results that came out of the distress of the few years past has been the reversion to lighter weight cars for city and for interurban service. It is of extreme importance that, in gaining the advantages of lighter weight, the factors of safety and comfort are not jeopardized. The automobile, if nothing else, has brought about a desire for greater comfort and greater convenience, and the street railways, as well as interurban railways, must meet this desire or go one step further if they are successfully to compete with the automobile.

There has been much progress in the last few years in the design of lighter weight cars for interurban service. The two cars designed for the Youngstown & Suburban Railway are only an additional step in the general progress of this idea in an attempt to combine greater economy with safety and comfort. The cars described in this article were designed and built by the G. C. Kuhlman Car Company in collaboration with the Day & Zimmermann organization and the officials of the Youngstown & Suburban Railway. The tabulation given herein shows the general dimensions of these cars and the photographs give an illustration of the construction, therefore only the important new features will be mentioned. These cars were designed for either one or two man operation, but have been operated since the beginning of their service as one-man cars, with entire success. They are equipped with the standard safety devices, with air-operated doors at the front right-hand side, the doors having a width of 42 in. The motor equipment, consisting of four General Electric 25-hp. motors, is mounted on low wheel trucks using 26-in. wheels. This allows the car floor to be of a height that requires only two steps from the ground to enter, a feature which combines a certain degree of comfort in loading and unloading as well as increased speed. Since the cars necessarily had to be double end, it was necessary to use a reversible seat, and for this reason it was impossible to make them as comfortable as



Steel Body Framing Showing Curved Side Girder Plates and Light Intermediate Post Construction



New Light-Weight, One-Man, Two-Man Cars of Youngstown (Ohio) Interurban

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would be possible if they were arranged permanently.

Details of Body Construction

The side panels below the belt rail are curved inwardly to the extent of 3½ in. at the floor sill and are constructed of material known as "Plymetl," a product of the Haskelite Manufacturing Company. This is a three-ply wood veneer with a 28-gage galvanized steel sheathing on each side, the three piles of wood and the two layers of steel being firmly held together by a waterproof cement developed during the war for airplane construction. These plates are pressed into the curved section at the time of manufacture. The plates are held together by hot riveting to batten strips extending a short distance over the edges. These plates are further stiffened by a combination of pressed and structural steel pieces extending inwardly and under certain of the seats.

The car roof rests principally on the pier walls at the end of the car, these pier walls being stiffened by the side plates surrounding the small windows in the car. No through carlines are used except at the pier walls. The intermediate posts are of very light-weight pressed-steel sections which serve principally as sash supports. They are bolted at the bottom to the belt rail and at the top of the letter panel. The roof itself consists of sections of Haskelite $\frac{1}{16}$ in. in thickness, which is similar to the Plymetl of the sides except for its thickness and the fact that steel sheathing is not used. The inside of the Haskelite roof is the exposed surface of the ceiling, and the top surface is covered by canvas set in white lead in the usual manner. The center of the ceiling is 7 ft. 3 in. above the top of the floor so that the roof is somewhat lower than has heretofore been customary.

GENERAL DIMENSIONS AND MAJOR EQUIPMENT OF THE YOUNGSTOWN & SUBURBAN RAILWAY'S LIGHT-WEIGHT DOUBLE-TRUCK MOTOR CARS

General Dimensions

Length of car body over bumpers	41 ft. 6 in.
Length of car body over corner posts	30 ft. 10 in.
Width of car body over all	8 ft. 6½ in.
Width of door openings	42 in.
Post centers	32 in.
Height from rail to top of floor	2 ft. 7½ in.
Height from top of floor to underside of ceiling	7 ft. 3 in.
Seating capacity of car	44 persons

Major Equipment

Trucks	Brill 27 E 1—wheel base 4 ft. 10 in.
Motor equipment	4 GE-264-25 hp. motor
Control	GE type K
Air brake	GE straight air equipment, CP-27 compressor
Weight, complete ready to run without passenger load	28,640 lb.

This feature, however, combined with the 26-in. wheel trucks, brings the center of gravity comparatively low so that the stresses thrown on the car body proper are lessened considerably. This, it is felt, will react favorably upon the maintenance of both the car equipment and the track. The floors are double, and while this adds some to the weight it was felt that the extra strength due to the double floor was an advantageous feature. Over the floor is also placed a ⅛-in. layer of dark green linoleum.

The car body floor is at practically the same elevation as the platform, there being only a slight 2-in. ramp. Aluminum has been used extensively, there being about 265 lb. in each car. The hoods over the platforms are each pressed out of a single sheet of aluminum and have been found to be satisfactory. The entire seat frame and supports are cast of aluminum so that each individual seat, including the spring cushions and spring backs, weighs only 48 lb. Aluminum is also used for the stanchions and electric heater frames and other smaller parts.

Center lighting has been used and the circuits so arranged that they all lead to the headlight, which consists of the 150-watt concentrated filament type. In this way the usual 80 per cent of loss in the headlight resistance is eliminated.

It is too early to predict how much reduction in car maintenance will result, but on account of the simplified "K" type of control and the modern features in the balance of the equipment, it is certain that the maintenance will be reduced on the one item of inspection alone. The real test, of course, must come after five or six years of service. Up to the present time the cars have shown no signs of failure which in any way could be attributed to the light-weight feature.

Careful checks have been made to determine the savings in power used for propulsion, and the following tests have been made on one of the old type cars weighing approximately 35 tons and one of the new type weighing 14.25 tons. These readings were taken over exactly the same trackage and during the same day when conditions were entirely similar in either case.

Heavy cars (35 tons)	4.63 kw.-hr. per car-mile
Lighter weight cars (14.25 tons)	3.36 kw.-hr. per car-mile

If this saving is reflected back to the point of purchase on the assumption of 66⅔ per cent efficiency of distribution, it results in 0.35 kw.-hr. per car-mile in favor of the light-weight equipment.

These cars also accelerate much more rapidly and, of course, with a great saving of energy. This greater speed of acceleration and braking has made it possible to maintain the same schedules with these cars even with one-man operation as previously was maintained with the heavier cars that were capable of attaining speeds 10 to 12 m.p.h. faster. All of these factors tend still further to increase the safety of operation.

It is not felt by the operating officials that this design is by any means the last word in lighter weight construction but that it is a very decided improvement over the cars in service previously, and it has had the effect of producing much needed economies without jeopardizing the passenger riding.

New Equipment Available

Sanding with Water

A WATERPROOF sandpaper has been developed by the Minnesota Mining & Manufacturing Company, St. Paul, Minn., which is impervious to either hot or cold water. It is being marketed under the trade name "Wetordry" and it can be used either with or without water.

Some of the advantages claimed for wet sanding are that the water keeps down all dust, thus making the painter's occupation more healthful and also the sand side of the paper is washed clean, thereby keeping the cutting edge of the sand so as to enable much faster sanding, as well as longer life for the paper.

The waterproof sandpaper is made in flint, garnet and artificial mineral, and in grits ranging from velvety fine to coarse. For best results the manufacturer recommends using the paper wrapped around a felt pad when used on varnish, and when sanding rough stuff the paper can best be attached to a rubber block. The company also furnishes a varnish pad and rough stuff block for convenient use of the sandpaper. These pads are designed in such a manner that the operator's hand is kept completely away from the abrasive grain.

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The News of the Industry

Merchants Favor Transit Commission Plan

The Merchants' Association of New York has approved the conclusions contained in a study of the local transit situation which was made by the committee on city affairs of that body. The association declares that the city's transit needs will be best served by a unified transit system with interconnecting lines affording direct movement between all parts of the city for a single fare. The report of the committee includes an analysis and comparison of plans that have been proposed for extending present transit system. It is the belief of the association that the city's unaided financial resources are not sufficient to enable it to provide funds for adequate new subway construction, or to acquire by direct purchase or recapture existing subway and elevated lines.

In finding that the various public improvements for which the city has mortgaged its resources have brought the city dangerously close to its debt limit, the report disapproves of the plan announced by the Mayor which calls for municipal ownership and operation of a $618,000,000 system, and expresses general approval of Transit Commission plan contemplating transfer to city of title to existing roads in exchange for securities guaranteed as to return. Necessary subway construction, it is asserted, can be financed only by placing on a self-supporting basis the city's present $250,000,000 subway investment, thereby releasing that sum from the debt limit. It is proposed to accomplish this by continuing present investment of private capital on the basis of reduced but definitely assured return, and by abolishing existing "differentials" in favor of the companies.

Provisions of the Transit Commission plan for abandoning certain surface lines and rerouting others is approved, but the committee is strongly of the opinion that this process should not be carried on to the extent advocated by the Mayor's plan which urges scrapping of all surface lines in favor of motor buses. The latter mode of transportation is believed to play an important part in transit situation by acting as feeders to rapid transit lines in outlying districts. Buses, it is held, cannot advantageously displace surface cars.

Bacharach Pushing His Bill

Representative Bacharach of New Jersey is making strenuous attempts to have the sub-committee of the judiciary committee of the House, of which Representative Graham of Pennsylvania is chairman, report out the so-called Bacharach bill, which would limit the jurisdiction of United States courts in cases relating to the making of rates by public utility corporations.

Mr. Bacharach has addressed a letter to members of the House, urging them to bring pressure to bear on the judiciary committee to report the bill, and calling their attention to the support that the bill has received from the Governors of many states and the regulatory commissions of many other states. It is to the members of the House from these states especially that he appeals.

Representative Bacharach has promised Governor Silzer of New Jersey, who has interested himself in the bill and who had much to say on the subject in his inaugural message, that if he finds he can not obtain action on the Bacharach bill he will offer in the House a substitute bill which has been prepared by Governor Silzer and attempt to obtain passage of the Silzer bill.

Governor Silzer first proposed the substitute bill to Mr. Bacharach last August, but at that time Representative Bacharach felt he could not introduce it, because he said he did not desire to weaken the support of the Bacharach bill by offering another bill on the same subject. Governor Silzer and Mr. Bacharach have now had further correspondence on the subject.

Railway Improvements Depend Upon Public Co-operation

Answering recent attacks on the inadequacy of the service provided by the Chicago Surface Lines, Williston Fish, general manager, states in the *Daily News* of Jan. 16 that the company under staggering difficulties is trying hard to handle its job and he believes that the results have been as good as Chicago could expect. Financial burdens and political antagonism have been hindrances to improvements in the opinion of the general manager. He reviewed the history of the warfare between the city authorities and the management of the surface lines saying that the present standstill dated back to 1915, the year Thompson first took office as Mayor. He said that the city's position that the cars have no rights in the streets had done more than involve the companies and present extensions, but had hurt the system's credit and impaired the sale of securities. The surface lines first mortgage bonds are now quoted around 77½. He said that any banker would say that no capital improvements would be financially justified under these conditions.

In concluding his remarks Mr. Fish said:

> Give the companies a chance by helping them instead of fighting them. Permit unification of service with supplementary subways. Then Chicago will have the best transportation in the world.

Municipal Railway Would Lease Cars Under Option to Purchase

Pointing out that more than one-half of the street cars now operated by the Seattle (Wash.) Municipal Railways have become unjustifiably expensive to operate and maintain, through long usage, an ordinance has been introduced in the City Council providing for the lease, with option of purchase, of from 100 to 200 new fifty-eight-passenger cars. The ordinance points out that since the city has not accumulated a replacement fund sufficient to purchase cars urgently needed, economy of operation makes it advisable that the city lease the cars needed, with option of purchase at the end of each twelve-month period, purchase of the cars to be made from the earnings of the street railway system.

If the ordinance is passed, the Board of Public Works is authorized and directed within thirty days to adopt plans and specifications for the new street cars, obtain bids and award the contract. No less than 100 nor more than 200 cars are to be leased. Three alternate proposals must be submitted by bidders to cover leases for periods of sixty months, eighty-four months and 120 months respectively. New lightweight, low-floored cars are to be specified, with double trucks, center and end entrance and exit, single end control and capable of being operated by one or two men.

If it is decided to purchase the cars at the end of the sixty-month lease, the purchase price is limited to $3,000 each; at the end of eighty-four months, $2,000 each, and if the cars are not bought until after 120 months, $1,000 each is the maximum price that can be paid. It is claimed that the plan, if it can be worked out, will effect a new saving in railway operating expenses of from $150,000 to $300,000 a year.

Commission Takes Over Operation of Railway

The South Carolina Railroad Commission has taken over the railway lines of the South Carolina Gas & Electric Company at Spartanburg for operation. The city has been without railway service for several weeks. The commission plans to supervise operation of the railway system temporarily to learn whether the road should be kept in full operation. It will be recalled that the company sought permission from the city to discontinue certain non-paying lines and substitute service by bus, but the city did not react favorably to this proposal. The railway is indisposed to keep in regular operation lines that do not give prospect of being able to pay their own way.

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Steel Cars Sold

A mutually advantageous arrangement has been made between the Beaver Valley Traction Company, New Brighton, Pa., and the Pittsburgh Railways whereby the former will sell to the latter twelve low-floor center-entrance steel cars which have been in use for the past six years. Six of the cars will be delivered immediately and the remaining six within a few weeks.

W. H. Boyce, general manager of the Beaver Valley Traction Company, said that there were several reasons why the sale was consummated. On this point he said:

> First, we were offered more money than we paid for these cars six years ago. Second, we are in need of ready cash; third, these cars are better suited to Pittsburgh than Beaver Valley operating conditions. There the streets are better drained and consequently the electrical equipment, which is mounted very low on these cars, does not suffer from water and snow damage as it does here. There the cars operate entirely over paved streets and they do not experience the difficulty that we do of having a lot of dust and dirt sucked in through the doors and car floor.

It is the intention of the Beaver Valley company to overhaul its double-truck wooden cars and to change over to one-man cars at least six of the present double-truck cars. Several manufacturers have been asked for prices on the latest double-truck one-man cars to be equipped with all the latest safety features. The company hopes to purchase six of these for a small payment down and pay the remainder in installments. Mr. Boyce said that as things had been going for the last two years the company must reduce its operating expenses by the installation of the one-man car if it was to continue to operate.

The deal between the two properties had to be closed at once as the Pittsburgh Railways is in need of additional cars and the receivers had just received the approval of the court for the purchase of additional cars.

Holding Company May Finance New Construction

Plans are being prepared by the Buffalo & Lake Erie Traction Company to build an extension in Erie, Pa., which will provide transportation facilities for the new annexed section southeast of the old city and will form the second and longest belt line operated by the traction company.

It is said that the company will be unable to finance the extension from State Street to Thirty-eighth and it is proposed to form a holding company which will install the extension and lease the line to the traction company until the Buffalo & Lake Erie Company can assume title to it.

It is understood that the traction officials are willing to assume the full cost of constructing a track in Thirty-eighth Street from State Street to connect with the double-track line in Water Street of Wesleyville provided a holding company can be organized to install the spur from its present terminal at Twenty-sixth Street to the old Mill or Cooper Road.

Since the annexation proceedings of 1920, when the area of the city was about doubled, there has been considerable agitation for a general extension of the lines of the street car company in the new outlying districts, which at the present time are without electric transportation facilities.

Preliminary plans for the proposed improvement are to be completed this year. It is expected that actual operations will be started some time during 1924. At the present time the traction company is engaged in reconstructing the present equipment for one-man operation.

Drastic Program Reported in New York

According to a dispatch from Albany to the New York *Times* dated Jan. 21 the present Public Service Commission in New York is doomed, and when it goes out of existence all its works will go with it into desuetude. This is the tenor of all the other dispatches of the same day to the New York City newspaper.

In the matter of public utility regulation and control, says the *Times*, each municipality, under the Governor's plan, will be master of its own house. It is not even certain that municipalities in a mood to shirk this new responsibility will be permitted to do so. Originally it was intended that any municipality could by resolution of its Common Council or corresponding legislative body return to the State a power thus universally bestowed. Since then opposition to this particular proposal, as liable to bring about chaotic conditions, has made itself felt at the Capitol. Thus far the original thought has survived in drafts of the legislation that have been prepared, but it was stated recently that in the final revision this tentative provision may be scrapped.

If the program goes through as reported by the *Times* all 7, 8 and even 10-cent fares granted by the Public Service Commission will be wiped out automatically.

As far as it has been worked out to date the Democratic program is to find expression in five bills. These are as follows:

1. The New York City transit bill giving the Hylan administration full and complete authority to deal with transit and buses. This measure is completed in its first draft and is being revised by the Hylan and Hearst representatives, with John H. Delaney in charge.
2. The State Public service act which will repeal the Miller transit law dealing with public utilities outside of New York City and with gas and lighting companies in this city.
3. A state-wide municipal ownership bill, companion to the second measure, and conferring on cities authority now vested in commissions.
4. A separate municipal ownership bill for New York to cement the transit law for this city and stop any possible gaps in the law. This may be made an amendment to the transit act instead of a separate bill.
5. The hydro-electric power development act, dealing with the state's water power on the same basis as the administration purposes to deal with transit and other utilities.

On Jan. 26 Governor Smith went into detail in the matter of his ideas on home rule in correspondence with Everett P. Wheeler.

Texas Interurban Seeks Franchise

The Texas Interurban Railway, which is now electrifying the Missouri, Kansas & Texas Railway Company's line from Dallas to Denton and will operate it as an interurban line, has filed application with the city commission at Denton, Tex., asking for a franchise covering the entry of the line into that city. Franchise covering the operation of the line in Denton County outside the city limits of Denton has already been obtained from the County Commissioners' Court.

The application filed with the City Commission seeks a forty-year franchise, and was presented by R. B. Hincks, as general attorney, and B. R. Brown, chief engineer, for the Texas Interurban Railway.

Route of the line into Denton is set out in the franchise asked, as over the tracks of the Missouri, Kansas & Texas Railway and onto the Texas & Pacific Railway Company's tracks to a point about 125 feet north of the present Texas & Pacific passenger station. There the interurban line would leave the tracks of the steam railway, and a new track would be built on East Oak Street to Ash Street, about 200 feet from the public square. Here the line would terminate and the Texas Interurban Railway would establish freight and passenger stations.

Announcement was made by Engineer Brown that actual construction in Denton will begin as soon as the franchise is granted. The work of electrifying the line is going forward and is expected to be completed by July.

Paving Question a Local Issue

Recommendation will be made to the joint legislative committee on taxation and retrenchment by the New York State Conference of Mayors that the question of how much paving shall be paid for by traction companies be left to the governmental agencies in the various cities of New York State.

This recommendation will be made to avoid "endless litigation, misunderstandings and bickerings." Under a State law the traction companies now have to pay the cost of paving between their tracks and for 2 ft. on either side. The railways contend that the law imposes an unjust burden on them. The Mayor's report says:

> Each city should be permitted to solve its own problems according to its peculiar local conditions. Moreover, under the broadening powers of local self-government, certain principles have been established which conceded the right of the city through its local legislative body to control the use of its streets by the granting of franchises. It is therefore the only logical body which should determine for how much damage to its pavements the street railway is responsible.

The committees were appointed and the conference was held at the suggestion of Senator Frederick M. Davenport, chairman of the joint legislative committee on taxation and retrenchment, who has intimated that he believes the present law imposed an undue burden on the traction companies and that some compromise plan could be worked out to the satisfaction of both the cities and the companies.

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More Measures Affecting Utilities Introduced at Albany

Among the bills recently introduced in the Senate at Albany, N. Y., are measures to:

Amend Public Service Commission law, so as to take away from Public Service Commission exclusive power of fixing the number of passengers that may be carried on any street car operated in certain cities. Permit cities to regulate service and fix rates for certain public utilities.

Amend Buffalo charter so as to authorize city to examine books and papers of persons or corporations operating public utilities within city limits.

Empower cities to institute actions involving rates, fares charges or service or issues of stock or other forms of indebtedness of public service corporations operating in whole or in part within city limits, and making in actions not instituted by the city, such city a necessary party thereto.

Permit any first or second class city to investigate public utilities operated wholly or in part within its boundaries, to hear complaints against service and to enact ordinances affecting such utilities, to establish bureaus of public utilities and to investigate books thereof.

The bills introduced in the Assembly included the measures to:

Prohibit Aldermen or Board of Estimate to grant franchise to construct or maintain an elevated railway in Manhattan or Kings boroughs.

Amend chapter 788 laws of 1917 relative to removal of Manhattan Railway structures at Forty-second Street, New York City, by providing for extinguishment of all rights in said structure, or to maintain same and assessing cost thereof.

Require use of steel cars on elevated and underground railroads in New York City. Change from cars not steel to steel must be made within one year.

Interurban Line Opened

The new interurban railway between Dallas and Terrell, Tex., was opened to traffic on Jan. 14. The day preceding a large party of Dallas business men guests of the management of the road, visited the towns on the line and at three principal points several addresses were made by city and chamber of commerce officials. At Terrell, which is 31 miles east of Dallas, the present end of the line, a large delegation from points in Van Zandt County and Tyler joined in the speaking and renewed the boom that they have been incubating for extension of the line to Tyler, a distance of about 70 miles east of Terrell.

The new line is the first of the two electric interurban lines to be built by the Texas Interurban Railway out of Dallas. Richard Meriwether, vice-president and general manager of the Dallas Railway, is also general manager of the new interurban line.

Socialist After Utility Information

The Wisconsin State Senate has ratified an Assembly resolution introduced by Assemblyman T. M. Duncan, Socialist of Milwaukee, requesting the Wisconsin Railroad Commission to furnish the Legislature complete information regarding financing of public utilities in the State and pointing out that privately owned public utilities in the State have not paid off any bonded indebtedness in fifteen years. The information requested is as follows:

1. The total of outstanding bonds on Wisconsin public utilities.
2. The approximate annual interest required by these bond issues.
3. The total of outstanding stock issues on Wisconsin public utilities.
4. Approximate annual dividends paid on such common stocks and preferred stocks.
5. Whether the Railroad Commission expects Wisconsin producers to meet this annual interest and dividend charge forever or whether the commission has any plan in mind to eliminate this tremendous public utility tax.

In a preamble the resolution declared:

The Railroad Commission since 1907 has regulated privately owned utilities in this State, and in all these years not a single public utility has made any progress toward paying off its indebtedness. This constantly increasing indebtedness with its ever-growing demand for more dividends is a tremendous annually increasing tax upon the workers of Wisconsin. No municipality is granted a license whereby it may escape paying off its indebtedness, but on the contrary, each city and county is compelled by law to redeem its bonds within twenty years from the date of issue.

The information will be used by the Socialists in drafting a bill which will be designed to make the retirement of bonded indebtedness by utility commissions compulsory within a certain period of time.

Serious Accident Stirs Up Grade Crossing Talk

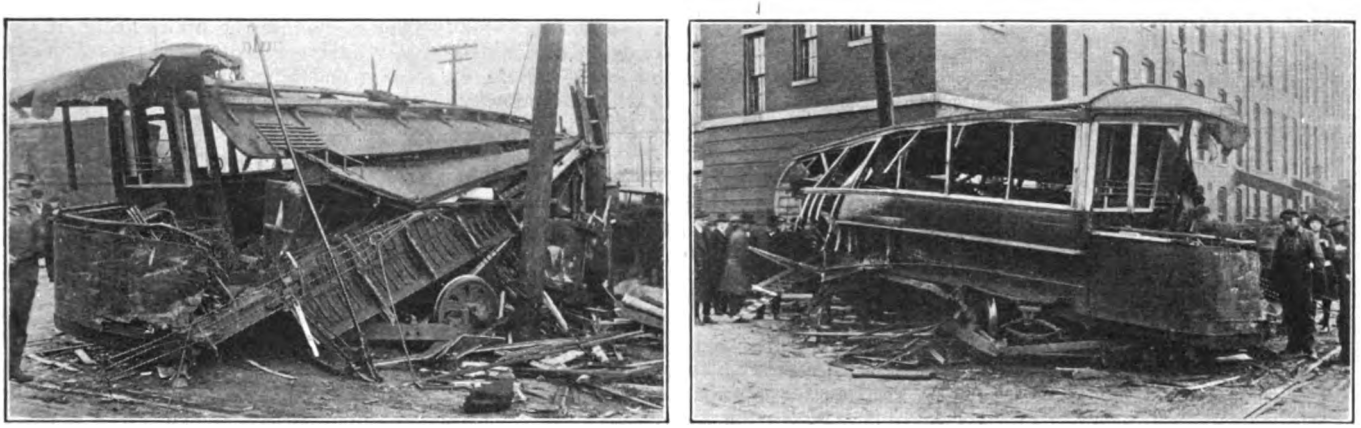
The need for the elimination of grade crossings or the establishment of gates or guards at every grade crossing of electric and steam lines in Louisville, Ky., was emphasized in Louisville at 6.45 o'clock on Jan. 18 when a Louisville & Nashville Railroad switcher smashed into a Twelfth Street car of the Louisville Railway, at the Ormsby Avenue intersection. The car was turned completely around, thrown against two telephone poles and demolished. Eight persons on the car at the time were injured. Seven were only cut and bruised and their injuries are not serious. The motorman-conductor of the one-man car suffered a fractured skull, but is recovering.

Reports indicate that there was no bell or warning and that those on the car suddenly saw the engine just as it hit. The track is straight at this point and it is said that there was nothing to interrupt the view. The conductor-motorman is unable to talk and the engine crew and the yard conductor have refused to talk.

President Barnes of the Louisville Railway was talking to members of the Central Electric Railway Association in the lobby of the Seelbach Hotel when the Louisville correspondent of the ELECTRIC RAILWAY JOURNAL showed him photographs of the wreck. Mr. Barnes remarked that it was one of the worst torn up cars he had ever seen and that he was really surprised that no one was killed. Other members of the Central Association expressed surprise that any one came out alive.

Mr. Barnes pulled a newspaper from his pocket and referred to an item in which it was said that Councilman Petty had sent a formal request to Mayor Quin asking that the city proceed at once to force the railroad to take steps to safeguard the lives of trolley passengers.

This item appeared directly under a heavy typed heading, which carried the wreck stories in the afternoon paper, on the front page. The accident brought out forcefully the need of greater protection at crossings in the city of Louisville, not only for street railway operation but for general vehicular and pedestrian traffic.



Destruction Wrought by Steam Engine Smashing Into Street Railway Car at Grade Crossing in Louisville, Ky.

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Committee Favors One-Man Cars

Declaring that one-man cars have enabled the companies to render more frequent and safer service, that they have reduced the operating expenses, making it possible for some lines to continue which otherwise would have had to abandon service and others to escape receiverships, and that they have helped platform men to earn a higher average rate of wage, the public utilities committee of the Philadelphia Chamber of Commerce has handed down a decision in favor of the one-man cars. The committee, composed of expert engineers and public utility men, made an investigation in 136 cities operating 7,000 cars of this type. The committee through its chairman, William P. Barba, says that there are still some problems to be overcome in the operation of the one-man car. In part the opinion follows:

The data obtained by this committee show that one-man cars are in very general use in 136 cities of the United States—in many of these cities on virtually all routes. In the larger cities the use seems to be confined more generally to use as feeders to main trunk lines and in serving the more sparsely settled sections, but in the smaller cities the one-man trolley is used throughout for all classes of service and apparently with great satisfaction. It is the opinion of your committee, however, that in a city the size of Philadelphia the proper field for the operation of one-man trolleys is probably going to be found in their use as feeders to trunk lines and as full-service use in the less densely settled portions of the city.

It is probably unnecessary to point out the great interest which the public has in extending the use of one-man cars so far as it is compatible with the situations which we have outlined above, because in most instances, if one-man trolleys are not put into use, either the section will do without transportation or will have to put up with the use of one-man buses or jitneys, either of which introduce hazards and uncertainty not possessed by the one-man trolley with its more regular schedule of operation.

Unless such use of one-man trolleys is permitted and encouraged, alternatives are the use of less safe one-man buses or the complete abandonment of such service to such communities.

Asks Probe of Alabama Property.—Gov. Thomas E. Kilby sent a special message to the Senate and House recently asking for appointment of a special commission to probe into the valuations of the Alabama Power Company, Birmingham, Ala., declaring "the public has rights and privileges in the matter of rate making, which the state laws must protect."

May Again Operate Line.—The people of Goldsboro, N. C., will vote in about six weeks to decide whether the city will put the street car system of the city in operation again. The city has about $35,000, which was realized from the sale of the old power plant ten years ago. It has been holding this money ever since the sale as a sort of trust fund. The proposition to be voted upon is whether the city will take this $35,000 and rehabilitate the street car system and put it into operation.

Must Accept Cut.—As a result of a decision of the trustees of the Boston (Mass.) Elevated Railway, employees must accept the 2 cents an hour reduction in their wages, effective Jan. 1. The carmen had petitioned for a deferment of this wage cut on the ground that living costs had gone up since last July, when the joint agreement reducing the wages had been entered into. With the cut in effect, the motormen and conductors will receive a wage scale of 61 cents an hour.

Retiring Governor Makes Recommendations.—Among recommendations in his message retiring Governor Taylor of Tennessee recommended the consolidation of state departments reducing the number to eight. Curbing powers of the State Railroad and Utilities Commission, especially as to control of local affairs and repeal of the eight per cent interest laws. The members of the Legislature have since endorsed Gov. Taylor by telegraphic message for Secretary of Interior, though it is stated Gov. Taylor is not an applicant.

Ford Solves the Electric Railway Problem.—In some comments which he made recently Mr. Ford said that the managements of the electric railways should not increase their charges but lessen them. He advised the new Mayor of Detroit to begin his career by cutting in half the fare charged by the Detroit Municipal Railway. His idea is that every possible economy should be resorted to rather than interfere with what he regards as the life of the system, namely, its cheapness. He said: "People would find they could ride the cars so cheaply that tens of thousands who now drive to and from work would ride the street cars—the saving would be considerable, they could not afford to drive."

Foreign News

At a meeting of Glasgow Town Council on Nov. 16 a special committee presented a report recommending:

1. That when the sanction of Parliament has been obtained to the purchase by the Council of the Glasgow subway railway the work of electrifying the system (now worked by cable haulage) be carried out by contract.

2. That with a view to the work of electrification being put in hand as soon as possible after Parliamentary sanction has been obtained, schemes and quotations be now invited from firms capable of carrying out the work.

Some labor members moved to have the matter remitted back to the committee for consideration of the expediency of having the work done by the Glasgow tramway department under the direction of the general manager. Lord Provost Paxton said that the general manager did not want the job, as it was in a great measure of a nature new to the department and the general manager would prefer to get offers from contractors. The committee's recommendation was carried by fifty-eight votes to thirty.

The Glasgow tramway committee has approved the acceptance of a tender by the Cargo Fleet Iron Company, Middlesbrough, for the supply of 4,200 tons of steel rails, with fish-plates, at the price of £41,000. An offer by a German firm was £5,000 lower and one by a Belgian firm £4,000 lower. It was stated that the quality of the British steel was superior to that of the foreign.

From a tramway operating point of view a decision of the highways committee of London County Council to drop for the time being the use of trail cars on the Embankment-Tooting-Wimbledon route is of interest. Instead of having trailers coupled to the motor cars during the rush hours, more electric cars are being run. According to a statement by the chairman of the highways committee, the change is an experiment. Thirty-four trailers have thus been put out of service on the route. Some of the London daily newspapers stated that the object was to provide shelter from the weather for all passengers, as the upper decks of the trailers are open to the air, while the upper decks of the motor cars are roofed salons. Another reason, and apparently the real one, is that the Wimbledon Borough Council objected to the use of trail cars in the narrow streets of Wimbledon. The whole matter is of much interest because some years ago the County Council, after a fierce Parliamentary contest, in which the opponents were the Metropolitan police authorities, obtained authority to use trail cars. That was considered a great victory for the Council and for tramway passengers. The trailers have proved very useful.

Municipal Lines Reduce Fares

One of the reasons assigned for installing still more powerful motor cars recently on various routes in London was to enable the cars to maintain the same speed with trailers as the older motor cars showed without trailers. Probably more will be heard about this matter. In any event, trailers continue to be used on other routes.

The London County Council has decided on certain fare reductions. Workmen's fares are reduced to the following: Not exceeding four sections, 2nd. return (approximately total distance 4.8 miles); exceeding four and not exceeding eight sections, 4d. return; exceeding eight sections, 6d. return. On ordinary fares only one reduction is made. That is that between 10 a.m. and 4 p.m., when the 2d. fare for any distance beyond the 1d. stage is in operation, the length on the penny stage will be increased from 1.2 miles to 1.8 miles. The committee expects that there will be some reduction in revenue as a consequence, but not sufficient to prevent a small surplus being realized on the present year's working. The reason why a more favorable financial result is expected than in last financial year is that though there has been a heavy falling off in receipts, largely due to bad trade, there has been a great reduction in the cost of labor and materials.

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Financial and Corporate

December Surplus $32,176

Statement of Toledo Property Reflects Good Conditions—Improved Service and Operating Economies Expected in 1923

A surplus of $32,176 was the result of operations of the Community Traction Company, Toledo, Ohio, during December of last year. This amount remained after all operating expenses, taxes, repair bills and interest charges had been paid and $17,708 added to the municipal ownership fund. The surplus was placed in the fare stabilizing fund, which once was almost depleted on account of losses. The amount in the stabilizing fund now is $204,707.

The latest credit to the stabilizing fund is the largest, by almost $11,000, that has heretofore been available. Compared with the credit from December, 1921, operation of $11,419, in which month a power credit of $15,500 and a lower maintenance allowance were reflected, it would seem fair to assume that Toledo is well on the way to a return of normal business conditions. This conclusion is supported by a material increase in the daily average revenues for the present month.

During the year 1923 it is proposed to spend on maintenance $640,000, as against a similar expenditure during 1922 of $497,835. Further, the maximum depreciation allowance will be set up, making available in that fund the sum of $127,500, as compared with a total credit for the year 1922 of $42,500. Through these two items additional expenditures this year of $227,165 will be made on the maintenance and replacement of track and equipment. The result should reflect savings in other items of operating expense and permit of improved service and operating conditions, Commissioner W. E. Cann said.

The city has just bought $112,000 more of the bonds of the company for delivery Feb. 1. The total stock and bond ownership of the company acquired by the city will then amount to $367,000 and there is $30,000 more in the purchase fund deposited on interest in a bank.

Gross earnings and operating expenses for December are respectively $347,846 and $191,494, as compared with $323,500 and $184,479 for December, 1921. Fixed charges, including interest and dividends, amounted to $124,177 in December, 1922, and $127,602 in December, 1921.

During the month there were carried 5,475,825 revenue passengers, or an average of 176,614 a day, as compared with 5,009,197, or an average of 161,587 a day, in December, 1921. Car-miles operated—653,710—represent an increase over the same month of the previous year of 23,859.

The ratio of operating expense to gross income of 67.275 per cent compares favorably with a ratio of 68.167 a year ago.

The board authorized the commissioner to ask the Council's approval of an allowance of $25,000 for the maintenance of the commissioner's office for the coming year.

The term of Henry Truesdall, chairman of the board of control, expires on Feb. 1. He served in that capacity for two years.

November Result Good

The North American Company, New York, N. Y., has made a good showing for the twelve months ended Nov. 30, 1922. At the close of that period the net earnings were equal to more than $24 a share on the common stock outstanding. This compares with $22.75 a share on the 400,518 shares of stock outstanding for the twelve months ended Oct. 31; $22.67 a share on the 378,958 outstanding common shares for the twelve months ended Sept. 30, and $19,35 a share earned in the 1921 calendar year on the 300,664 shares of common stock outstanding on Dec. 31, 1921. It is believed likely that the common cash dividend distribution will either be increased or an extra payment made to the stockholders during the coming year as the result of a favorable outlook.

Hopes for Operation Abandoned

Efforts have been abandoned which were made by persons living along the Springfield, Troy & Piqua Railway, Springfield, Ohio, recently sold for junk to the Schonthal Company, Columbus, to purchase the line between Christiansburg and Troy, and keep it in operation. Troy and Casstown committees failed to raise their quotas. The $30,000 option expired at midnight Jan. 19 without action being taken.

A. J. Bright, Christiansburg, head of the main committee, said that Christiansburg had raised $12,000 of its quota of $15,000, but that Troy and Casstown had subscribed but $3,000 each, with no prospects of increasing the amount. Hence efforts to buy were dropped.

Acting for the Schonthal Company, W. G. Bell, resident manager at Springfield, Ohio, in accordance with instructions of Federal Judge John E. Sater, is settling claims out of the funds paid by the Schonthal Company for the properties.

The sum of $23,878.50 was refunded to persons along the line who had sought to refinance the entire line and keep it in operation but who had failed in their purpose. Taxes amounting to $4,702 to Champaign County, $5,913 to Miami County and $9,222 to Clark County were paid. Cost of administration amounted to $6,900 and receiver's certificates $19,240, while other minor claims are also being met.

Detroit Net Income Lower

For the thirty-one days ended December, 1922, the city of Detroit Department of Street Railways realized a net income of $47,271. against $91,768 for the month preceding. There was an increase in the total operating expenses, $1,107,092 being checked against November, 1922, and $1,213,884 against December. The total number of passengers carried increased from 37,103,301 in November to 38,258,194 in December.

	atest	Month Ago	Year Ago	Peak	1913
	Jan.	Dec.	Jan.	May	
Street Railway Fares*	1923 6.94	1922 6.96	1922 7.20	1921 7.24	4.84
	Dec.	Nov.	Dec.	Sept.	
Street Railway Materials*	1922 174	1922 174	1921 159	1920 247	100
	Jan.	Dec.	Jan.	Sept.	
Street Railway Wages*	1923 207	1922 208	1922 213	1920 232	100
	Dec 31	Nov. 30	Dec. 31	Apr. 30	
Steel Unfilled orders (Million tons)	1922 6.75	1922 6.84	1921 4.27	1917 12.18	5.91
	Dec.	Nov.	Dec.	March	Av. Mo.
U.S. Bank Clearings Outside N. Y. City (Billions)	1922 14.94	1922 13.56	1921 12.93	1920 18.54	1913 6.12
	Dec.	Nov.	Dec.	Jan.	Av. Mo.
Business Failures Number	1922 1,851	1922 1,758	1921 2,427	1922 2,722	1913 1,213
Liabilities (millions)	45.84	54.0g	81.43	105.7	24.64

Conspectus of Indexes for Jan., 1923

Compiled for Publication in this Paper by

Albert S. Richey

Electric Railway Engineer
Worcester, Mass.

	Latest	Month Ago	Year Ago	Peak	1913
	Jan.	Dec.	Jan.	June	
Eng. News-Record Construction costs	1923 191.7	1922 192.6	1922 168.7	1920 273.8	100
	Dec.	Nov.	Dec.	May	
U.S. Bur. Lab. Stat. Wholesale Commodities	1922 156	1922 156	1921 140	1920 247	100
	Jan. 1	Dec. 1	Jan. 1	Feb. 1	
Bradstreet's Wholesale Commodities	1923 13.70	1922 13.78	1922 11.37	1920 20.87	9.21
	Jan. 1	Dec. 1	Jan. 1	May 1	
Dun's Wholesale Commodities	1923 185.6	1922 185.5	1922 164.4	1920 263.3	128.9
	Dec.	Nov	Dec.	June	
U.S. Bur. Lab. Stat. Retail food	1922 147	1922 145	1921 150	1920 219	100
	Dec.	Nov.	Dec.	July	
Nat. Ind. Conf. Bd. Cost of living	1922 158.9	1922 158.4	1921 162.7	1920 204.5	(1914) 100

*The three index numbers marked with an asterisk are computed by Mr. Richey, as follows: Fares index is average street railway fare in all United States cities with a population of 50,000 or over, except New York City, and weighted according to population. Street Railway Materials index is relative average price of materials (including fuel) used in street railway operation and maintenance, weighted according to average use of such materials. Wages index is relative average maximum hourly wage of motormen and conductors on street and interurban railways in the United States. †Revised weighting.

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Equipment Trust Certificates of P.R.T. Offered

The Philadelphia Rapid Transit Company has sold to Dillon, Read & Company, New York, N. Y., an issue of $4,750,000 5½ per cent equipment trust certificates, Series G, which were offered for subscription on Jan. 23 at prices to yield from 5.20 per cent to 5.50 per cent. The par value of the certificates will represent approximately 74 per cent of the total cost of the new equipment, for which the proceeds will be used. This will include 520 standard double-truck closed vestibule passenger cars, 34 double-truck snow plows and sweepers, 20 double-truck construction and repair cars and two crane construction cars. This equipment is to be constructed at a cost of $6,500,000. The trusts are due in semi-annual installments from Feb. 1, 1924, to Aug. 1, 1933.

House Passes Tax-Free Bond Measure

The House of Representatives on Jan. 23 passed the joint resolution proposing an amendment to the constitution of the United States intended to prevent the issuance of tax-exempt securities. The belief is quite general on Capitol Hill that the approval of the joint resolution cannot be secured at this session of congress in the Senate. This would have the effect of allowing the legislation to die with the session of congress which ends March 4, thereby making it necessary for the House of Representatives to reconsider the measure at the next session. Even were the Senate to pass it before March 4, many are of the opinion that great difficulty will be experienced in securing the ratification of the amendment by two-thirds of the States.

$4,533,411 Loss by New York Roads in 1921

The accompanying table showing the result of electric railway operations in New York State outside of New York City was contained in the report presented by the Public Service Commission to the Legislature. It covers the earnings of these companies for the years 1919, 1920 and 1921. Other phases of the report of the commission were reviewed in the ELECTRIC RAILWAY JOURNAL for Jan. 13. The commission has pointed out that the total dividends paid during the year 1921 by all electric railroads in the State was $419,659. This would represent a return of 6 per cent on an investment of only $7,000,000, as compared with the book values of these plants as reported to the commission, and in many instances fixed by this and prior commissions in rate and capitalization proceedings, amounting approximately to the sum of $250,000,000.

RESULTS OF OPERATION OF ELECTRIC RAILWAYS OF NEW YORK STATE OUTSIDE OF NEW YORK CITY

	1919	1920	1921
Railway operating revenues	$40,227,395	$47,059,281	$42,824,208
Railway operating expenses	32,797,351	39,483,189	37,290,565
Net revenue railway operations	$7,430,051	$7,576,098	$5,533,646
Railway tax accruals	2,473,104	2,668,731	2,779,829
Railway operating income	$4,956,947	$4,907,362	$2,753,813
Net revenue, other operations	656,846	824,809	817,335
Non-operating income	542,316	968,531	1,086,074
Gross income	$6,156,105	$6,700,707	$4,657,220
Interest charges	8,550,119	8,943,678	8,548,575
Other deductions from gross income	604,497	636,614	642,060
Net income	Loss $2,998,520	Loss $2,879,590	Loss $4,533,411
Dividends during year	315,719	305,719	419,659
Passengers carried	713,102,461	743,233,247	643,870,858
Revenue car-miles	97,938,246	97,356,831	91,059,219
Mileage in New York State	2,011	2,014	2,001
Operating ratio	81.53%	83.90%	87.08%

Increases Capital Stocks.—The Groton & Stonington Traction Company, operating between Groton and Stonington, Conn., has recently increased its capital stock from $50,000 to $481,000. The increase is taken care of by the issue of 4,310 shares valued at $100 each.

Increase in Net Income.—The Brooklyn (N. Y.) City Railroad for the six months ended Dec. 31, 1922, reports a net corporate income of $985,070 against $689,885 for the same period in 1921. The passenger revenue increased from $5,654,453 to $5,849,254 for the six months ending December, 1922.

Mortgage Notes for Sale.—Stone & Webster, Boston, Mass., are offering $400,000 of two and one-half year 6 per cent mortgage notes of the Keokuk (Iowa) Electric Company. The price is 98½ and interest to yield 6.65 per cent. The notes are dated Jan. 2, 1923, and are due July 1, 1925.

Service Will Cease.—The Dominion Power & Transmission Company has notified the town of Dundas, Ont., that the railway service on the Hamilton & Dundas Street Railway will cease on Jan. 31, 1923. The reason given is that the line is bankrupt and the service for a few years past has been carried on at a loss.

Reappraisement Hearings On.—Hearings are taking place in Duluth, Minn., before the Wisconsin Railroad Commission for reappraisement of the valuation of the Duluth-Superior Street Railway. At the hearing on Jan. 10 Herbert Warren, general manager of the Duluth Street Railway, was the first to be questioned. He was asked about the amount of fare for car passengers and about motors, vehicles and bridge tolls. Statements were presented showing cost of operation since Aug. 1, 1922.

Wants Bond Canceled.—W. H. Hitchcock, local manager at Keyport, N. J., of the Jersey Central Traction Company, has petitioned the Middlesex County Board of Freeholders for the cancellation of a bond for $10,000 given by the company in 1903 as a protection to the county in the repair work being done on the Morgan bridge at that time. The matter is under advisement.

Officers Elected.—R. S. Hecht and A. L. Kempster have been re-elected president and vice-president and general manager of the New Orleans (La.) Public Service Inc. All the directors and officers of the company were re-elected, in addition to E. T. Colton, who was attached to the engineering department of the Board of Port Commissioners. He was made assistant secretary and assistant treasurer.

Increase in Net Income. — For the twelve months ended Dec. 31, 1922, the Philadelphia (Pa.) Rapid Transit Company reports a net income of $1,829,278, against $1,807,293 for the twelve months ended Dec. 31, 1921. There was an increase in traffic from 836,547,351 passengers in 1921 to 848,883,512 passengers in 1922. The passenger revenue for 1922 amounted to $41,758,763, against $41,514,830 in 1921.

Line Reported Sold.—The line of the Five Mile Beach Electric Railway, operating between Anglesea and Wildwood Crest, N. J., has been sold to a resident of Wildwood, according to a report in financial circles. The line was formerly owned by the West Jersey Electric Company, which also operates the electric light plant at Wildwood. It is said that the new owner proposes to extend the trolley line to Cold Spring Harbor as soon as business conditions warrant it.

North American to Consolidate Subsidiaries.—The North American Company, which recently obtained control of the East St. Louis & Suburban Railway, is seeking to unite the utilities into one company. It is proposed also to include the Cahokia power plant, now under construction by the Union Electric Light & Power Company, with capital supplied by the North American Company. The new company will be known as the Union Electric Company of Illinois and will have an authorized capital of $13,000,000 common and $25,000,000 preferred stocks.

Unsold Bonds Will Be Available.—The financial statement of the Rapid Transit Commission, Cincinnati, Ohio, for 1922, shows that bonds totaling $3,930,000 were sold of the authorized $6,000,000, leaving $2,070,000 unissued. This balance includes $500,000 which Mayor George P. Carrel refused to sign. In his report Frank Krug, engineer for the commission, said these bonds "should be available during the early part of this year." Total expenditures from the rapid transit fund so far amount to $3,492,666, with approximately $300,000 additional certified for expenditures, leaving $159,686 on hand.

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Traffic and Transportation

Settlement Near

Negotiations Between the City Directors and Railway Officials Lead to Bus-Railway Arrangement

It is considered from recent developments that Pasadena, Calif., is about to have its transportation problems settled as a result of conferences between the City Directors and the officials of the Pacific Electric Railway. The directors and the officials of the railway have practically agreed on a plan. However, the directors are making moves to have the present 6-cent fare charged by the railway on its local lines in Pasadena lowered to 5 cents. Before this can be accomplished it will be necessary for the city of Pasadena and the railway to appeal to the State Railroad Commission.

Railway Operates Bus Lines

On Jan. 12, 1923, the board of directors gave out a statement on the transportation question, making public the revised plan of the Pacific Electric Railway as submitted to the city by D. W. Pontius, vice-president and general manager, which was received shortly after the recent municipal bus bonds were defeated. If the directors of the city accept the company's plan, only four of the company's present local street car lines in Pasadena will be operated, namely, Lincoln Avenue Line, North Fair Oaks Avenue Line, East Colorado Street Line and Lake Avenue Line. The railway company agrees to operate bus lines on eleven streets and to place in service at once forty-five high-class motor buses and to give greater frequency of service than it has been doing with the abandoned street car lines.

The City Directors state that they will not grant franchises for bus lines, but will issue permits, and hold that when a bus supersedes an electric street car line the service should be more frequent. The directors also maintain that there should be a revised valuation of the company's holdings in the city of Pasadena, a check should be maintained on the company's accounts and that the city shall have the right to buy the bus system at cost less depreciation.

Advantages of Single Agency Stated

The board further states that it is a recognized fact that the public convenience is best served by having a single agency conduct an entire transportation system, greater economy of operation and consequently less cost of service results with the elimination of conflicting interests, and at the same time greater convenience is offered to the patrons than can be had from separate systems, without the universal transfer privilege; but all of this, provided this agency can be controlled and regulated, will be responsive to public necessity in the matter of facilities, service and future improvements.

Practical agreement exists on the various points, but the board of directors has taken the position that a modification of the present fare is essential for frequent users of the service in the form of reduced rates for tickets. It will be necessary to secure the approval of the State Railroad Commission before any adjustment of fare can be made, and this approval it is proposed to obtain by joint action by the railway and the city.

The Pasadena traction question has been pending more than a year. The city rejected one after another several propositions made by the railway and an order of independent bus owners, and finally submitted to the voters a plan which asked a bond issue of $500,000 for a municipally owned bus system. This was voted down by the people on Dec. 5, 1922. The trolley lines to be abandoned are all east and west lines in the city except those on Colorado Street, the Orange Grove Avenue line and the North and South Los Robles Avenue lines.

Rock Island Card Sales Exceed 11,000 Mark

The sale of identification cards in December on the Tri-City Railway of Illinois, Rock Island, reached the highest mark since the fare system was begun ten months ago. The actual figure for last month was 11,639 cards, which were sold for 50 cents and entitled the holder to a 5-cent fare. During the month there were 570,000 5-cent fares or an average daily riding of 1.8 per card. Records, since the card system has been in force, show that this average has remained about the same each month.

The plan for selling the cards in stores located in convenient parts of the city has worked out well. In all, some fifty places about the city handle the cards and as high as 800 have been sold from one store. It has also been noted that there is some call for the cards within only a few days of their expiration. Salesmen, having learned of the card system, purchased them, it is thought, because the large amount of riding in the short stay shows a saving over the 10-cent fare.

March, 1922	8,515
April	9,395
May	9,327
June	9,379
July	9,033
August	9,027
September	9,765
October	9,967
November	10,583
December	11,639

The card sales in Rock Island since the plan became effective on March 1, 1922, are shown in the accompanying table.

Plans on Bus Service Halted

Toledo's decision to get into the bus business through the establishment of auxiliary service by the Community Traction Company has been upset several times in the last fortnight by the changes of attitude on the part of members of Council.

Objection was raised to the addition of the $30,000 investment suggested by Street Railway Commissioner W. E. Cann to the capital value of the company. Then the Council repealed its original legislation providing for that and another resolution, asking that the buses be bought from the depreciation fund, was thrown into the hopper. The commissioner was also requested to get bids from private operators.

At a meeting of the finance committee of the Council on Jan. 17 he submitted bids ranging from $13.50 to $26 a day depending upon the value of the equipment, which ranged from $600 to $3,700 a bus. Some were bids for use of old cars, others for new machines and the range in passenger carrying capacity was from fourteen to sixteen.

Mr. Cann said he had estimated that the cost of similar service if rendered by the Community Traction Company, under the original plan with new equipment would be $17.38 a day.

The committee voted six to two to accept Mr. Cann's proposal, but left no way open for the financing of the matter. That will be taken up by the Council at its next meeting.

Mr. Cann said that it was illegal to take money out of the street railway depreciation fund for the purchase of the Oak Street buses. However, he did report that the Erie Street line, which goes across the old Miami & Erie Canal, is costing the company 9.76 cents a passenger to operate and that now the line is in need of repairs.

He recommended purchase of a bus for this service and the taking of the money from the depreciation fund.

Independent bus operators had to renew licenses by Jan. 20 and the safety director had informed them that insurance and an indemnifying bond of $1,000 each had to be filed by that date or they would not be permitted to operate. The busmen have asked waiver of the requirement because many complained they were unable to get surety in that amount.

Service Buttons to Employees

At the annual Christmas tree celebration of the Beaver Valley Traction Company, New Brighton, Pa., service buttons were formally presented to seventy-three employees. The buttons, which are inscribed with the words "Beaver Valley Traction Company" and the number of years of service, are of gold, triangularly shaped with a black center and a tiny street car on top. General Manager Boyce arranged for the presentation and E. E. Hamilton, vice-president, addressed the men. One honor employee has put in twenty-three years' service with the company. He is H. J. Meyer, master mechanic.

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Railway Seeks Jitney Rights

The Eastern Massachusetts Railway petitioned the City Council of Malden, Mass., on Jan. 16 for a jitney license from Malden to Cliftondale via Linden and North Broadway, with the right to sell a book of twenty tickets for $1, each good from Converse Square to the entrance of Forest Dale Cemetery on Main Street. This would give Main Street residents a 5-cent fare where they now are charged 10 cents.

The Eastern Massachusetts Company offers to run express over the territory where the Elevated feels that competition has been made by the Hart jitneys. The petition went to the special committee on motor vehicles, together with the petition of the Elevated for a jitney line from Malden to Linden, from Malden to Edgeworth and the petition of Joseph Hart for jitney licenses.

When the L petition for a jitney line from Malden Square to Edgeworth was read Alderman Trainor said he understood there was no Sunday or holiday schedule on it, and investigation proved this statement correct. Before acting on the petition the committee will investigate this phase of the question.

Connecticut Fares Reduced Ten per Cent

A voluntary 10 per cent fare reduction over lines of the Connecticut Company, which means most of the trolley routes in the State, effective April 1, was voted by the Board of Directors on Jan. 13. An announcement to this effect was recently made from the company's office in New Haven. This reduction is available through the use of tokens now selling at three for a quarter, and which on April 1 will be two for 15 cents.

The company's statement says that improved financial conditions, increased patronage, and continued relief from jitney competition make possible the reduction.

Santa Barbara Pass Gets Good Start

Reports from the Santa Barbara & Suburban Railway, Santa Barbara, Calif., covering the first three weeks of its unlimited-ride weekly pass are considered most favorable. The period covered, namely, Dec. 11 to Dec. 31, 1922, inclusive, shows 7.5 per cent more revenue when compared with the same period of 1921 and about 7 per cent more revenue when contrasted with the twenty-one days just preceding the pass. The relative increases in usefulness to the public, as measured by rides taken, were 22 per cent and 20 per cent.

The pass costs $1. The cash fare is 8 cents with five tickets for 35 cents. The effect of the pass has been to cut down the number of ticket purchasers, whereas the maximum fare riders have actually increased in number. These facts hold good for both methods of comparison used. Another interesting fact is that the number of school tickets sold shows a decrease, although these are obtainable at the rate of forty for $1, or only 2½ cents each. This indicates that in some families the pass is used partly by one of the children under twelve between the hours of 8 a.m. and 6 p.m. on school days (these are the limitations on school tickets) and partly by other members of the family. As the average gross fare from a pass was 3.8 cents, it will be seen that some school children pay 1.3 cents more per ride on a pass than on a 2.5-cent ticket.

Appeal to Legislature for Trackless Trolley Buses

An effort will be made to have the Wisconsin Legislature grant the city of Milwaukee power to permit the Milwaukee Electric Railway & Light Company to operate trackless trolley cars on the streets of Milwaukee.

The company offered some months ago to install a trackless trolley line on Lincoln Avenue as an extension to the present railway system. City Attorney Niven of Milwaukee, in an opinion rendered at the request of the City Council, held that the city is under the present law without authority to grant such permission. Residents of the south side, where it was proposed to have the trackless trolley line operate, have been very much in favor of the project and have exerted pressure on the Common Council with the result that the Legislature will now be asked to pass necessary amendment to the law which will permit the city to authorize trackless trolley operation in Milwaukee.

Council Approves Bus Franchise

While final decision was not made in the Circuit Court on the electric railway bus franchise litigation of Nov. 7 and while petitions are in circulation for the resubmission of the last franchise slightly modified, the City Council of Saginaw, Mich., has approved a ten-year franchise for the Saginaw Motor Omnibus Company, a $500,000 corporation. The Council has ordered the submission of this grant to the electors at the primaries on March 7. Those interested in the corporation are John Wade, Atlantic City; Samuel Bogert, Walter Kutzlieb and George R. Bidwell, New York City. Imperial omnibuses are to be used if the franchise carries, and active management is expected under Mr. Wade, who operates omnibuses in Minneapolis, St. Paul, Cleveland, Akron, Miami and Atlantic City. The citizens' committee which is back of the proposal for a street car-bus franchise will continue its efforts to obtain approval of its plan.

Trolley Buses for Philadelphia.—The Philadelphia Rapid Transit Company has decided to purchase fifteen trolley buses for use on Oregon Avenue in Philadelphia.

Metal Tickets in Force.—The United Electric Railways, Providence, R. I., put into effect on Jan. 1 its 6-cent fare schedule with ten metal tickets for 50 cents. President Potter said that the end of the second week of circulation of the fare disks found them constantly gaining in favor among the patrons.

Planning One-Man Cars.—The Morris County Traction Company, Morristown, N. J., is planning the operation of one-man cars only. They now run from Summit to Elizabeth, Wharton to Rockaway and Denville to Boonton. Employees have filed a protest against the installation of this system with the Dover Board of Aldermen.

Hearing on Rates Announced.—The Kansas Public Utilities Commission at Topeka, Kan., has announced that it will hold a hearing Feb. 24 on the application of the United Traction Company to put in effect interurban rates between Manhattan and Junction City and stage rates between Junction City and Abilene.

Second Bus Line Started.—The Johnstown (Pa.) Traction company through the subsidiary company, the Traction Bus Company, on Jan. 21 placed the second trolley feeder bus line in operation in Cambria County. A 5-cent fare is charged. A few weeks ago the traction company opened the first bus line.

Proposed Five-Cent Fare.—Bills have been presented in the House of Representatives proposing a 5-cent fare on all electric railway lines in the City of Providence and prohibiting the use of one-man cars operating over grade crossings. The act would establish a one-fare zone in Providence so that a person could ride from the farthermost point in the city to the other for 5 cents.

North Shore Opens Another Feeder Line.—The Chicago, North Shore & Milwaukee Railroad has established a feeder bus line from Waukegan, Ill., to Kenosha, Wis. This railway started a bus service on Aug. 12 between Lake Geneva and Kenosha and the establishment of other feeder lines is under consideration. The one-way fare from Waukegan to Kenosha is 45 cents for the 16-mile trip, which is made in fifty six minutes.

Bus Service to Start.—The Springfield (Mass.) Street Railway expects to start its new bus service over the Hampden County Memorial Bridge to West Springfield points within a few days. By the terms of the permit granted the company Jan. 16 by the Public Utilities Commission the company has authority to run motor buses anywhere in its territory.

Lower Fare Rate Disclosed.—Operation of the Cleveland (Ohio) Railway during 1922 produced results which indicate that a slight reduction in the rate of fare will probably go into effect March 1. This information was disclosed as a result of the meeting of the directors on Jan. 25. The present rate of fare is 5 cents cash, with 1 cent for transfer, and the new rate will make no change in this, but tickets will be sold at eleven for 50 cents. The company estimates the reduction will approximate 10 per cent.

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Personal Items

Mr. Deal Leaves Springfield

E. C. Deal has resigned as manager of the Springfield (Mo.) Traction Company and the Springfield Gas & Electric Company, owned by the Federal Light & Traction Company, New York, to become associated with the Electric Bond & Share Company, New York. Mr. Deal will assume his duties as adviser of the public utilities of that company as soon as a manager is appointed to succeed him with the Springfield companies.

During the four years that Mr. Deal has been general manager of the Springfield properties many improvements have been made in the railway, electric and gas service. Among them is a $1,000,000 power plant now nearing completion. He installed buses in city operation and succeeded in keeping fares to 7 cents cash with four tickets for a quarter. Mr. Deal also put into effect a very successful plan of customer ownership.

Before becoming connected with the properties at Springfield Mr. Deal was general manager of the Federal Light & Traction Company's properties at Trinidad, Col. Prior to that time he was associated with Stone & Webster, Boston, Mass.

W. O. Wood Resigns from New York & Queens County Railway

William O. Wood has resigned as president and general manager of the New York & Queens County Railway, Long Island City, now in the hands of Gen. Lincoln C. Andrews as receiver. He has been connected with the company since 1908, first as vice-president and general manager.

Mr. Wood has been connected with the railway properties in Greater New York since 1903. In that year he entered the employ of the Brooklyn Rapid Transit Company, then under the direction of Col. E. W. Winter. Charged with the responsibility of rehabilitating the Brooklyn lines after the serious impairment of their physical structure and earning capacity, Colonel Winter scoured the country for talent with which to rehabilitate the lines and Mr. Wood was one of the galaxy of transportation stars that Colonel Winter gathered around him at that time in rebuilding the personnel of the company. Others among them were W. S. Menden, W. G. Gove and the late John F. Calderwood.

Mr. Wood began his electric railway career in Detroit in 1900 as general superintendent of the Rapid Railway. From there he went to Brooklyn. His first position there was superintendent of the elevated lines. The following year he was made assistant general superintendent of the company. In 1907 he resigned to become associated with the Interborough Rapid Transit Company and for a year was engaged in special work, reporting to President Shonts. From that company he went to the New York & Queens County Road, affiliated with the Interborough group. Previous to his service in Detroit Mr. Wood was for ten years associated with the Illinois Central Railroad as trainmaster and as secretary to J. T. Harahan.

In June, 1921, Mr. Wood was elected president of the New York Electric Railway Association. He is one of the best-known railway men in the country and has won many friends within and without the industry through a most attractive personality. He has always been interested in association work, and he has been unfailing in his attendance at the sessions of the New York body. He has not announced his plans for the future.

J. P. Barnes C. E. R. A. President

Louisville Executive Honored, Although in Central West Only a Little More than Two Years — Remarkable Record Made by Him in Managing Road in Southern City

JIM BARNES, president Louisville Railway, was elected last week to succeed Sam Greenland as head of the C.E.R.A. Although Jim considers himself a newcomer in his territory, he has established himself completely in the association by his work for its welfare and his enviable record as a railway executive in Louisville. Those present at the annual meeting received irrefutable evidence that Jim Barnes is a master in the art of public and employee relations. Mayor Quin of Louisville and Arthur Krock, managing editor of the *Courier-Journal-Louisville Times*, both addressed the C. E. R. A. meeting at Louisville and stressed the fact that Mr. Barnes had gained the confidence of every one in Louisville and had established himself as one of the city's indispensable citizens.

J. P. Barnes

Jim Barnes is everything to Louisville because first Louisville was everything to Jim Barnes. It was in July, 1920, that Mr. Barnes left the Schenectady Railway to become head of the Louisville property. He had been there only a few days when this incident happened. Two men stood slightly removed contemplating Mr. Barnes. Said one: "Nice, fellow, Barnes; seems too bad, doesn't it?" "Yes," said the other, "it not only seems too bad, but it is too bad." They were referring to the situation which Mr. Barnes had inherited. Moreover, Mr. Minary, the former president, was on record as having said publicly, "My heart goes out to any man who must take the responsibility of the management of a street car company." Mr. Minary meant it.

Some time before that Mr. Minary, who had directed the company for thirty years, retired to become chairman of the board. The property was then placed in the hands of a committee of three of the directors, W. S. Speed, W. H. Kaye and John W. Barr, Jr. An increase in fares had been denied the company. The situation on the whole was a mighty complex one. Dividends on the preferred stock had been suspended in 1918, and shortly before that the payment on the common stock had been cut off. It was just about this time that Mr. Barnes was offered the Louisville post. Other men would have been inclined to hesitate, but not Barnes. He fixed his management forces first, and then he took his case up with the city. Meanwhile the question of confiscation came before the courts and the company secured an order to charge a temporary 7-cent fare. All the time negotiations were in progress looking toward a permanent settlement, and this was effected last fall with an agreement providing for operation under service-at-cost at an initial 7-cent cash fare, with five tickets for 30 cents, this rate to continue to Dec. 31, 1923. That briefly is the record of Jim Barnes with the Louisville Railway. It is only part of the story, however.

Mr. Barnes from the beginning made himself a factor in the business life of the city. He is a member of all the prominent clubs, a bank director and a director of the Louisville Industrial Foundation, the so-called $1,000,000 factory-getting enterprise of Louisville, founded to aid in bringing industries to the city. He has endeared himself to the boys of the city by taking a prominent part in the Boy Scout movement. No matter what the local activity, the reply to the inquisitor is always the same: "Have you asked Jim?"

It is indeed unfortunate that the sum-

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mer cruise of the Central Electric Railway Association is to be omitted under Jim Barnes' leadership, for he has proved himself such an able commander of river cruises for his employees. Among the numerous employee outings conducted by the Louisville Railway the river trip is the feature, and on these occasions Jim Barnes can be seen standing beside the gangplank welcoming each one that goes aboard and then circulating around during the trip to see that every one is happy.

Mr. Barnes is a native of Syracuse. N. Y. He was graduated from the Massachusetts Institute of Technology. His railway work previous to going to Louisville included terms of service with the Oneida (N. Y.) Railway, Syracuse Rapid Transit Company, Syracuse & Suburban Railway, Buffalo, Lockport & Rochester Railway and the Schenectady Railway. In 1916 he was president of the New York Electric Railway Association. His activities in behalf of the American Electric Railway Association are so well known that the need does not exist for repeating them here.

General Andrews Receiver of Queens Line

Chief Executive Officer of New York Transit Commission Will Direct Road for Court—E. A. Roberts, Utility Expert, Named as General Manager to Serve Under Him

GEN. LINCOLN C. ANDREWS was appointed receiver of the New York & Queens County Railway, Long Island City, N. Y., on Jan. 18. For two years previous he was chief executive officer of the New York Transit Commission and withdrew from the commission to accept the appointment to the railway. General Andrews entered upon his duties with the railway at once. The receivership was precipitated by announcement by the Interborough Rapid Transit Company to the effect that it would cease to make up the deficit on the Queens County line, which operates in Queens County and into the Borough of Manhattan over the Queensborough Bridge.

© Bachrach

L. C. Andrews

General Andrews appreciates keenly all the expressions of good will toward him made on the announcement of his appointment, especially the attitude of Chairman McAneny of the commission in releasing him; but he was particularly pleased with a letter that reached him the day after he entered upon his new duties. This letter, from a railroad man in charge of one of the New York City properties, follows:

"Dear General Andrews: I see by the morning papers that you are 'out of the frying pan and into the fire.' I want to tender my congratulations and bid you welcome to the ranks of the slaves.

"You will find lots of cause for worry, but it is wonderful to take a sick property, work over it and see it respond. There will be many times when you will damn the job and all that goes with it, but next morning you will be back with the bit in your teeth ready for another long, hard day.

"If there is anything that my little organization or I can do for you, do not hesitate to let me know."

General Andrews regards this as a delightful expression of the mental attitude and point of view of the successful railroad man of to-day. It confirms the impression gained by the General when in 1921 he was a member of a party of railway men and commission officials that made a tour of inspection of the city railway properties in Philadelphia, Cleveland, Kansas City, Chicago and other places to study operating methods in those cities. At that time he said that the thing that impressed him most forcibly was that the type of men who are either managers or operators of the properties which he visited were keen, wide awake and intensely devoted to giving the public the best possible service.

An Army Man in Business

General Andrews left the regular army after the war for the purpose of trying his hand in business. His first real experience was the year and a half he has just finished as chief executive officer of the New York Transit Commission. While he started with no predilections for any special line of work, his contracts with the electric railway business during this period aroused in him a desire to continue in the railroad game, for it appealed to him as vital and very much a man's proposition, particularly in these parlous times. That is the main reason why he accepted the appointment as receiver of the New York & Queens County Railway. He regards the position as offering him an entrance into what he now considers his chosen field. He is thoroughly alive to the fact that the situation before him is a very trying one, but has been nerved to the task by the feeling of assurance that he has the sympathetic good will of his associates.

General Andrews was appointed to the United States Military Academy from Seneca Falls, N. Y., in 1889, and was graduated in 1893. He was aide to General Sumner, commanding the cavalry division, in the Santiago campaign during the war with Spain, and was a Major of volunteer infantry in the Philippines and first American Governor of the Island of Leyte. Later he was instructor at the Military Academy and was active in officers' training work before the World War, in which he commanded a brigade in this country and in France. Later, as Deputy Provost Marshal General in France, he assisted in the organization and training of the American Military Police. General Andrews retired from active service in the army in 1919, and before becoming executive officer of the Transit Commission was in charge of the military training of boys under the New York State Military Training Commission.

E. A. Roberts General Manager

As general manager to the receiver, General Andrews has chosen E. A. Roberts, who since last April has been chief of the transit bureau of the New York Commission. Mr. Roberts has a long list of accomplishments to his credit. He went with the commission from the force of John A. Beeler, for whom he acted as principal assistant. Mr. Roberts became associated with Mr. Beeler in 1917 and served with him for the Massachusetts Public Service Commission in the investigation of operating methods and practices preceding state control of the Boston Elevated Railway, and with the Public Utilities Commission of the District of Columbia. His work in Washington had to do with recommendations looking toward the increase of the capacity of the Washington railway systems under war conditions. He has also made extensive investigations for the Philadelphia Rapid Transit Company and the Public Service Railway of New Jersey. With the New York Transit Commission Mr. Roberts' work had to do primarily with the making of plans for the efficient utilization of the transportation facilities already in existence.

E. A. Roberts

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The significance of this work can best be judged by the fact that under conditions as they exist in New York at present it will be five years at least before more new subways can be completed and placed in operation and perhaps many years more.

After he was graduated from Harvard College in 1914 Mr. Roberts spent two years with the General Electric Company at Lynn, Mass., and Erie, Pa., in departments connected with the manufacture of electric railway apparatus. During 1916-19 he was a research member of the faculty of the railway engineering department of the University of Illinois, and for a short time thereafter he was associated with the Boston Elevated in its electrical engineering department.

Mr. Kanneberg Named to Wisconsin Railroad Commission

Adolph Kanneberg, lawyer and Court Commissioner, has been appointed by Gov. J. J. Blaine of Wisconsin a member of the Wisconsin Railroad Commission, succeeding Carl D. Jackson, who recently resigned to become counsel for the National Electric Light Association.

Mr. Kanneberg has been an active supporter since 1900 of the LaFollette wing of the Republican party in Wisconsin. In 1920 he was a candidate for Attorney General on the LaFollette ticket, but was defeated at the primaries. In 1922 he was chairman of the Progressive Republican Club of Milwaukee County. He has held no public office other than that of Court Commissioner. Mr. Kanneberg is a resident of Milwaukee and his appointment follows the wishes of the Milwaukee City Administration to have a Milwaukee man on the commission.

It is reported that Governor Blaine will appoint Frank McManamy, a traffic expert of Washington, D. C., to succeed Henry Trumbower, whose term expires in February. Mr. McManamy has been active in the railroad brotherhoods.

The term for which Mr. Kanneberg was appointed has two more years to run while that to which it is expected Mr. McManamy will be appointed is a six-year term.

Obituary

H. G. McConnaughty

H. G. McConnaughty, who has recently been associated with the Edison Electric Illuminating Company of Boston, died on Sunday, Jan. 21, after a long illness. During the war Mr. McConnaughty acted as an assistant on the fuel board, which was one of the committees of the Council of National Defense at Washington. He was at one time exhibit director of the American Electric Railway Association and subsequently of the National Electric Light Association. Some years ago he was identified with the Dearborn Drug & Chemical Corporation.

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

500 Electrically Operated Turnstiles Ordered

An order for 500 electrically operated turnstiles to be used by the Interborough Rapid Transit Company, New York, on its elevated system has been received by the General Electric Company.

This will be the first use of electric turnstiles on the elevated lines in New York. The feature of the electric turnstile is that the nickel when dropped into the slot lands between two contacts, thus completing an electrical circuit which releases the turnstile, allowing it to turn just far enough for one person to pass, and at the same time locking it from use in the opposite direction.

After the passenger has passed the nickel falls from the contacts to a space behind a magnifying lens, where it is plainly visible until another nickel is deposited. An electric lamp in the fare box illuminates this enlarged figure of the coin, thus providing a means for detecting false coins. The turnstiles are similar to those now in use in the New York subway.

Changes Announced in Western Electric Organization

The Western Electric Company has announced important organization changes.

F. A. Ketcham has been appointed general manager of the supply department. For the past four years he has been general sales manager.

G. E. Cullinan assumes the position of general sales manager. Mr. Cullinan entered the employ of the company upon his graduation from Williams College in 1901 and for several years was connected with the New York house. He went to St. Louis in 1907 and was manager there from 1909 to 1918 going to Chicago as central district manager.

L. M. Dunn, who for the past three years has been manager of the Eastern District, which includes the New York and the New England territory, has been made general merchandise manager on the general manager's staff.

W. J. Drury has been made manager of the Eastern District to fill the vacancy created by Mr. Dunn. Mr. Drury has been sales manager of the New York house for the past three years, and is succeeded in that capacity by J. F. Davis, who has been sales manager of the Boston branch for the same period.

T. E. Burger has been made sales manager at Boston. Mr. Burger was for thirteen years connected with the Los Angeles and San Francisco organizations, being sales manager of the former. More recently he has been on the staff of the Society for Electrical Development, coming back to the Western Electric organization in 1922.

W. P. Hoagland has been appointed central district manager in charge of the Chicago and Minneapolis branch houses. For the past three years Mr. Hoagland has been sales manager at Chicago.

J. H. Gleason takes the position of Chicago sales manager. Mr. Gleason has been power apparatus sales manager at Chicago.

H. L. Grant, who for the past three years has been general appliance sales manager, located at New York, has been appointed Erie district manager, a new grouping of the distributing houses at Cleveland, Pittsburgh, Detroit and Cincinnati. Mr. Grant's headquarters will be at Cleveland. A. M. Collins continues as manager at Cleveland.

It is interesting to note that all of these organization changes are in the nature of promotions. They became effective on Jan. 15.

Mr. Down Vice-President Westinghouse Traction Brake Company

The Westinghouse Traction Brake Company of Wilmerding, Pa., has announced the election of S. G. Down as vice-president in general charge of sales and commercial activities. Mr. Down has been general sales manager of the company, with headquarters at Wilmerding. Previous to the appointment as general sales manager, he had been president of the Westinghouse Pacific Coast Brake Company, at Emeryville, Calif., and Western district manager of the Westinghouse Air Brake Company and Westinghouse Traction Brake Company.

Mr. Down came to the Traction Brake Company from the Michigan Central Railroad in 1902 to act as instructor on the Westinghouse Air Brake instruction car.

Metal, Coal and Material Prices

Metals—New York	Jan. 23, 1923
Copper, electrolytic, cents per lb.	14.50
Copper wire base, cents per lb.	16.75
Lead, cents per lb.	8.00
Zinc, cents per lb.	7.00
Tin, Straits, cents per lb.	40.00
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$8.75
Somerset mine run, Boston, net tons	5.00
Pittsburgh mine run, Pittsburgh, net tons	3.50
Franklin, Ill., screenings, Chicago, net tons	2.675
Central, Ill., screenings, Chicago, net tons	1.70
Kansas screenings, Kansas City, net tons	2.50
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.	6.85
Weatherproof wire base, N.Y., cents per lb.	16.50
Cement, Chicago net prices, without bags.	$2.05
Linseed oil (5-bbl. lots), N.Y., cents per gal.	93.00
White lead, (100-lb. keg), N.Y., cents per lb.	12.625
Turpentine, (bbl. lots), N.Y., per gal.	$1.53

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Walter Jackson Consultant to Detroit City Line

The Department of Street Railways, city of Detroit, through the Board of Street Railway Commissioners and Ross Schram, assistant general manager, has engaged Walter Jackson to make an analysis of the workings of each department along the following lines:

1. Compare the practices of the Detroit United Railway and those of the successor organization.
2. Suggest any changes or additions that will help to make the Detroit system the best mass transport organization in America.

His report will be made public so that the people of Detroit as well as the industry at large will be able to judge intelligently as to what the Department of Street Railways found upon taking over the Detroit United Railway, what it has achieved so far in rebuilding the lines and in managing them and what it hopes to accomplish in the future.

Mr. Ong Consultant at Los Angeles

J. R. Ong, consulting transportation engineer, has been engaged by the Los Angeles (Calif.) Railway, to make a survey of Los Angeles traffic conditions. Mr. Ong is now actively at work on extensive travel checks and other features of his work.

Los Angeles is at present wrestling with the problem of traffic congestion in the downtown business district which handicaps street car operation.

Mr. Ong's immediate objective will be to assist the management of the Los Angeles Railway in giving the public the best possible service under existing conditions, and he will also show what steps are necessary for the company to play its proper part in the future development of Los Angeles.

Rolling Stock

Indiana Service Corporation, Fort Wayne, Ind., is considering the purchase of some new light-weight interurban cars.

Northern Ohio Traction & Light Company, Akron, Ohio, recently purchased new milk cars of 80,000 lb. capacity from the American Car & Foundry Company.

Seattle, Wash.—An ordinance has been introduced which provides for the lease with option of purchase of from 100 to 200 new fifty-eight passenger cars. Purchase will be made from the earnings of the Municipal Railway system. The plan is outlined elsewhere in this issue.

Springfield (Mass.) Street Railway and **Worcester Consolidated Street Railway** have purchased two escalator snow removers costing about $3,000 each. This device built on a caterpillar tractor is expected to lighten the financial burden of snow removal. They were built at Aurora, Ill.

Reading Transit & Light Company, Reading, Pa., will soon put into service three model cars constructed in its own shop. Practicable suggestions from patrons were incorporated into the new type of car. The cars, which were referred to in the ELECTRIC RAILWAY JOURNAL, issue of Oct. 21, are about 45 ft. in length, seat forty-six passengers and have large safety guarded windows.

Interstate Public Service Company, Indianapolis, Ind., recently ordered from the American Car & Foundry Company, Jeffersonville, Ind., twenty-five box cars, fifteen stock cars, and four ballast cars. One new 50-ton electric locomotive was also ordered from the Westinghouse Electric & Manufacturing Company. The stock cars will be of 60,000 lb. capacity and the box and ballast cars of 80,000 lb. capacity. All of these cars except the stock cars will be built with steel underframes.

Philadelphia (Pa.) Rapid Transit Company has ordered 576 new cars, costing approximately $6,500,000. Of the car order, 520 cars will be of the regular passenger type, thirty-four snow plows and sweepers, twenty construction and supply cars, one crane car for subway (elevated operation) and one crane car for surface operation. The J. G. Brill Company will build the new cars and will commence delivery at the rate of three a day on June 1 next. The expenditure will be financed by cash payments of $1,750,000 by the company, while the remainder will be taken care of by an issue of car trust certificates, mentioned elsewhere in this issue.

Track and Roadway

Puget Sound Power & Light Company, Bellingham, Wash., announces that it will rebuild its South Elk Street tracks and repave between them this year, at a cost of approximately $60,000.

Pacific Northwest Traction Company, Seattle, Wash., will expend approximately $150,000 in rebuilding the waterfront trestle, 4½ miles long, used by the interurban between Bellingham and Blanchard. Three million feet of timber and 20,000 ties will be needed for the improvement. The material will be purchased locally.

Trenton & Mercer County Traction Corporation, Trenton, N. J., will lay a double-track line on Hamilton Avenue from Chambers Street to Olden Avenue and on Olden Avenue from Hamilton Avenue to East State Street. The company will also place a new switch on Perry Street and remove the one on North Broad Street.

Youngstown (Ohio) Municipal Railway announces through Superintendent Stewart that it will rebuild its line in Albert Street in the spring. The work will cost about $46,000, of which about half will be charged to maintenance expense and half to the company's capital value under provisions of the franchise.

Trade Notes

Bemis Car Truck Company, Springfield, Mass., is constructing a one-story, 55 x 140-ft., brick addition to its plant on Pirnie Avenue, which will cost about $40,000.

The National Forge Company, an Alabama company, recently transferred to a Kentucky charter and is erecting a plant in Louisville for the production of railway supplies, including knuckle pins, coupler yokes, rivets, brakeshoe keys, center pins, draft keys and other parts. Equipment of the Alabama plant and additional equipment will be installed as soon as the local building is completed.

Collins Switch & Signal Company, formerly the American Automatic Switch Company, has terminated its contract with the United States Electric Signal Company under which the latter company has manufactured and sold the devices of the former company for the past nine years. In the future this company will manufacture its electric track switches, tower controls and curb controls at 59-65 McWhorter Street, Newark, N. J.

S. E. Marks has been appointed director of traffic and shipping for the Westinghouse Electric & Manufacturing Company. Mr. Marks entered the employ of the Westinghouse Company in 1892, accepting a minor clerkship at the first Westinghouse plant in Garrison Alley. Shortly after the works was moved to East Pittsburgh he was transferred to the storekeeping and shipping departments, which at that time were combined. In 1903 he was appointed assistant shipper and in 1906 was made head of the shipping department when a new department was created. This appointment carried with it the responsibility of both packing and shipping for the domestic and foreign business of the company.

New Advertising Literature

Railway Improvement Company, New York, N. Y., has issued an illustrated booklet on the Ransom vacuum oiler. It shows the oiler installed on motors on a large number of properties.

Sterling Varnish Company, Pittsburgh, Pa., has appointed H. L. Hazeltine, formerly its Eastern manager, to the position of engineer of insulation. After Feb. 1 Mr. Hazeltine's headquarters will be at Pittsburgh.

American Wood Preservers' Association, Chicago, Ill., has published its first issue of *Wood Preserving News*. The object of this periodical is to provide a carrier of information to the engineering profession concerning the use of treated wood. The first issue outlines the program of the nineteenth annual convention of the American Wood Preservers' Association, which was held in New Orleans from Jan. 23 to Jan. 25.

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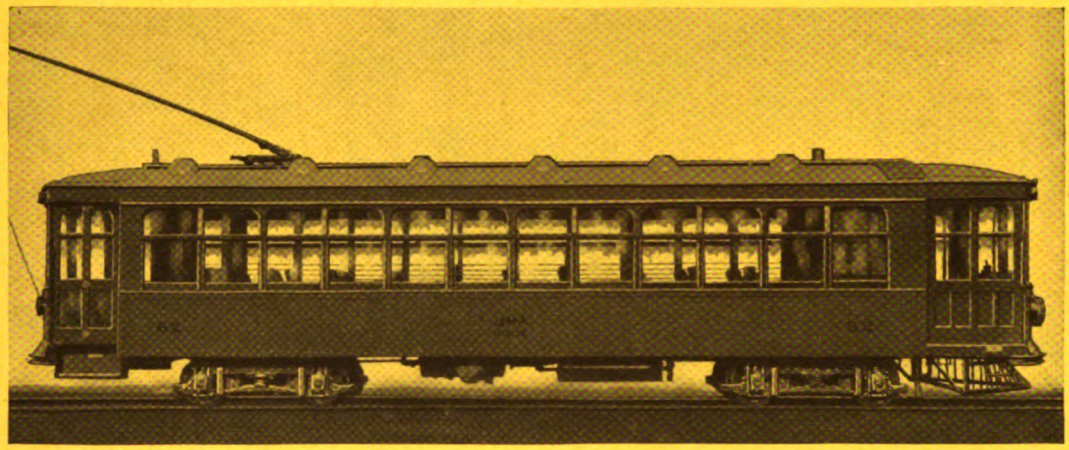
Light-Weight Interurban Cars "Ride Perfectly at any Speed"



33,000-lb. Interurban Car built by The G. C. Kuhlman Car Company for high-speed service

So says Superintendent of Transportation and Equipment, Western Ohio Railway Company, before Central Electric Railway Association

Mounted on Brill Low-level trucks No. 77-E, the ten light weight interurban cars built by our Kuhlman Plant for the Western Ohio Railway Company are very satisfactorily meeting the high-speed schedule requirements and according to this railway official "ride perfectly at any speed."

The results of their operation for the past few months are discussed in detail in the January 13th issue of the *Electric Railway Journal.*

Included among the advantages which these cars have demonstrated to this railway company are

Worthwhile Saving in Power
Lower Track, Car and Equipment Maintenance
Easier to Maintain High-Speed Schedules
Fewer Serious Accidents

Write for complete information to

THE J. G. BRILL COMPANY
PHILADELPHIA, PA.

AMERICAN CAR CO. ST. LOUIS MO. — G. C. KUHLMAN CAR CO. CLEVELAND, OHIO. — WASON MANF'G CO. SPRINGFIELD, MASS.

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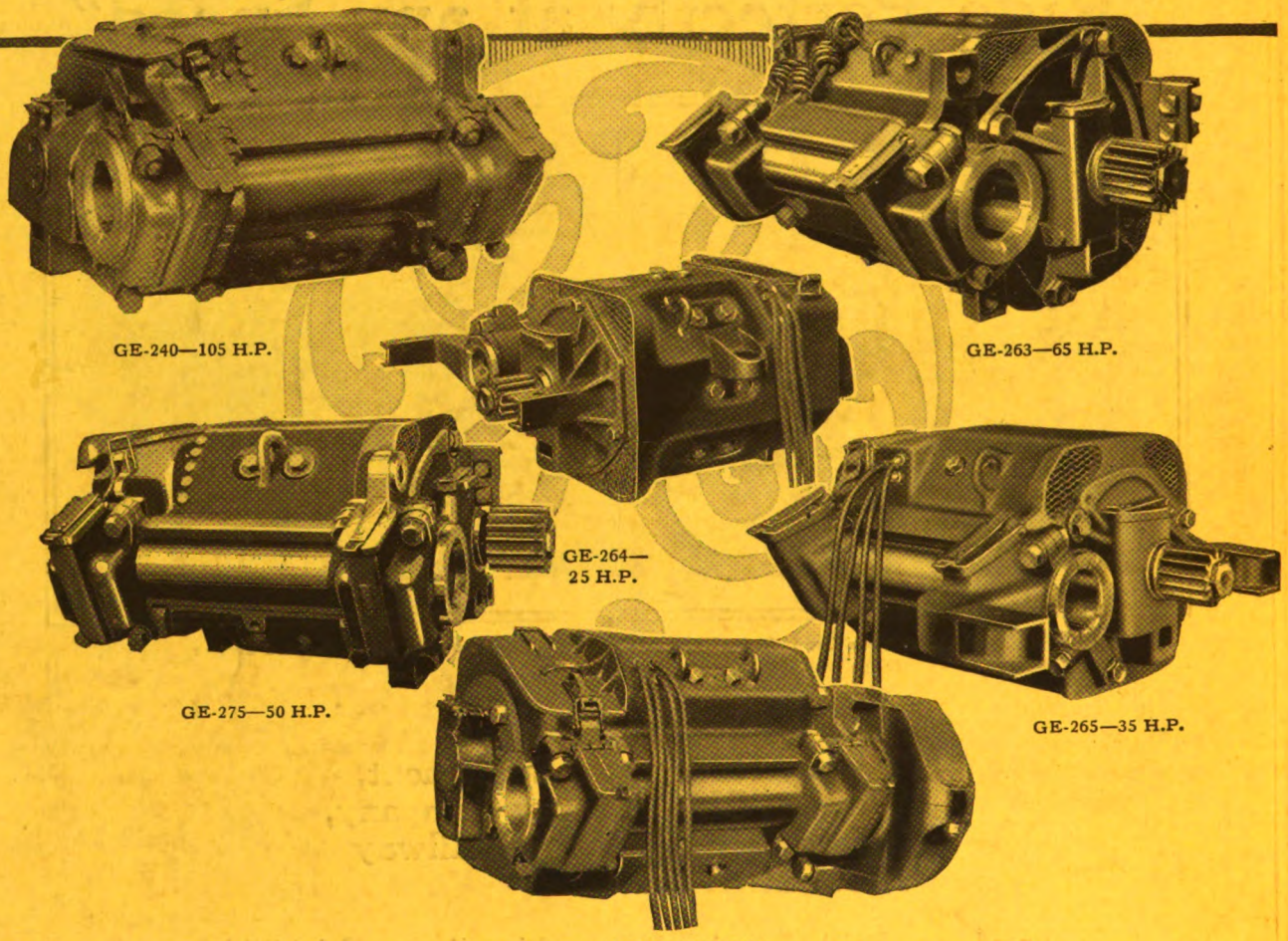
In 1923

Motor replacements will lower maintenance



GE-240—105 H.P.

GE-263—65 H.P.

GE-264—
25 H.P.

GE-275—50 H.P.

GE-265—35 H.P.

GE-254—140 H.P.

—And improve service

Records of a large number of railway motors which have been in service 15 to 20 years show annual maintenance and inspection costs of $120 to $250 per motor.

Similar records on modern G-E railway motors show annual maintenance and inspection costs of only $35 per motor.

Investigate the savings in operating costs, and the increased reliability of service which can be obtained by replacing your older machines.

General Electric Company

General Office
Schenectady, N.Y.

Sales Offices in
all large cities

25-196

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McGraw-Hill Co., Inc. February 3, 1923 Twenty Cents Per Copy

ELECTRIC RAILWAY JOURNAL

Miller Trolley Shoes

(patented)

—where wire wear is less!

Chicago, No. Shore & Milw. R. R. reports:—"No actual measurements of wire are taken, but condition found on inspection shows conclusively there is less wear on wire due to use of sliding contacts."

Knoxville Ry. & Lt. Co. says:—"We have never made any measurements of wear on the trolley wire but we do know we have fewer emergency calls for line breaks."

Portland-Lewiston Interurban made the tests:—Measured wire at 12 points after four months' service. Found no measurable wear at nine points and a bare .001 inch at three points. In other words, practically no sign of wire wear.

All these companies have been using Miller Trolley Shoes in place of wheels for several years. It's time for you to try them on your road.

MILLER TROLLEY SHOE CO.
Boston-21, Mass.

Western Representative:
Economy Electric Devices Co.,
1590 Old Colony Bldg., Chicago, Ill.

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Electric Locomotives

"Joe," said the Vice-President, "I noticed in a recent issue of the Electric Railway Journal the 'For Sale' advertisement of the Westinghouse Company, offering five new 45-ton electric locomotives for immediate delivery. Don't you think we could make good use of one of these locomotives in our freight-haulage business?"

"Boss" answered Joe, "I was just going to take up with you the matter of additional motive equipment for our freight haulage business. It has increased at such a rate that our present equipment is already overloaded. With an electric locomotive, such as the ones advertised, we can take care of all business for some time to come."

"Well, Joe," said the Vice-President, "see whether one of these locomotives would answer our purpose and what it would cost."

Westinghouse Electric & Manufacturing Company
East Pittsburgh, Pa.

Westinghouse

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ELECTRIC RAILWAY JOURNAL

Consolidation of Street Railway Journal and Electric Railway Review

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HENRY W. BLAKE and HARRY L. BROWN, *Editors*

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A Convention Without an Exhibit Is Hardly a Convention

THE American Electric Railway Association committee has been appointed to determine whether there shall be an exhibit in conjunction with the annual convention next fall and where the convention shall be held. The exhibit was such a great success last year that presumably there will be little doubt among the committee members that it should again be a feature of this year's convention. To compare the interest and attendance at the last convention in Chicago with that at the two previous conventions serves to emphasize the great attraction which the exhibits make and the value of a central location. In 1920 the convention at Atlantic City with exhibits had an attendance of 3,300; in 1921 at the same location, but without exhibits, the convention attendance was 1,300, and then last year at Chicago, with exhibits, it was 4,200, with 3,300 passes issued in addition.

To exhibit, and exhibit well, is of course quite an expense to the manufacturers. But in what other way can the manufacturers get an equivalent opportunity to have such a large number of railway men see their products and to talk with them about their merits in so short a space of time? At the convention the railway men are away from their own pressing operating work and are in large measure free to give undivided attention to what the manufacturer has to say and show. Furthermore, the exhibit provides the opportunity to show devices and equipment to those many railway men who are not directly interested in their use, but who are an influence for or against purchasing such items (often depending on their acquaintance or lack of acquaintance with the subject) when sitting in staff counsels.

Another reason why an exhibit is desirable is that there is a great deal of development work going on again, now that the railways are in position to buy improvements, and this means that there will be many new devices and many improvements on old equipment which the convention will afford first opportunity for the operating men to see.

The general sentiment of the field is that a convention without exhibits is hardly a convention at all.

Atlantic City Is the Logical Location

THE Chicago convention last year was one of the best the association has ever held in point of interest, accomplishment and attendance. And we want to go back to Chicago again—perhaps in 1924—for its great pier, wonderful hotel facilities and central location make its advantages greater than any other city can offer. But this year it probably will meet with most general approval to go to Atlantic City again. There is no doubt that the Eastern ocean resort is a tremendously popular location for the railway conventions, and it might be a good scheme to alternate that city every other year with the locations elsewhere over the country. This year, President Emmons, being a resident of Baltimore, quite naturally favors Atlantic City, and unless it is impossible to get a fair deal with the business interests there, the 1923 convention should logically be held in Atlantic City.

Politics No Substitute for Judicial Inquiry

THE recent debate in the United States Senate over the rate of the carfares in Washington, D. C., as reported in the *Congressional Record* for Jan. 25, is a good example of the kind of inquiry into their finances under which utilities formerly suffered, but it was hoped that such a condition had long passed. The situation arose over the complaint of Senator McKellar of Tennessee that the present railway fares in the District of Columbia of 8 cents cash, with six tokens for 45 cents, gave too great a return on the investment in the railway properties, and he advocated a reduction to 5 cents. To compel the District public utility commission to enforce this rate, he urged that its appropriation, including salaries, should not be payable until it should fix rates of fare not in excess of those in the existing charters or contracts with Congress, which he said would reduce the fare to 5 cents. The debate brought out clearly that these salaries are a liability against the government in any case, and the effect of the amendment would be to try to withhold them unless the commission did certain things, which, if it is conscientious in the performance of its duties, it might find it could not do. Nevertheless, the amendment was defeated by a comparatively small margin only.

The *Congressional Record* report indicates that no evidence was presented, such as would be required in a commission hearing, as to the value of the railway properties in the District or that the proposed 5-cent fare would be suffiicent to yield an income adequate to pay a fair return on these values. On the other hand, great stress was laid upon the "burden" now borne by government clerks who go to Washington to serve the government, and are charged such "exorbitant" rates by the electric railways that they have to pay $1.50 per month more for trolley fares than if the rate was 5 cents, as it was before the war. Sympathy for these underpaid public servants on the part of the Senate is perfectly proper. Many of the salaries paid by the government are admittedly too low. But the proper place to correct this trouble is not to transfer the burden or part of it to the public utility, if it is charging only a fair price. There are many other items which enter into the cost of living and have increased far more in percentage and importance than carfare.

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The action which the Senate ought to take, if it is really disturbed over the low salaries paid the government employees, is to raise the salaries. This would correct the trouble directly. The idea of correcting it indirectly by trying to cut carfares would be only a very small contribution to the government clerks, but it would reduce fares, also, to a very much larger number of people in Washington who presumably are amply able to pay them. But, when one wants to be generous, it is always easy to be so with the money of some one else, and politicians usually have this kind of generosity.

The subject has added interest just at present because of the efforts being made in some states to upset the principle of utility regulation by state commissions, which has been developed during the last fifteen years. If this movement should succeed, much of this same kind of argument in connection with utility rates will become common. There are underpaid workers in every city, and a politician can always find an excuse for asking that railway fares be reduced so that not so much will have to be paid by them for transportation. At the same time others better off financially will also pay low fares. But as Carl D. Jackson said at the last meeting of the New York Electric Railway Association, local regulation at this time, after the experience had with state control, would be a step backward and against public interest.

How Many Electric Railways Paid Stock Dividends Last Year?

THE daily papers in December contained notices of many stock dividends of 50, 100 and more per cent declared by well-known manufacturing, oil and other industrial companies. A vigorous debate has arisen in and out of Congress whether these dividends should not be heavily taxed, but to the electric railway stockholder the subject possesses only academic interest. He may read the arguments of Mr. Bedford against taxation and of some of our Senators in favor of it, but throughout the length and breadth of this land there is not an electric railway company whose stockholders as such will be affected if any such law is placed on or kept off the statute books.

If the railway stockholder should ask why he is not favored; indeed, why his company is prevented by law from declaring stock dividends, he will be told that it is because the railway is a public utility. As a utility it is not allowed to make enormous profits or to charge all the traffic will bear, like other commercial enterprises, but it must be content with a reasonable return on the investment in the property. Any greater profit would be equivalent to exploiting the public, which cannot be permitted. In return, however, and because the railway is a utility, it will be protected from unfair competition by the state, as well as permitted to earn a reasonable return on the value of its property, provided there is business to be done in the territory served.

If this condition was always followed out there might be some justice for the prohibition of high profits. But the experience of the railways proves that it is not. Otherwise, why are many of the railways in New York City in the hands of receivers, while those that are still solvent are staggering along under the burden of a 5-cent fare? Surely if these roads were permitted to charge as high a rate as the traffic would bear, they could declare 100 per cent stock dividends many times over.

All in all, the treatment of the utilities of this country by the public has been too frequently disingenuous. In the years that have passed the public nature of their work has been the excuse for limiting their gains far more often than it has served as a protection against financial disaster. These conditions are changing somewhat, due to intelligent commission rulings, but the recent recommendations of Governor Smith of New York on the subject of home rule proves that there is still much educational work to do.

Twenty Years Behind in Salaries

THE more one studies the question the more he becomes convinced that the low level of salaries is one of the fundamental ailments of the electric railway field. There seems to be a lamentable similarity between the salaries of today and those paid twenty years ago. Stories keep coming in of men who for ten, twenty and thirty years have been the faithful wheelhorses in the trying "nineteen hours a day" work of keeping the transportation machine functioning, but who have finally had to desert their lifetime work in dire need of a living wage income. The company, in such cases, usually loses a brand of loyalty and a round of experience that are difficult, if not often impossible, to replace.

Managements, of course, have been beset with the problem of making ends meet, and perhaps the conditions of the past have justified a policy of holding down hard. But is it good economy to apply this policy rigidly to the matter of salaries of the important members of the staff in all departments? Frequently, when the person of last resort, let us say the president, insists that the salary of some much appreciated employee cannot be increased $25 or $50 a month, the president is later confronted with the necessity of paying a substantial increase over that amount when he comes to replace the man, and, at that, replace him with a man inexperienced on the property. If this is good business or good economy, then experience counts for nought.

Compared with his responsibility, as measured in terms of the very large expenditures of money for which he may be responsible or the opportunity he may realize for big savings, the salary of any one important employee, in fact the combined salaries of the whole operating staff (if a change in one must be considered in the light of its effect on salaries of other staff employees) is insignificant. Viewed constructively, the answer to all this is that either the man should be fired or his ability should be rewarded in a measure commensurate with his responsibility and comparable to the present-day salary levels in other fields of endeavor.

The best of the run of men cannot be kept at poor or mediocre salaries. The best of those who remain become discontented and lose interest as they learn that there is no recognition of good work. With ambition stunted, they join forces with the poor employees and stay on, indefinitely, indifferent.

What has been said above in particular reference to major employees of course also applies to their assistants and the young men, for these salaries must all be scaled down from the boss'.

The remedy is obvious. And getting down to brass tacks, this salary situation is a direct reflection of the suspicion that many managements are still living in the past—by about twenty years.

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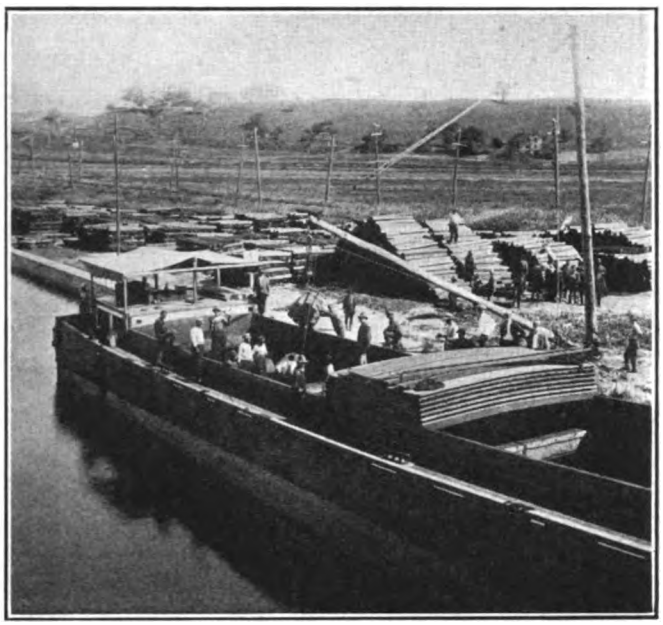
High-Speed Railroad on Erie Canal Site

The Rochester & Syracuse Railroad Builds a Cut-Off Near the Business Center of This Important Village in Central New York, Thereby Saving Considerably in Running Time — Attractive Station Is Included in the Improvement

THE Rochester & Syracuse Railroad is a high-speed interurban serving a prosperous farming and manufacturing community between the terminal cities. The company has recently acquired additional track and facilities through taking over the Empire State Railroad Corporation. The R. & S., as well as the recently acquired property, formed at one time part of the "Beebe System" which furnished a high-class interurban service in Central New York.

In seeking ways to improve the property and the service, T. C. Cherry, general manager of the company, and D. E. Crouse, chief engineer, saw at Lyons an opportunity to clip five minutes from the schedule, furnish greatly improved facilities for handling passengers and freight and reduce maintenance costs. There was a bad jog in the line at this point, due to the fact that the railway had to be brought into Canal Street, the principal business street of the village, and out again in the fashion shown on the accompanying map. The abandonment of the Erie Canal left a vacant strip of land in just the location needed by the railroad to remove this jog and at the same time keep the line within a few hundred feet of Canal Street.

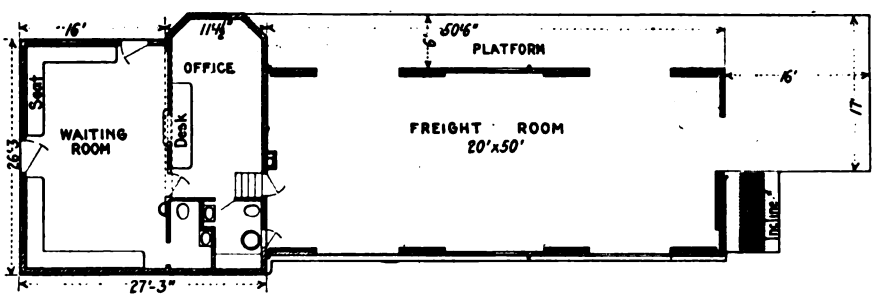
When the project was broached to the village fathers, the president and the village board gladly co-operated with the company. The necessary franchises for street crossings were granted and the services of the board were cheerfully furnished in making arrangements with abutting property owners, facilitating the moving of some structures, etc. The village purchased the entire canal strip inside the corporate limits and sold the railway what it needed for its purposes. There was no opposition from merchants on the streets vacated because the location of the station which it was proposed to build was convenient to their stores, and in a village like this business is not substantially affected by the route so long as it is fairly convenient.



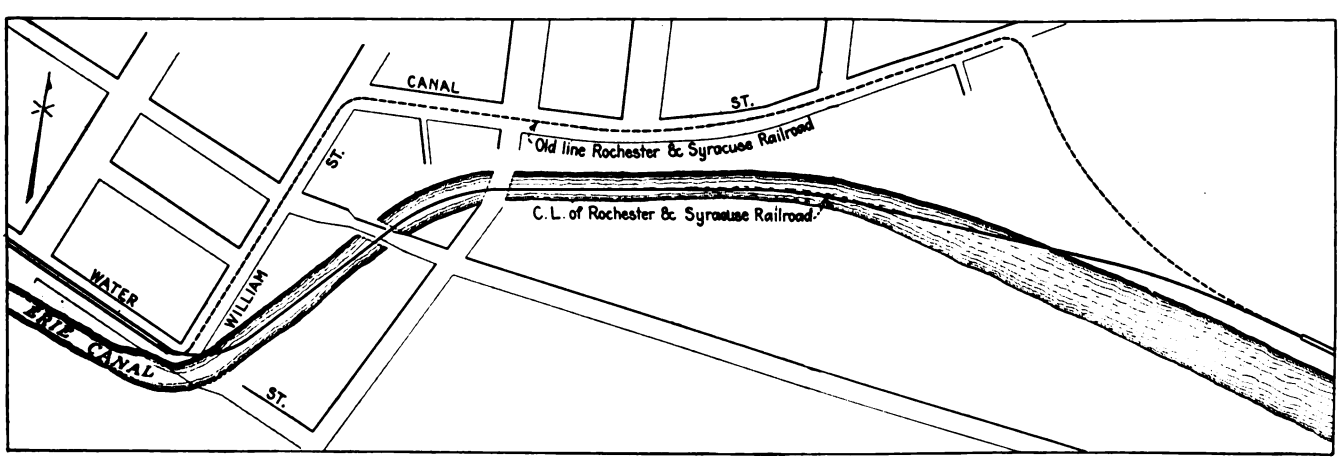
Part of These Ties Were Used on the Cut-Off

Where track was abandoned in brick-paved street the ties were left in place and the space previously occupied by the rail was brick paved. Track in macadam street was jacked out whole.

The cut-off has a length of 3,066 ft. It was built on the old tow path where possible, this being widened to accommodate double track. In other parts it was



Plan of Passenger and Freight Station, Standard for Certain Types of Station on R. & S. R.R.



New and Old Routes of the Rochester and Syracuse, Through Lyons, N. Y.

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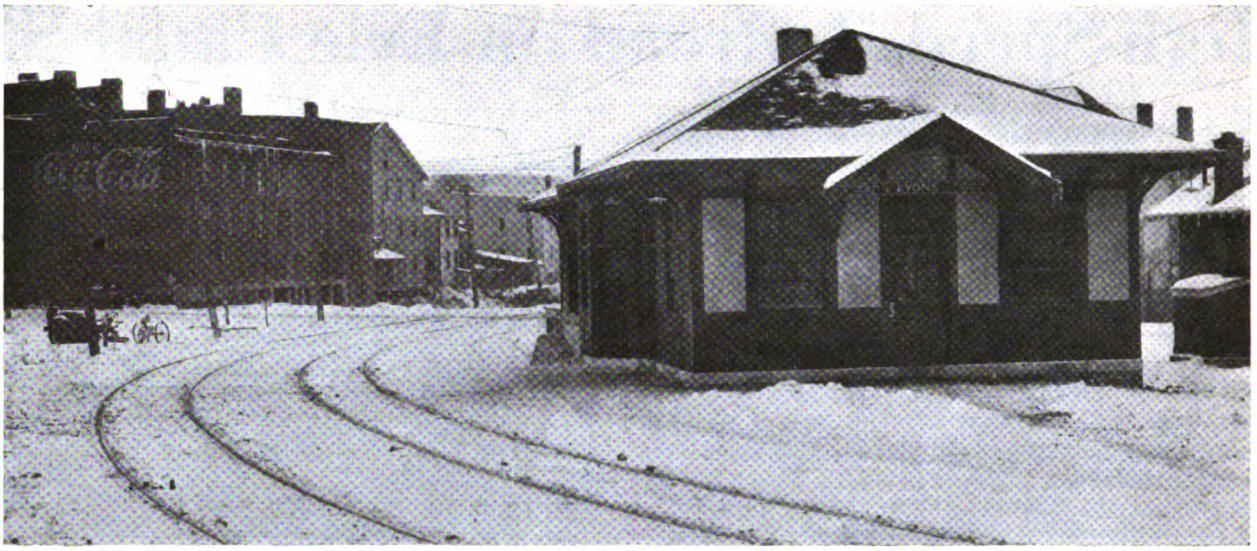
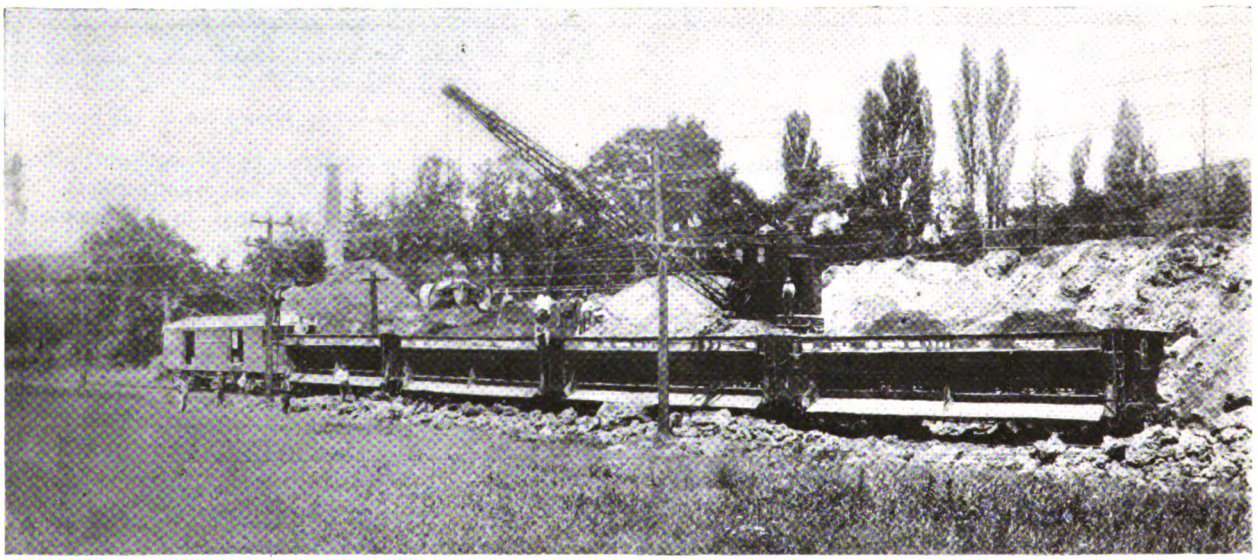
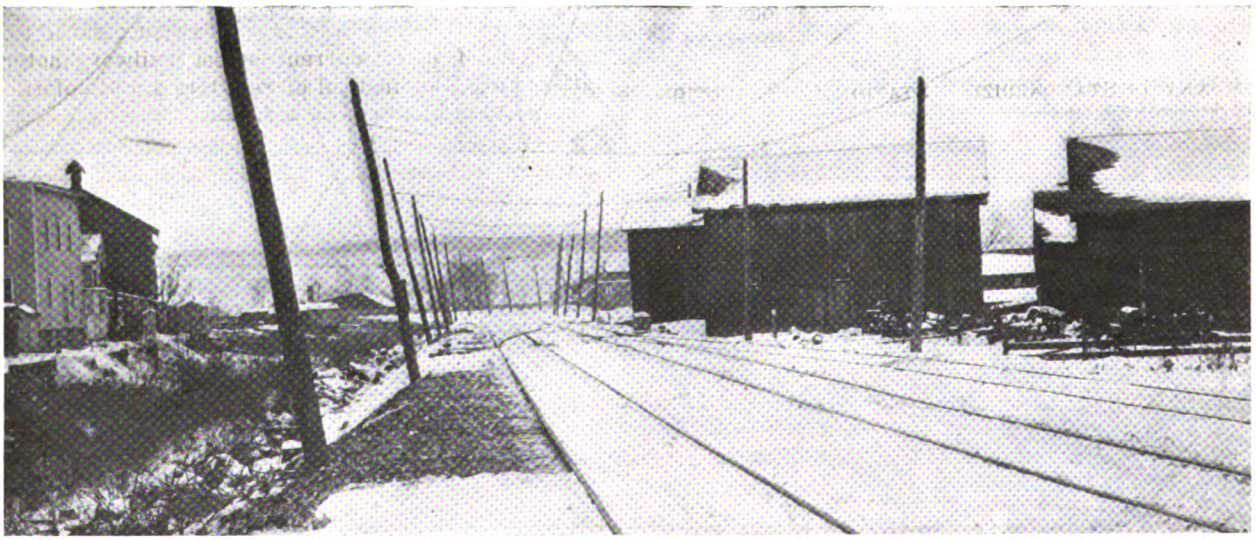


New Station on Lyons Cut-Off, Rochester & Syracuse Railroad



Filling Ballast Cars at Lyons Power Plant with Cinder for the Cut-Off Fill



Lyons Cut-Off on Site of Erie Canal, from Point near New Station. Part of Old Canal Bed Visible at Left.

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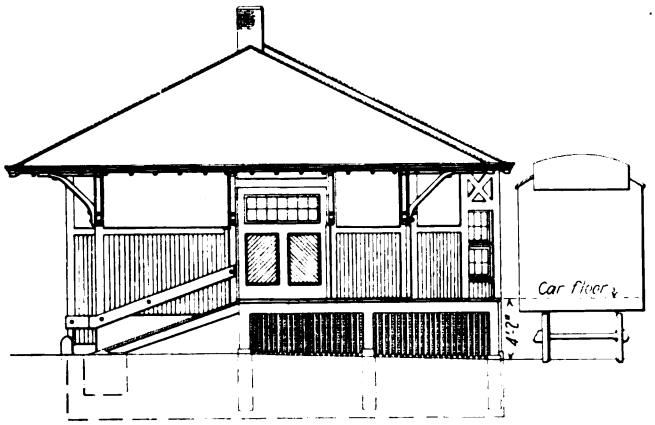
necessary to make a new fill, the deepest fill, 15 ft., being between Church and Water Streets.

For the fill a total of 12,000 cu.yd. of cinder and 3,000 cu.yd. of earth was required. Fortunately for the proposition there had accumulated at the company's power house in Lyons, not far from the cut-off, an ample supply of cinder. This was hauled to the canal site in ballast cars which had been rented from the Goodwin Car Company, near Chicago, at a rental of $4 per day on a six-month contract. These cars, of which four were rented, have a capacity of 35 cu.yd. each. They



Rear Elevation of Rochester & Syracuse Standard Freight and Passenger Station, Showing Position of Freight Car

were used for general ballasting during the summer, as well as for the Lyons cut-off. These cars were supplemented by four 80,000-lb. hopper cars which the railway company purchased.

The ties used on the cut-off were part of a lot of 35,000 yellow pine ties purchased for the season's work from Eppinger & Russell, Jacksonville, Fla. They were impregnated with creosote oil to the extent of 10 lb. per tie. They were brought by steamer and barge, and the total cost delivered on the storage piles was about $1.50 each. The number required in the construction of the cut-off was 3,500.

The track was laid in part with old 90-lb. A. S. C. E. rails which the company had on hand, but the ends of these were cut off by means of an acetylene torch, and new bolt holes for the angle plates were punched. The balance of the track was laid with new 70-lb. rails.

COMPANY IS STANDARDIZING STATION CONSTRUCTION

The new freight and passenger station, which was part of the cut-off improvement, followed in design the standards which have been developed by the company. Experience has been utilized to produce a station which combines general convenience, attractiveness and low cost. Part of the drawings of the standard station are reproduced. A slight modification from the plan was necessary here in the freight section on account of the curvature of the track.

There is no cellar under the building, but the ground under the freight section is left 6 in. higher than grade to insure good drainage. Under the passenger section a 4-in. excavation is made, to be filled in with cinder as a foundation for a concrete sub-floor. The foundations are of concrete with ¼-in. to 1½-in. crushed stone aggregate, whereas the sizes for facings and concrete floor are ¼ in. to ½ in. Water table and sills are of local limestone. The concrete for foundation walls, piers and footings is one part cement, two and one-half sand and five stone, with a barrel of cement to the cubic yard.

The outside of the building is sheathed with 8-in. boards, covered with building paper and with a half-timbered roughcast finish above and ceiling below. Inside, the passenger station is finished in plain red oak, with plastering above and wainscoting below. The main floor is laid with white maple on 2-in. x 4-in. hemlock stringers.

To insure dryness in the passenger station, the floor is laid on a waterproof foundation. As already mentioned, there is a layer of tamped cinders on the ground. On this is laid a 4-in. layer of concrete with coarse aggregate and a 1-in. finishing layer. Just before the wood floor is laid two layers of two-ply roofing felt are applied to this, each having a coating of coal-tar pitch throughout. The damp-proofing is carried 6 in. up the walls.

In the freight house the floor is of 2-in. matched Georgia pine. It is carried on the side walls and a row of center columns spaced 10 ft. on centers, by means of heavy pine timbers.

The cost of construction of the passenger station was approximately $10,000 and that of the total improvement approximately $40,000.

A.-C. Locomotive Control

Review of Plans Used for Varying Voltage in European Single-Phase Locomotives, Leading Up to Account of Inductive Regulator with Brush Shift

BY DR. IVAN DÖRY
Manager Pöge Elektricitäts Gesellschaft, Chemnitz, Germany

THE speed regulation of modern alternating-current locomotives is difficult due to the great size of the motors (up to 3,000 hp.) which are employed. These have to be controlled with easy gradations of voltage and current; the control system must be capable of providing interlocks, and the operation of the motors must be sparkless. The efforts to develop a control which fulfills these requirements have led to a great variety of design.

For locomotives of small capacity, the usual type of controller, which has proved so successful for the operation of direct-current street railway motors, is satisfactory, but instead of resistors for regulating the current a multi-step transformer is employed. For great capacities, however, such a controller would be unwieldy and difficult to operate; hence in large locomotives the switching of the actual operating current is removed from the controller and given over to special individual switches or contactors. The operating controller thus becomes a master controller, and the drum control is replaced by contactor control.

This arrangement permits the easy handling of large currents in many steps and the contactors can be placed in any convenient location. The master controller has to switch only a small current, it is convenient and it can be operated easily. The contactor control is, therefore, suitable for many railway requirements. It, however, lacks the interlocking feature, that is, there is no guarantee that the contactors obey the master controller, and, although many interlocking contacts are provided, a full interlocking can never be reached.

Attempts have been made to simplify contactor con-

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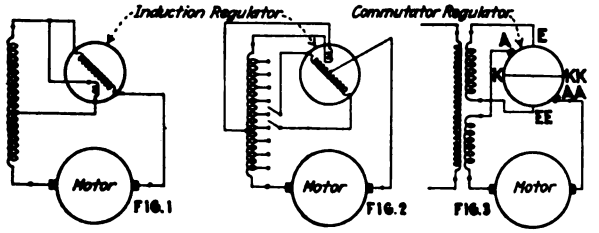
trol by reducing the size and number of the contactors. The start in this direction was made by the development of the simple voltage divider (or voltage splitter). For example, the Siemens-Schuckert Works employed a triple voltage divider on the I-C-I express locomotives for the Prussian railroads. The Westinghouse Company, the Bergmann Works and the Swedish Almänna went even to four, six and more subdivisions of voltage.

The first use of an auxiliary transformer originated with B. G. Lamme, this arrangement requiring only half



Diagrams Showing Steps in the Development of the Induction Regulator as Applied to the Control of Voltage for Use on Single-Phase Locomotives.

Fig. 1—Induction regulator arranged for buck-and-boost connection.
Fig. 2—Induction regulator combined with step transformer.
Fig. 3—Induction regulator with commutator and arrangement for shifting brushes.

as many contactors in steps. The A. E. G. (Allgemeine Elektricitäts Gesellschaft) built the auxiliary transformer as a two-winding transformer, and the author went a step further and provided for further connections on the primary turns of the auxiliary transformer and also for regulation on the secondary winding.

The Oerlikon Works built for the C + C type Lötschberg locomotive the contactors in the form of a drum located above the transformer, operated by a remotely controlled ratchet mechanism. The advantages of a hand-operated control led Brown-Boveri & Company to the design of a straight contact row arrangement similar to a storage battery cell switch, avoiding short circuiting of adjacent contacts through the brush by splitting the latter and using a switching resistor.

Induction Regulator Found Impracticable

To avoid difficulties with arcing, Prof. R. Richter suggested the use of an induction regulator, but with the usual "buck-and-boost" connection (see Fig. 1) the required output and, therefore, the weight of the regulator render its use impracticable. He combined the regulator with a step transformer, reducing the necessary weight of the regulator. Finally, Professor Richter combined the switches in a drum coupled to the regulator in such a manner that it can be connected to the transformer only at the instant, when the position of the regulator is such that there will be zero voltage between the switch contacts (see Fig. 2). This system worked out well in service, but there are mechanical difficulties regarding the motor drive of the regulator.

The principle of brush shifting is another attractive possibility in motor control, because it gives easy gradations of control, easily controls heavy current, and is absolutely interlocked. Unfortunately, this principle of motor control is principally applicable in the repulsion motor.

For such reasons as those mentioned the induction regulator and the shifting of brushes have had to give way largely to the contactor control, but the efforts to use them brought about further improvements in large contactors. The primary consideration with regard to regulators and brush shifting seem to be: The regulator in its usual form has to have an air gap, which results in a low power factor. The regulator requires a motor drive to overcome its torque. The brush shifting method is applicable principally to the repulsion motor, whereas the series motor suffers if brush shifting is applied to it.

It is possible, however, to combine the advantages of the regulator with those of brush shifting, by equipping the regulator with a commutator and changing its voltage by shifting its brushes. The brushes may be shifted by hand, and the regulator may be designed without bearings and air gap. In this case the brushes are shifted upon the commutator of the regulator, not upon the commutator of the motor, insuring the advantages of a permanent brush position in the latter.

Fig. 4 shows an example of such a regulator with brush shifting, as built at the Pöge Works. The commutator winding of the regulator is fed from the points *E-EE* shown in the diagram Fig. 3. The variable operating voltage is taken from the adjustable brushes *A-AA*. The common commutator winding may also be used as a compensating winding, if it is short circuited along the axis *K-KK*, electrically less than 90 deg. from the axis of excitation. The regulator is connected to one-half of the low-voltage winding of the transformer, while the other half of this winding is in series with the adjustable brushes and the variable operating voltage. No switches are used.

Regulator Consists of a Stationary Transformer with Annular Iron Core

The regulator as shown is designed for a locomotive output of 1,600 hp. continuous load. It is a stationary transformer with an annular iron core. The upper surface of its winding is built like a commutator. A sturdy

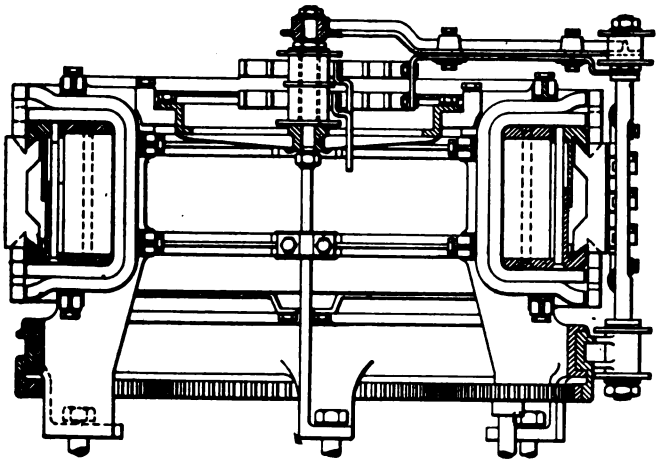


Fig. 4—Cross-Section of Induction Regulator Shown Diagrammatically in Fig. 3

iron ring, placed upon columns, supports the laminated core. The commutator is solidly connected to this core, and the winding is braced to make it short-circuit-proof. The brush apparatus is attached to the regulator column. The drawing shows the regulator standing upright. It may be altered by laying it on its side.

This method of control will soon be employed for some new German locomotives, as was stated in an article in a recent issue of the *Elektrotechnische Zeitschrift.*

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Boston Transit Conditions Analyzed

Massachusetts Commission Recommends Boston Elevated Railway Extensions, Continuation of Present Fare Policy and Restrictions on Use of Automobiles in Congested Streets

ON JAN. 2 the Department of Public Utilities of Massachusetts submitted a special report to the Legislature on a number of special topics relating to local transportation facilities on which its opinion had been requested. These topics may be summarized as follows: (1) How to provide better transportation facilities between Boston and certain suburbs, particularly Chelsea, Hyde Park and Mattapan; (2) fares and financial condition of the Boston Elevated Railway; (3) co-ordination of the existing carrier facilities in the metropolitan district.

Extension of Facilities North and South

The question of the service north centers about the fact that the Eastern Massachusetts Street Railway enters Boston through Chelsea and Charleston and then over two drawbridges to Scollay Square, while part of this same territory is also served by the Boston Elevated Railway, which enters Boston through the East Boston tunnel. The latter line gives transfers to other Boston Elevated lines, whereas this is not done by the Eastern Massachusetts cars, so that there is seemingly some discrimination between the territories served. To remove this the commission recommends that the service be given by the Boston Elevated, and that about 30 miles of the Eastern Massachusetts Street Railway in Chelsea, Revere and East Boston be purchased by a political subdivision of the State to be known as the Metropolitan Transportation District, and then leased to the Boston Elevated. Somewhat the same recommendation is made for certain lines in the Hyde Park District to the south, except that in that case the city of Boston is suggested as the purchaser from the Eastern Massachusetts Street Railway, the property to be leased to the Boston Elevated, and for the purchase by the city of the Shawmut branch of the New Haven Railroad, a short spur about 5 miles in length, whose passenger business, in the opinion of the commission, could be operated to better advantage by the Boston Elevated Railway.

Economic Discussion of Boston Elevated System

As the Boston Elevated Railway is operated by public trustees, the state has a direct interest in the matter of economical service and fares. The commission points out that the investment in the system is about $141,000,000, of which $44,000,000 was supplied by Boston and Massachusetts for the construction or purchase of the subways which are leased to the company. The rest of the investment in the property was provided by private capital.

There are 9,000 employees, of which the motormen, conductors and station employees number 4,700. The basic fare is 10 cents, but there are a number of 5-cent lines, increasing in number. The following are average fares at the dates mentioned: Year ended June 30, 1921, 9.820 cents; last six months of 1921, 9.349 cents; first six months of 1922, 9.009 cents; quarter ended September, 1922, 8.883 cents; November, 1922, 8.802 cents.

The maximum wage rate for motormen and conductors increased from 30.5 cents in April, 1914, to 70 cents in the fourteen months from May 1, 1920, to July 1, 1921. During the first half of 1922 the maximum rate was 65 cents an hour. Statistics are given of other items of cost which have gone up in similar proportion. Thus coal, which cost $3.28 per gross ton at the power station wharf in 1914, went up to $10.24 in 1920. In 1921 the figure was $6.48.

TABLE I—SUMMARY OF PROPERTY ON WHICH DEPRECIATION CHARGE WAS BASED, BOSTON ELEVATED RAILWAY, DEC. 31, 1921

Description	Value of Property	Est. Life	Per Cent Yearly Dep.	Amount of Yearly Depreciation
Railway machinery and tools	$148,099.22	10	10	$14,908.92
Tunnels and subway equipment	514,447.76	25	4	20,577.91
Elevated structure and foundation	17,606,517.79	75	1⅓	234,753.56
Bridges, trestles and culverts	122,357.56	25	4	4,894.30
	1,663,122.18	75	1⅓	22,174.96
Signals and int. apparatus	858,598.14	20	5	42,929.90
Telephone and telegraph lines	36,472.76	20	5	1,923.64
Shops and carhouses	4,123,455.64	40	2½	103,086.38
Stations and miscellaneous buildings	3,543,908.55	50	2	70,878.17
Wharves and docks	39,378.95	50	2	787.58
Cars and electrical equipment	16,948,107.54	20	5	847,405.38
Shop equipment	536,870.41	20	5	26,843.52
Furniture, office appliance, station fare boxes, etc	75,621.23	20	5	3,781.06
Automobiles and trucks	237,487.65	5	20	47,497.53
Horses and road machines	492,104.33	10	10	49,210.43
Power plant buildings	5,113,335.19	40	2½	127,833.38
Substation buildings	510,579.55	40	2½	12,764.49
Power plant equipment	7,107,623.15	15	6⅔	473,841.54
Substation equipment	1,517,544.94	15	6⅔	101,169.66
Poles and fixtures	712,637.78	30	3⅓	23,754.57
Underground conduits	1,583,824.03	50	2	31,676.48
Distribution system	3,952,011.38	30	3⅓	131,733.70
Transmission system	959,964.30	30	3⅓	31,998.80
Tremont street subway-line equipment	85,487.37	30	3⅓	2,849.57
	$68,489,557.40			$2,429,176.43
Allowance to provide for track the use of which may be discontinued				75,000.00
Total yearly accrual to provide for depreciation, obsolescence and losses in respect to property sold, destroyed or abandoned				$2,504,176.40

The amounts charged off for depreciation have also been increased. For the three years previous to the acquisition of the property by the state trustees, the amounts allowed had averaged a little over $300,000 a year. Table I gives the basis used by trustees for determining the depreciation charge. In consideration of this summary and the detail tables accompanying, the trustees determined that the amount of $2,004,000 per year should be charged to depreciation. In fixing the amount for depreciation, the property excluded from consideration was that listed as obsolete, not used, or non-depreciable (like land) and that older than the estimated life. The value of this property aggregated $26,351,872. On an investment in road and equipment of $94,841,429, the company made during the year ended June 30, 1922, expenditures for maintenance of way and structures and equipment of $5,286,949, besides the allowance for depreciation of $2,004,000. Thus the total for maintenance and depreciation during this period was $7,290,949. Comparison of this depreciation allowance with that of other companies, as given in the report, is shown in Table III.

The total expenditures made by the company for improvements and charged to capital account since July 1, 1918, were as shown in Table II.

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The commission then points out that if the company was required to introduce a 5-cent fare over all of its lines, the deficit, which would amount to from $10,000,000 to $12,000,000 a year, could be made up only from taxation. It adds that while low-priced local transportation admittedly is a good thing for a community, if this plan of defraying part of the cost from taxation should be followed, it would be difficult to say where it should end. It is hard to say that transportation is any more vital to the well being of a community than electricity, water and gas, or the principle might be applied to housing, fuel, food, clothing, etc. The commission does not think that the state should assume this burden and believes it to be the wiser policy for people to pay for what they get when they receive it. It is argued, it is true, that as automobile riding increases car riding will diminish and car fares will increase, and that is very unjust to those who have to ride in street cars, but the commission believes that the automobile question is a problem which should be dealt with and solved as such. The time has come, in its opinion, when the expenses which the automobiles impose on the community ought to be paid by them, and the commission is therefore all the more opposed to any suggestion which looks like burying these expenses still further in the general tax rate.

TABLE II—EXPENDITURES ON ROAD AND EQUIPMENT, BOSTON ELEVATED, JULY 1, 1918, TO SEPT 1, 1922

Elevated structures and appurtenances	$770,257.97
Surface lines	2,384,822.46
Car houses and shops	1,515,669.66
Power houses and transmission of electricity	2,297,660.01
Cars	7,583,149.14
Miscellaneous	279,702.58
Total	$14,831,261.82

Several bills presented to the Legislature last year provided that the common stock of the Boston Elevated Railway Company should be purchased by the state or one or more of its subdivisions, so as to become publicly owned. This stock aggregates $23,879,400 par value and now receives a dividend of 6 per cent per annum. All of the securities aggregate nearly $100,000,000. The various subways are publicly owned now, and this seems to be going far enough in the direction of public ownership, and the commission recommends that the present status be given a longer test.

Another suggestion is that subway rentals should be remitted for the future on the plea that the subways are nothing but underground highways and hence should be free. The remission of these rentals would amount to about $2,000,000 a year. This would benefit the car rider materially, but the commission does not recommend it, however. In the first place, it would increase the tax rate. Then, the same arguments apply also to the elevated structures, which are nothing but overhead highways. The better plan is to follow the opposite policy, i.e., to require the street railways to pay for the subways, tunnels, elevated structures, etc., and have other vehicular traffic, especially automobiles, pay a fair sum for their use of the highways. For similar reasons the commission does not approve the suggestion of remitting the corporate taxes of the Boston Elevated Railway Company.

The commission was requested also to investigate the transportation service and facilities within the metropolitan district, and whether the different means could be co-ordinated. A study was made, and a central planning body able to develop plans for the future along comprehensive lines for the relief of congestion, together with provision for the proper distribution of the cost thereof, was recommended. The commission finds that the greatly extended use of automobiles has created a serious situation which requires immediate study and prompt relief.

The motor truck, owing to free use of the roads, has been seriously injuring the steam railroads, and also greatly increasing the maintenance cost of the roads to the injury of the public. It should be made to pay properly for its use of the highways. The passenger automobile also seriously affects the receipts of the railroads and the street railways. Interurban traffic on street railways in many localities is moribund. Besides this, the automobile has become the biggest electric railway hazard and costs street railway companies large sums in safety measures and in suits.

Automobile travel also affects injuriously street railways in other ways. Thus, it was recently suggested that the Harvard Square subway entrance should be removed at a substantial cost to the railway to make this square safer for rerouting automobiles. Petitioners have asked that one-man cars in Malden be prohibited because of the congestion due to these cars and the unrestricted parking of automobiles. In Boston the street congestion is such that unless some effective restriction of traffic in the center of the city is adopted, tunnels and additional highways will have to be built for motor and other vehicular traffic, and foot travel is slow and dangerous.

The commission sees no alternative except that such tunnels and additional highways should be built or else that areas should be created in the heart of Boston from which all automobiles are excluded, except for certain business purposes or during certain hours of the day, and the latter course is the one which should be carefully considered. Such a course would probably mean congestion in traffic and parking outside this restricted area, so that the matter should be considered as a Metropolitan District matter. On this general subject the commission recommends the creation of a division of metropolitan planning of the Metropolitan District Commission, to consider among other things (1) proper compensation for the use of highways and bridges by motor vehicles; (2) the creation of areas in congested districts from which motor vehicles would be excluded wholly or partially; (3) the subjection of operators of motor trucks for hire to the jurisdiction of this department to the same extent and in the same manner as other well-recognized common carriers.

TABLE III—COMPARISON OF DEPRECIATION ALLOWANCE YEAR ENDED DEC. 31, 1921

	Depreciation	Revenue Car-Miles	Road and Equipment Expenditures	Railway Operating Revenues	Per Car-Mile, Cents	Per Cent of Investment in Road and Equipment	Per Cent of Railway Operating Revenue
Capital Traction Company, Washington, D. C.	$340,693*	9,750,116	$19,097,224	$5,501,200	3.5	1.7	6.2
Milwaukee Electric Railway & Light Company	1,162,132	22,149,606	15,030,126	9,573,885	5.2	7.7	12.1
Chicago Surface Lines	4,827,498	118,446,044	160,610,560	60,205,794	4.1	3.0	8.0
United Railways & Electric Company of Baltimore	816,600	35,708,800	78,743,000	16,332,800	2.3	1.0	4.9
Boston Elevated Railway	2,004,000	49,804,625	95,991,673	32,853,053	4.0	2.1	6.0
Public Service Railway, Newark, N. J.	1,092,664	57,496,974	.....	26,031,601	1.9	...	4.2

* On 3 per cent sinking fund basis. If on a straight line basis charge would be $470,777.99.

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"By the Elevated Lines"

IN THE expansion of its publicity work the Chicago Elevated Railroads is utilizing hand-painted bulletin boards, the reproductions of which above merely indicate the subject portrayed, for a photograph cannot bring out the contrast and art of the original. The six views shown have been placed in twenty-five different locations about Chicago, principally in the outlying districts within a short radius of the elevated where people can use the service but where the structure is not in view. The purpose is to get people talking about the posters as a work of art and in so doing have them naturally form a favorable opinion of an advertiser who uses such high-class copy in appealing to the traveling public.

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Collecting Five and Ten-Cent Fares

This Problem Has Been Worked Out in Several Ways in Boston, Depending Upon the Kind of Terminal Station and the Service Given—Problem Is Not a Simple One

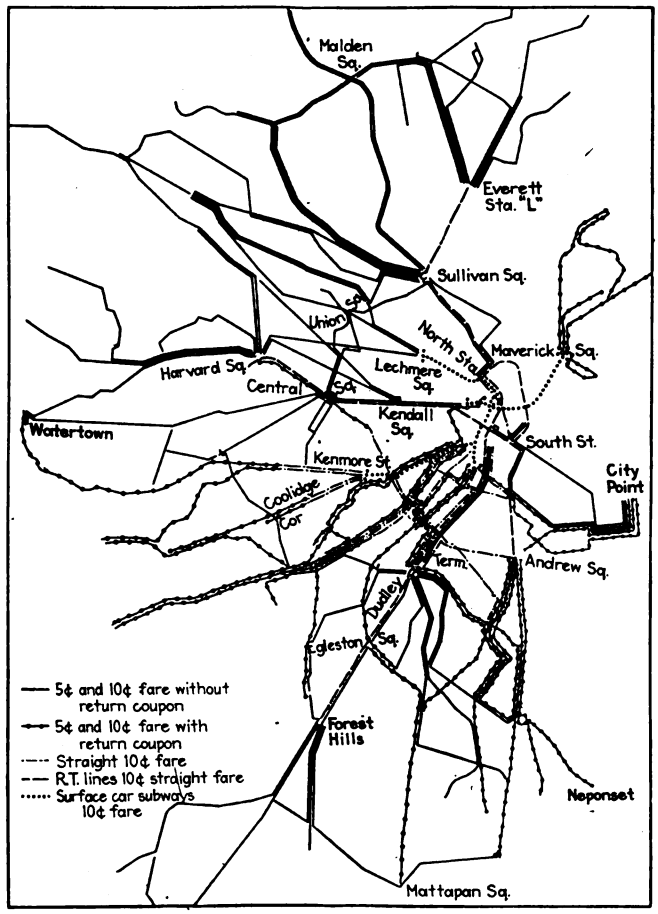
READERS of this paper generally are familiar with the principles of the Boston Elevated Railway's fare system. From July 10, 1919, up to the spring of 1921 the fare was 10 cents, but beginning with April of 1921 a system of 5-cent fares for local rides was established in the suburbs. Within Boston, however, with the exception of one or two short lines and between Boston and all of its suburbs except South Boston and Charlestown, the fare remained 10 cents.

The general arrangement of the lines of the Boston Elevated Railway facilitates the collection of these two fares reasonably well because most of the traffic entering Boston does so through the terminal stations of the rapid transit divisions of the Boston Elevated Railway at Andrew Square, Dudley Street, Harvard Square, Kendall Square, Lechmere Square, Sullivan Square and Everett Square. At each of these points passengers going to Boston from points farther out change from a surface car to a rapid transit line so that each of these points forms a logical zone limit. Moreover, at most of these points there is a prepayment area where passengers formerly, when a flat fare was charged, transferred directly between surface and rapid transit cars. With the introduction of the 5-cent fare for suburban rides, therefore, these prepayment areas proved most useful in separating the 5-cent and the 10-cent passengers. Actually the problem is not so simple as this, because all of the suburban surface cars do not run into prepayment stations where there are inclosed areas into which the passengers can unload.

At places where these prepayment areas exist, as at Everett Station, Sullivan Square Station, Harvard Station, Dudley Station, Forest Hill Station and Lechmere Station, local passengers in inbound cars pay 5 cents on leaving if they get off before they reach the prepayment station. Otherwise, they drop 10 cents in the fare box on the rapid transit platform after they leave the surface car and as they enter the rapid transit station. Local passengers on outbound surface cars pay 5 cents on entering the car.

A second condition exists where surface lines run to rapid transit terminals in the suburbs where it was not feasible to provide inclosures and collect the fares when the passengers leave the surface cars. In this case all inbound passengers pay a 10-cent fare, but if a passenger expects to leave the surface car before he reaches the prepayment station he asks for a "warrant," which entitles him when he leaves the car to a "return coupon." This is good for an outbound local fare within a period ranging from ten to forty days, so that the local fare is virtually 5 cents each way. It should be remembered that a considerable number of these local cars in the suburban areas are operated by one man.

According to the rule under which the 5-cent fare was extended to the suburban districts, the fare applies only to rides where a transfer is not used. Hence, warrants are not given except in certain specified cases



Map of Boston Showing Lines Classified as to Fare

where the local passenger offers a transfer to the conductor.

This system is used for cars running to Maverick Square, Andrew Square, Egleston Station, Broadway Station, for certain lines to Dudley Station and at a few other points.

Finally, there is another situation where lines do not run to prepayment stations but where it is practicable for both kinds of fares to be paid on the cars. This applies to most of the lines running to Kendall Square and Central Square in Cambridge, the line from South Boston to Dewey Square and Rowe's Wharf, the line between South Station and North Station and one or two others. In these cases the 5-cent fare entitles the passenger to a ride as far as the car goes, whereas a 10-cent fare entitles him to a transfer to some other surface car or the rapid transit system.

Reproductions of a typical warrant and a return coupon are shown herewith.

TRANSFERS NOT PUNCHED ON TRIP

The Boston Elevated Railway has a number of forms of transfers for different conditions, but the most common form is that illustrated on page 205. This transfer was put into use on Division 2 on Nov. 1 and

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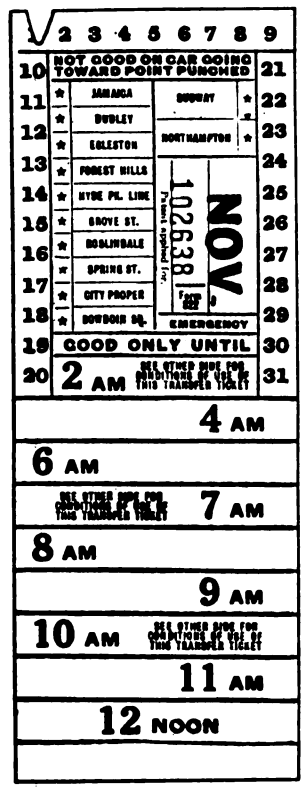
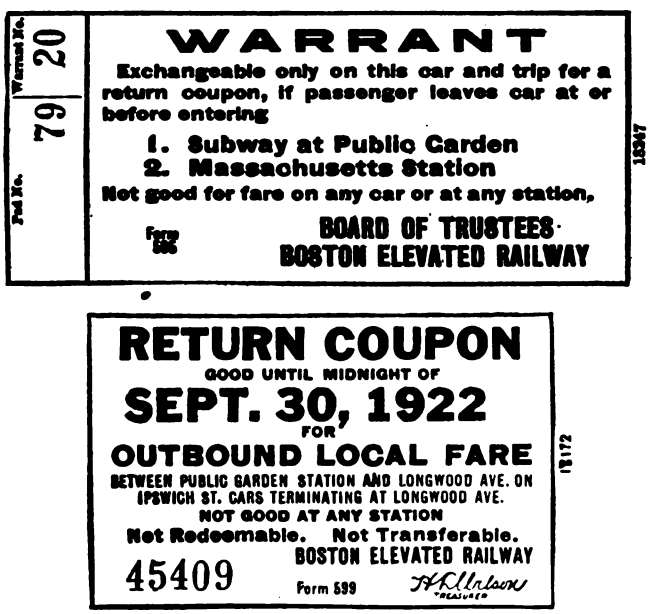
will probably be put into use on the other divisions shortly. It is a modification of the form shown in the ELECTRIC RAILWAY JOURNAL for Aug. 26, 1922. The chief feature of this transfer is, of course, the method of indicating the hour of issue by tearing off the transfer at the proper line. This enables the conductor to issue the transfer without punching the time. It has also been possible to dispense with the punch for the route on which the transfer is good by making it good on all routes except the route which would take the passenger back to his starting point, and this is indicated by a punch made by the conductor before starting on his trip. The transfers have the month printed on the face of the check, in red, and the days of the month from 1 to 31 printed around the edge. The transfer is punched for the day of the month at the carhouse before it is issued to the conductor. To facilitate the proper use of the transfer it is stapled at the bottom, so that the pad carries the stubs as well as the transfers not issued.



Present Standard Form of Boston A.M. Transfer. No Punching on Car Is Required

The company varies the colors of its transfers with the division at which they are employed so that there is less chance for their improper use. Thus on one division it will issue straw paper for a.m. and mandarin paper for p.m., and on another division lilac for a.m. and green for p.m. It also distinguishes the transfers issued by the rapid transit lines from those issued by the surface lines by printing them with red ink, while those of the surface lines are printed in black ink.



The Local Suburban Passenger Receives a Warrant When He Pays His 10-Cent Fare and Exchanges This Warrant for a Return Ticket if He Leaves the Car Within the 5-Cent Limit

All transfers received from passengers are turned in at the carhouses, where they are counted by a tickometer. These machines are very rapid. The transfers are then sent to the treasurer's office.

Coin-counting machines are also used extensively in the treasurer's office, the type employed being the Sattley, which not only counts but wraps the coins. The locked fare boxes are collected every morning by auto truck, and as there are very few pennies in them these are first taken out by hand. This leaves only the nickels and dimes, and each counting and wrapping machine can count $2,500 worth and wrap them in an hour.

From the machine the wrapped coins are put in bags and the bags are checked by weighing them before they are sent to the bank. Roughly speaking, one-half of the receipts a day are received in locked fare boxes and one-half through station agents or in recording boxes.

All used transfers are canceled by a macerator which is operated by one man, who also bales the macerated tickets. Macerated tickets are then sold as waste paper for $20 a ton.

Fifteen Million People Live in Zoned Cities

MORE than 15,000,000 people live in zoned cities, towns and villages, according to information made public recently by the Division of Building and Housing of the Department of Commerce. Zoning regulations provide, by a neighborly kind of agreement, that a city or town shall be divided into districts in which the uses for which structures may be built, their maximum height and the area of the lot which they may cover are established. In line with the zoning plan, certain districts are set aside for residences, for apartment houses, for office buildings and for manufacturing.

During 1922 zoning spread especially rapidly in smaller places. Fourteen towns with five to ten thousand inhabitants were zoned during the year, bringing the total zoned towns in this class to twenty-three. Twelve places with 5,000 inhabitants or less were added to the list in 1922, bringing the total in that class to seventeen. The percentage of large cities which have already zoned remains much greater, of course, and of the fifty largest cities in the country, twenty-two have zoning ordinances in effect. New York has been zoned since 1916, and 81 per cent of the urban population of New York State lives in zoned municipalities. California ranks second among the states with 71 per cent of her urban population zoned; Minnesota, third, with 58 per cent; New Jersey, fourth, with 57 per cent; and Utah, fifth, with 55 per cent. The entire District of Columbia is zoned.

The electric railways of New York City will show a net profit for the present fiscal year, which ends June 30 next, according to a report of the statistical department of the Transit Commission. The conclusion is arrived at by analysis of the reports of the various companies for November, 1922. The result for all companies for November was a profit of $61,696, an increase of $170,170 over the same month in 1921. The winter season is proving a profitable one for the rapid transit lines of the dual system. The Interborough Rapid Transit Company earned a net profit of $58,164 and the New York Consolidated Railroad $104,248.

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Association News & Discussions

New York Association Holds Midyear Meeting

Delegates Discuss the Weekly Pass, Lubrication of Railway Motors, Motor Vehicle Regulation and the Installation and Cost of Catenary Systems in a One-Day Session in New York

THE regular midyear meeting of the New York Electric Railway Association was held at the Commodore Hotel, New York, on Jan. 25, 1923. There were morning and afternoon sessions and in the evening a banquet. A short account of the meeting was published in the last issue of this paper. B. E. Tilton, president of the association and vice-president and general manager New York State Railways (Syracuse lines), presided at all three sessions.

THE WEEKLY PASS

The first paper was that on the "Selling Principle of the Weekly Pass," by Walter Jackson, Mount Vernon, N. Y. This was printed in abstract in last week's issue.

Mr. Jackson, before presenting the paper, gave some further particulars in regard to the pass. He said that one British road had just decided to put in the pass. Up to this time, the form of pass or commutation ticket sold abroad has been for such long periods that only the wealthiest patrons could afford to buy the cheapest form of transportation. While the pass permits unlimited service, the objections which apply to the supply of unlimited service by any other municipal utility do not apply to an electric railway. With a gas or water company a man could turn on all the cocks in his house and go to the ball game. The railway pass, however, requires the time of the owner to be of value. In Chicago it has been found that a pass traveler rides about twenty-two times a week. In a city of from 50,000 to 75,000 inhabitants, the passholder would ride a larger number of times because he would go home to lunch, but there is of course a limit to its use in any city, and practically all use except two rides a day will have to be in the off-peak hours.

It is desirable to make the pass as convenient as possible for customers to buy it and use it. For this reason the usual form in which it is sold is better than if a punch card is used, as on some roads, because with the latter the customer naturally will endeavor to figure with each pass purchased whether he is ahead or behind the company at the end of the period. Moreover, punching requires the time of the conductor or operator. The speaker recommended that the number of pass riders be registered, but all companies do not do this. Where it is done, it is done on an old register or on a counter used for registering telephone calls. Such a counter can be purchased for about $3.50. Several companies check pass rides at intervals. A record of the number of the pass rides is helpful to prove to a regulating commission that the average rate given by the railway is low. Then, where a fare complaint is made, it is provable that the complainant is a cash rider and consequently not a regular rider.

In connection with his paper Mr. Jackson showed various window and other posters which had been prepared for use in Chicago and elsewhere to assist in the sale of the pass. In many cases the poster incidentally advertised the local movies, theaters, art museums, ballgrounds, etc., in explaining how a passholder could reach these resorts in the evening without additional fare. This has created a great deal of good will and had led to reciprocal courtesy on the part of these institutions or enterprises. Some of the posters prepared for the Chicago Elevated Lines were particularly attractive. (The ELECTRIC RAILWAY JOURNAL has prepared a page illustrating these posters. This page is shown elsewhere in this issue.)

DISCUSSION ON PASS

The first discussion on the pass was a letter received from Samuel W. Greenland, vice-president and general manager Indiana Service Corporation, Fort Wayne, Ind. The letter was read by Clinton E. Morgan, Brooklyn City Railroad.

Mr. Greenland's letter contains a tabulation by weeks from Jan. 1, 1921, to Jan. 14, 1923, of the city line earnings with the number of passes sold. Passes were put on sale for the first time in the week ended March 5, 1922, and up to that time nearly every week in the year had shown a decrease in gross receipts over the corresponding week in the previous year. Beginning with the second week of the pass, however, the condition changed, and only one week since that time shows a decrease over the corresponding week of the previous year. The number of passes sold have gradually been increasing from 2,967 during the first week to 6,954 in the forty-seventh week. In addition, the letter from Mr. Greenland said in part:

We estimate twenty-five rides per week per passholder. This, we think, is quite conservative, and it is possible that this number should reach as high as thirty rides per week.

Our present fare is now and has been since before the pass was introduced 7 cents cash, 6½ cents for tokens, and the pass sells for $1 a week. In analyzing our revenues for the last seven weeks of 1922, we find the revenues divided as follows: Cash, 11.45 per cent; tokens, 51.29 per cent; passes, 27.26 per cent.

In our opinion the pass has done more to improve our relationship situation than anything that has been done on our property, and I am very frank to say that we have not at any time had any criticism of the pass or its operation. On the contrary, we believe it has made innumerable friends for us and our service. We operate about 45 miles of track in Fort Wayne, and 100 per cent one-man cars, and are continuing to advertise the pass practically every week, using the car card method.

We pave and maintain the pavement between our rails and for 1 ft. on either side, and have not at any time had any jitney competition. The operation of such competitive service, we believe, has been forestalled by the furnishing of frequent headways on all of our lines, by the use of the one-man car.

THE PASS IN BEAVER VALLEY

W. H. Boyce, general manager of the Beaver Valley Traction Company, New Brighton, Pa., then told of the results obtained from the use of the weekly pass on his lines. He said they have a zone system of fare collection with a 5-cent fare for each zone. They began using the pass in February, 1922, and the revenue increased from the start. While it is somewhat difficult to say just how much of the increase is due solely to the pass, their investigation showed that for the first five months fully 70 per cent of the increased revenue was due to the sale of the pass. Passes were sold for use in one, two or three zones. As 96 per cent of the revenue came from rides of three zones or less, the three-zone pass after eight weeks was changed to one good in all zones. When a holiday occurs, the sales for that week drop off from 35 per cent to 40 per cent.

Mr. Boyce described the manner in which the school pass was introduced on his system. They charge 75 cents per week for a universal school pass good between the hours of 8 a.m. to 4:45 p.m. and the revenue from these passes now amounts to $235 per week. An advertisement for the Gas & Electric Shop is run on the backs of passes, which reduces the cost of printing. The various merchants are enthusiastic over the use of the pass and put on special sales and co-operate with the railway. The railway company spent about $300 in advertising the pass at the start but has not spent any since. Relations with the public have been made much better through the use of the pass. The railway is getting more money and putting more riders on the cars during periods of least riding.

The next speaker was E. M. Walker, general manager Terre Haute Traction

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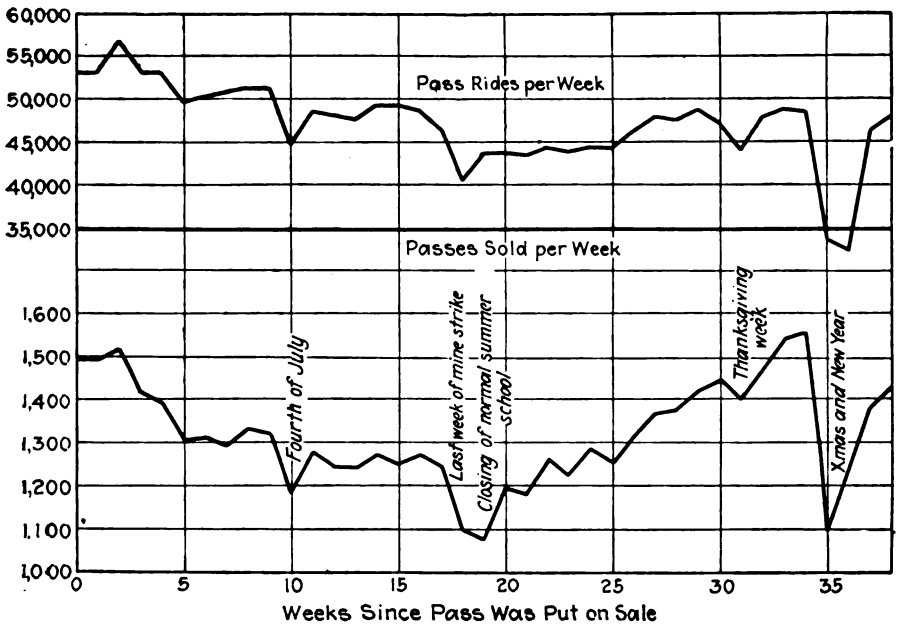

Passes Sold and Passenger Revenue in Terre Haute Since Pass Was Put on Sale (May 1, 1922)

& Light Company, who said that electric railway business conditions had changed greatly in the last ten years. Formerly, city transportation business was largely a monopoly. Now, it is highly competitive because of the private automobiles and sometimes because of jitneys. The pass is a very good means of combating both of these means of transportation and has so proved in Terre Haute. The price in Terre Haute was set at $1 a week, or equivalent to twenty rides, and the company sells about 1,500 passes a week. Mr. Walker showed a chart of the number of passes sold by weeks, pointing out that in a week with a holiday, such as Christmas, the sale of the pass drops off 30 per cent. Although other lines of business in Terre Haute had felt the effect of the coal strike, the gross earnings of the railway company have shown very little variation.

In reply to a question, Mr. Jackson gave it as his off-hand opinion that the saturation point for number of passes in a city was about 15 per cent of the total population.

Motor Lubrication

The next paper presented was "Lubricating Railway Motors," by L. M. Clark, published in abstract on page 175 of the issue of this paper for last week.

The principal discussion of Mr. Clark's paper was presented by L. J. Davis, mechanical and electrical engineer for the Brooklyn City Railroad, who said that the mechanical department of every electric railway is handicapped, in its efforts to lubricate railway motors, in a number of ways, some of which are not generally recognized. To begin with, the suppliers of lubricating oils and greases have for many years so diligently pursued the elusive oiling contract, which is generally based on the first cost of the lubricant and not on the maintenance cost of the parts lubricated or other details affected by these parts, that a magnified importance is given to the first cost of lubricant on many properties. The periodic oil report on its special form has a psychological effect on many managers which is entirely out of proportion with its real importance.

It is admittedly more difficult to analyze such items as bearing costs, gear and pinion costs, motor failures and delays to service, in their relation to the reduction in cost of lubricants than it is to accept such reductions as a mark of business acumen in the purchasing department, or managerial ability.

Suppliers of waste urge the purchase of a product whose advertised virtues are of such number as to be comparable with the latitude allowed the assembler in the selection of its constituent parts. These range from yarn made of wool to the fibrous covering of the cocoanut. These combinations of materials, whose sole virtue frequently is low first cost, are sometimes purchased and must be used.

The motor designer in his efforts to produce a lighter and lower priced product often finds that he can do so if the bearings are reduced in certain dimensions, if the armature speeds are increased, if a cheaper babbitt is used, or accessibility of lubricating details is sacrificed. The first cost is reduced but at the expense of lower lubricating efficiency and increased maintenance costs.

The truck designer, under instructions to produce a lighter and smaller truck, is sometimes forced to reduce the space allotted to the motor. This results in making the oil openings of the motor less accessible to the oiler. The car body designer endeavors to provide a low-floor car, but in doing so reduces the space between the motors and car flooring to such an extent that motor oiling on some cars has become most difficult.

These, Mr. Davis said, are some of the handicaps to successful motor lubrication. Some are the result of a misconception of efficient operation, some are due to lack of judgment as to what constitutes real economical purchasing, some to forced buying of the lowest priced product on account of financial conditions, others to the trend toward faster operation of cars and the necessity for lowered power costs.

A study of the lubrication problem on the surface cars on a large property showed that there was a considerable amount of trouble with babbitted bearings. This trouble was in a great measure due to the peening and breaking of the babbitt caused by the pounding incident to cars passing over much special work and some bad joints. It was decided to change to solid bronze bearings with no babbitt and untinned. This change is being made with satisfactory results. Reduction in the frequency of oiling of some of the older type motors was another matter which it was decided was highly desirable. It is felt that with the elimination of babbitted bearings and the installation of a new oiling device a number of the handicaps to the satisfactory lubrication of the motors on this property will be removed, thus giving better performance.

At the conclusion of Mr. Davis' discussion, C. E. Morgan of the Brooklyn City Railroad requested that Mr. Clark explain the details and theory of the vacuum oiling device which the Railway Improvement Company is marketing. Mr. Clark explained this by use of a lantern slide. A description of this device was published in the ELECTRIC RAILWAY JOURNAL for Oct. 29, 1921, page 781.

Motor Vehicle Regulation

The next paper read was one on "Fundamental Principles of State Motor Vehicle Common Carrier Regulation," presented by D. C. Fenner, chairman Motor Vehicle Conference Committee of the National Automobile Chamber of Commerce. An abstract of this paper appears elsewhere in this issue.

In calling for a discussion on this paper, Chairman Tilton said that in his opinion the automotive vehicle is here to stay, and those interested in it and electric railways should work together in connection with legislative problems.

In the discussion Walter Jackson questioned the practicability of having the fees from automobiles devoted to special highway purposes. He thought that these in time would go into the general treasury of the state.

Mr. Fenner said he thought that the highways should be constructed by the general public but the maintenance should come from the motor vehicles.

H. W. Blake thought that the tendency was toward a greater regulation of automotive common carriers and that such regulation was desirable for both public and carriers. Free com-

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petition is sometimes advocated as a means of securing fair rates, but that was tried originally with the railroads and later with the electric railways and had given place to regulation and exclusive franchises, which had proved more desirable.

The final paper at the technical sessions was on insulation of catenary and other power and railway systems and was presented by Arthur O. Austin, chief engineer Ohio Insulator Company. It was illustrated by lantern slides. There was no discussion. At the conclusion of the presentation of this paper the meeting adjourned.

Regulation of Motor Vehicle Common Carrier*

Twenty-two States Now Provide for Control of Motor Vehicle Common Carriers—Position on this Matter of Motor Vehicle Conference Committee

BY D. C. FENNER
Chairman Motor Vehicle Conference Committee
of the National Automobile Chamber of Commerce

DURING the course of the present year the legislatures of forty-three states will meet in regular session. If 1921, when a similar condition existed, is any criterion, there will be introduced and considered by the lawmakers of these states fully 2,500 bills directly or indirectly affecting the production, sale and use of motor vehicles.

Unquestionably many of these measures will deal with the problem of governmental regulation of the motor vehicle when used as a common carrier.

What is meant by the expression motor vehicle common carrier?

Motor vehicles are subjected to two general but distinct uses: First, they are privately employed by their owners for the transportation of persons or property. Second, for the transportation for hire of the persons or property of others than their owners.

Until a few years ago the legislatures of our forty-eight states in no way differentiated between these various uses of the motor vehicle in the laws which they enacted dealing with operating requirements, registration fees and the many other subjects which are usually found in a state's motor vehicle laws. In 1914, however, Pennsylvania definitely segregated motor vehicles when used as common carriers and placed them under the regulation of the State's public service commission. Today the laws of twenty-two states provide for a greater or less degree of such state control. Without exception state regulation of motor vehicle common carriers has been vested by law in pre-existing state agencies that exercise control over other forms of common carriers such as railroads, trolleys, telephone and telegraph lines, pipe lines, etc.

A few states deal with the subject merely from the standpoint of local control, the incorporated municipalities being given power by the state legislature to require motor vehicle common carriers to obtain permission and a license for operating from the local governing body. This is the case in Massachusetts, where the Board of Selectmen of the City Council exercises control over motor vehicle common carriers transporting passengers.

With very few exceptions the powers wielded by the public service commissions or similar forms of state agencies over common carrier transportation by motor vehicles are extremely numerous and broad. These powers are as follows:

1. Grant, refuse to grant, amend or revoke certificates of public convenience and necessity.
2. Prescribe routes.
3. Fix schedules.
4. Determine character of service and promote the comfort and safety of traveling public.
5. Establish fares and rates.
6. Require reports and uniform methods of accounting.
7. Examine accounts and records.
8. Supervise fiscal affairs such as incorporation, capitalization of stock, etc.
9. Compel additions to, extensions of, or betterments in physical equipment.

It is apparent that these powers are practically unlimited and of such a nature that the state agency has almost absolute control over the life or death of motor transportation within its jurisdiction. Nevertheless, all of the rulings of the various commissions are subject to review by the proper courts.

In a few states, as New Hampshire, it is only necessary for the operator to obtain a permit from the state authority. This is the rare exception, however. In nearly every other state a certificate of public convenience and necessity is required, while in Colorado, New York and Wisconsin a permit from the governing bodies of the municipalities in which the common carriers seek to operate must also be secured.

ARGUMENTS PRO AND CON

Those who contend for state regulation say that such control is necessary:

1. Because motor transportation for hire is a public utility and as such should be regulated along with other public vehicles so that travelers and shippers by such means can be made sure of safe, prompt, regular, adequate, efficient and economical service.

2. So that, in all cases where motor vehicle common carriers come or are likely to come, in ruinous competition with other common carriers, the state can step in and determine whether public convenience and necessity require such competition, and save, if desirable, the pre-existing agencies of transportation.

3. In order to shoulder upon the motor vehicle common carrier obligations, financial and otherwise, in return for the rights given it to operate for a profit over all or certain highways within a state, especially so since the highways are built and maintained by the public. In some cases these rights take the form of valuable franchises which virtually grant monopolistic privileges over certain routes.

4. For the purpose of eliminating the irresponsible, so-called "fly-by-night" companies and individuals who, while undergoing certain destruction for themselves, pull down with the ruin well managed motor transportation agencies which render a real public service and are entitled to a reasonable return on their investments and a stabilization of their business.

Opponents of state regulation of the motor vehicle common carrier, on the other hand, maintain:

1. That granted motor transportation for hire is a public utility, public interest can best be served by unrestricted competition and complete freedom from regulation in which none but the fittest can survive. This policy, they contend, will yield to passengers and shippers the maximum of results with the minimum of cost.

They deny any analogy between motor vehicle common carriers and railroad and trolley transportation agencies, pointing out that the latter by virtue of private ownership of franchises, rights-of-way, roadbeds, tracks and terminals have an exclusive and monopolistic control over all transportation on their routes. Motor truck operators, on the other hand, even where granted a monopoly of transportation for hire over a certain prescribed highway or portion thereof, cannot deny the use of that highway to others who wish for themselves or as private carriers to transport persons or property over those same routes.

Finally, they point out that governmental regulation of rail and trolley common carriers came after these agencies had abused their rights and through pools, stifling of competition, exorbitant increase of rates, discrimination, stock watering, etc., made it necessary for the public in self-protection to subject them to control. By the very nature of the service these evils are impossible with motor transportation since the road is free to the use of every one and motor vehicles are quickly, cheaply and in unlimited numbers available for every one.

2. Since the obvious outcome of the first argument is "cut-throat" competi-

*Abstract of paper presented at midyear meeting of New York Electric Railway Association, New York, Jan. 25, 1923.

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tion between various forms of transportation attempting to serve a certain territory, the opponents of state regulation do not attempt to ignore the logical consequences of such a struggle. They claim that wherever any existing form of transportation for hire cannot stand up before a newer and better form, public interest demands that it should give way; likewise, within that newer and better form of transformation, the rule should be survival of none but the most efficient and economical agencies.

Even though such a policy may mean the destruction at times of more or less invested capital, as it did when rail and inland water transportation first came into acute competition, they are confident that the final economic benefits to the community as a whole will many times compensate for the loss involved.

3. As for shouldering upon motor transportation for hire financial and other burdens which it should rightly carry, opponents of state regulation say that if the only questions involved are to determine the weight limits for motor vehicles used as common carriers, their registration fees and other charges, their liability to the public for injury to persons or damage to property, etc., these are not sufficient to warrant almost unlimited regulation in all other respects by a state agency.

4. Lastly, those against state regulation believe that the natural working out of economic laws will do more to stabilize the motor transportation for hire business than extensive interference on the part of governmental agencies of any sort.

Position of the Conference Committee

After a thorough investigation of the experience which the various states have had with regulation of motor vehicle common carriers and after a canvas of the views of hundreds of interested parties, the Motor Vehicle Conference Committee, composed of representatives from the American Automobile Association, Motor & Accessory Manufacturers' Association, National Automobile Dealers' Association, National Automobile Chamber of Commerce and Rubber Association of America, has concluded that granted a state deems regulation of motor vehicle common carriers necessary, the following fundamental principles should underlie laws on the subject:

1. Control over interstate transportation of persons and property for hire, over regular routes or between fixed points, if adopted, should be exclusively in the hands of some agency of the state. No power whatever in the premises should be vested in the governing bodies of the municipalities of the state.

2. Such state control over motor vehicle common carriers should be placed in existing commissions, such as the public utility commission, etc., of the various states. It should be provided, however, that at least one member of such a commission should be conversant with and in sympathy with motor transportation.

3. As a prerequisite to the operation of a motor vehicle common carrier, the owner thereof should be obliged:

(a) To obtain a certificate of public convenience and necessity with a proviso that lines in actual operation before the law goes into effect shall prima facie be regarded as necessary to public convenience and necessity and should, therefore, automatically be granted a certificate.

(b) To take out liability insurance adequate to idemnify injuries to persons or damage to property resulting from negligent operation.

4. The state regulatory bodies having control over motor vehicle common carriers should be vested with the same powers they exercise in controlling other forms of public utilities.

5. Any special or extra fees levied upon motor vehicle common carriers should be utilized exclusively for highway maintenance. Such special or extra fees should in no case be more than 100 per cent greater than the normal registration fees for the vehicles of the class to which they belong.

6. Legislation should be enacted enabling steam railroads, trolleys and shipping companies to acquire, own and operate the motor vehicle in conjunction with their regular line of business.

Reliability and Cost of Catenary Insulators*

Among the Subjects Discussed Are the Relation Between Working Load and Cost of Insulator, Effect of Depreciation and Comparison of Different Insulator Types for Different Estimated Cost of Interruption

By Arthur O. Austin
Chief Engineer Ohio Insulator Company

THE catenary line insulator is subjected to mechanical loads and electrical stress due to the normal voltage, as well as to surges due to switching or sudden changes in the current flowing in the system, and to lightning. When we look at the simple catenary system using a single bracket arm, the problem looks very simple, but when we look at the large trunk system with a number of tracks the problem is decidedly complicated. The small single-track road with its light stresses, wood poles and relatively few insulators is unquestionably a better hazard than the large trunk system with its high mechanical stresses, steel structures and many insulators.

Fortunately, conditions are not as bad as they seem, for the reliability of the insulation is simply a matter of cost. Since cost is a controlling factor in producing reliability it is interesting to see in what manner the properties of the catenary system affect the cost of the insulator.

For direct-current systems the insulation is comparatively simple from the standpoint of the insulator, although line surges due to interruptions of the current may be relatively higher in a long line for direct current than for alternating current.

In so far as the main messenger insulators are concerned, it matters little whether insulators on adjacent messengers are operating on the same or on different phases, or with one positive and the other negative, with the full voltage to the track or ground on each. This arrangement, however, requires a material increase in the insulation between the contact systems at other points than at the supports.

Since the amount of power which may be transmitted over a conductor with a given percentage loss increases as the square of the voltage, there is material saving in conductors and supporting structures by going to higher voltages. Higher voltages reduce the difficulty of current collection, which is a difficult problem where high speeds or large amounts of power are needed. The reduction in current at the higher voltages is also a material factor in reducing inductive interference with signal lines.

Where the suspension type of a series of strain insulators is used, higher voltages simply necessitate an increase in the number of sections in the insulator. Where the messenger runs over the top of a rigid insulator, increased voltages are handled very readily unless the mechanical loads are exceedingly high. Where the messenger is supported underneath a rigid insulator the problem is more difficult unless the mechanical loads are very light. The greatest difficulties with increased voltages are mechanical rather than electrical. This is particularly true where the suspension type of insulator is used, as the longer insulator required for the higher voltages permits a greater displacement of the contact wire during heavy winds.

While practically any degree of stability may be insured by the use of "V" strings or "steady" insulators, it is readily seen that these increase the operating hazard. (See Fig. 4.)

While increased voltages are desirable, it is recognized that the interchangeability of equipment tends to maintain voltages once established. In the a.c. system this is readily taken

*Abstract of paper presented at the mid-year meeting of the New York Electric Railway Association, New York, Jan. 25, 1923.

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care of in the stepdown transformer. In the d.c. system the matter is not so simple when it is desired to operate equipment at a higher voltage, unless provisions have previously been made for such an arrangement.

As the general factors producing reliability are the same for the a.c. and for the d.c. system, the a.c. insulation will be discussed first, as the higher voltage used tends to show up the factors of cost and reliability to better advantage.

Effect of Mechanical Load on Cost of Insulator

Reference to Fig. 1 shows that as the maximum working loads increase, the cost of the insulator goes up very rapidly. The graphs are based on a factor of safety of three for the maximum load. A higher factor of safety is usually not advisable as the insulators may have a shorter life owing to higher thermal stresses either at the maximum or at the minimum temperatures. The difficulty of distributing the mechanical stress in the porcelain is also a factor where high ultimates are used. For this reason an insulator with a lower ultimate on test may have a higher effective reliability and permit a higher working load than an insulator of higher ultimate unless the latter is very carefully made.

If catenary lines are compared to transmission lines, it is well to bear in mind that the transmission voltage for an 11-kv. catenary system would be $11{,}000 \times \sqrt{3} = 19{,}000$ volts. This was recognized in making up the curves in Fig. 1. In these curves the 11-kv. catenary insulator corresponds electrically to a transmission line insulator from 20-kv. to 30-kv. rating. In the same way, a 22-kv. catenary insulator corresponds to a line insulator having a rating of from 33 kv. to 44 kv. The large and more important system also requires insulators of a higher rating than the less important system, hence high mechanical loads tend to increase the cost of the insulator for electrical reasons as well as for mechanical.

It is readily seen that for light mechanical loads the bridge or special pin-type insulator mounted over the supporting structures is much cheaper than the suspension or strain type of insulator. For the higher working loads the reverse, however, is true. This is due to the fact that where the rigid type of insulator is used, high bending moments are set up, making the design costly. The rigid type of insulator is usually six to eight times stronger in compression than for side pull, and from two to three times as strong in tension.

Where a triangular catenary is used, it is possible to take advantage of the above, permitting the use of an insulator of moderate mechanical strength for high working loads, by inclining the axis of the insulator in the line of the resultant load. In addition to inclining the axis of the insulator, the grip on the messenger must be limited for longitudinal loads occasioned by a break in the messenger. This same construction may be adopted for curves. To allow the insulator to take the line of the resultant is also a distinct advantage in most of the rigid insulators where the messenger is supported from the under side of the insulator.

It naturally follows that for high electrical reliability the catenary system should be as light as possible. This is also desirable in order to keep down the cost of insulation. This matter should receive careful consideration, as an increase in the weight of one item usually entails an additional expense for others, making it very easy to increase the working tensions and cost for a system without improving the reliability.

As catenary systems using large messengers and contact wires have a more stable contact system, there will be a strong incentive to use heavy construction where the traffic is dense. Fortunately, practically any degree of reliability may be obtained in so far as the insulator is concerned if sufficient clearance is provided. If the straight suspension will not give sufficient mechanical stability, "V" strings may be used and a sufficiently high electrical reliability obtained by adding more sections.

More trouble has been occasioned in the design of catenary insulators owing to limitations as to clearance than to any other one cause, and it is well to decide on the system of insulation before any decision is reached as to the type of structure. A good rule to follow in laying out catenary lines is to decide on the insulators first and then settle the other details as to type and size of supporting structure.

Insulator Depreciation

It is not possible to cover this matter completely, but it is well to take into account the effect of depreciation on the reliability or operation of the system. This is particularly true where combined electrical and steam operation is necessary, for the heating from steam locomotives sets up very severe stresses in the insulator which tend to increase the rate of depreciation. There is also a sudden heating of the insulator due to the leakage of current over the surface when a locomotive blast strikes the insulator. Condensation from the hot moist blast striking the insulator is particularly severe where the insulator is below the supporting structure in main-line work or to one side in tunnels.

Complete electrification of steam roads will do much to improve conditions for the insulator and cut down the depreciation and resulting trouble, or to permit the use of smaller insulators.

Where steam locomotives are operated under catenary lines, the insulators are not only subjected to severe conditions due to the hot blast of the locomotives, but the surfaces are severely coated, necessitating more insulation than would otherwise be necessary.

Curves E and F in Fig. 2 show the lowering of operating costs which may be effected on an old system by the change in type of insulation permitted by increased clearance. This study also shows the marked advantage in lowering the operating cost, due to going over the system and weeding out faulty material wherever possible. In this connection, it is well to bear in mind that any two-piece insulator or two-section insulator may be tested out without disconnecting it from the line. This is a very important point to be taken into consideration in insulating even a low voltage system.

In two-part insulators the depreciation is likely to be more in one part than in the other. This applies to pin types, pendent or suspension insulators. Providing a single part of the insulator is large enough to carry the entire load and the other part should fail, the reliability will be very much higher if a given per cent depreciation based on a total number of parts is largely confined to one part of the insulator.

In Fig. 3 the total annual cost for different sized insulators is compared. It is readily seen that if the depreciation is exceedingly small a material saving may be effected. It is for this reason that many improvements have been added to the suspension insulator within the last few years in order to secure a low rate of depreciation. These improvements have necessitated an increased manufacturing cost, but this is made up a number of times, as a fewer number of sections may be used so that the final cost per thousand strings is very much less for a given standard of operation.

In deciding upon an insulating system, it is very important that the relative hazards of the different systems be given careful consideration, as this affects the annual cost of the interruptions very materially. In Fig. 4, several different insulating systems are compared with the same basis of depreciation. A study of this figure indicates the possible advantage of single insulating systems as against multiple systems where the same rate of depreciation obtains.

Fortunately improvements added to the insulators within the last two or three years make it possible to produce high ultimate strings with a low depreciation rate. This is a distinct advantage, as in the past insulators having a high mechanical ultimate have had a much higher depreciation rate. It is advisable to use a high ultimate insulator so as to take advantage of the lower hazard due to the single string as against the multiple string only where the insulators are of the most refined design.

Reliability as Affecting Cost

The value of reliability is really the determining factor in the selection of the insulator system. The cost of interruptions varies, depending upon the importance of the system or the service desired.

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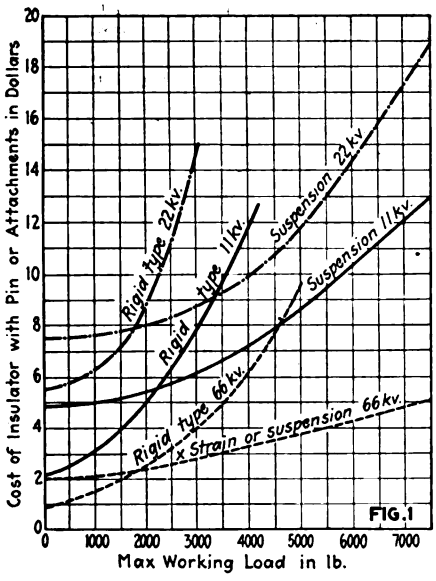

Fig. 1—Relation between working load and cost of insulator.

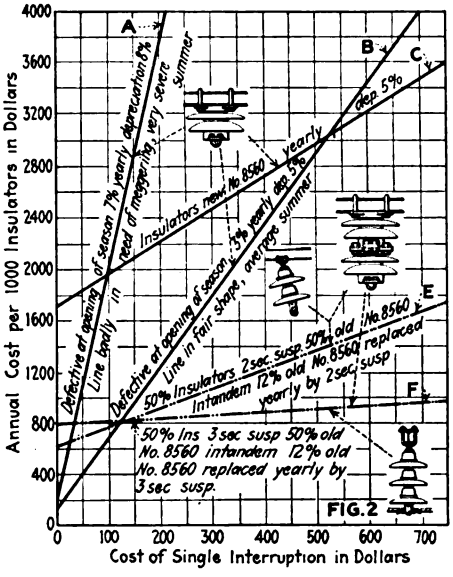

Fig. 2—Annual expenditure required for different insulators and combinations affected by average cost of interruptions.

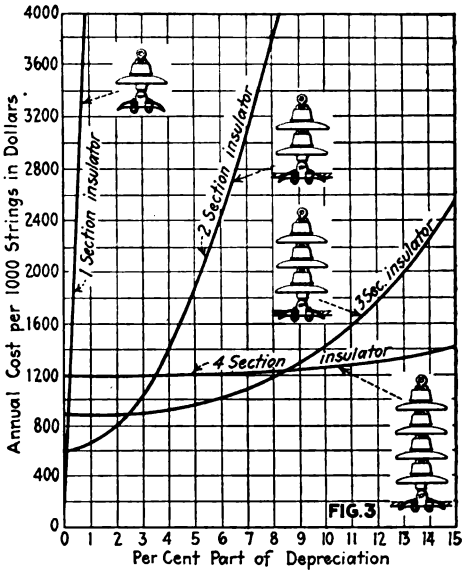

Fig. 3—Effect of depreciation on the annual cost of various sizes of insulators. Fixed charges, 30 cents per section; average cost of interruptions, $500.

Where the value of reliability is slight it is a mistake to over-insulate the system, as the fixed charges for insulators and supporting system would be out of all proportion to the saving effected by reducing the probable number of interruptions. Where the system is large it is simply a matter of good business to capitalize the interruptions on a proper basis and balance this against the fixed charges. Fig. 5 shows the annual cost for one thousand insulator strings, for various average interruption costs.

While the information in Fig. 6 may be obtained from Fig. 5, the relation between the number of sections and the annual cost is shown to better advantage in Fig. 6.

By referring to Fig. 5 or to Fig. 6, it is seen that a three-section insulator is the most economical where the cost of an average interruption does not exceed $275. It is further evident that there is little saving in the operating cost for a three section insulator until the cost of an interruption exceeds $500. Even where an interruption costs only $50, it is seen that a three section insulator costs approximately the same as a two section. Interruption costs would have to exceed $2,000 to necessitate more than four sections in the string.

The conditions assumed in these studies are not based on the line in good condition, but under conditions which may prevail after some years of operation, or where they are severe.

The rates of depreciation are probably on the safe side, but in the past considerable expense has been incurred by not allowing sufficiently for this factor. In setting the rate of depreciation it must be remembered that the fragile dielectric in the insulator works under a factor of safety smaller than any part of the system. This factor of safety is largely independent of the working load applied, and seldom exceeds 2 or 3.

If reference is made to the several studies, it will be seen that insurance costs but little if any more and may safeguard an investment running into millions.

The same general rules apply whether the system is a.c. or d.c. The

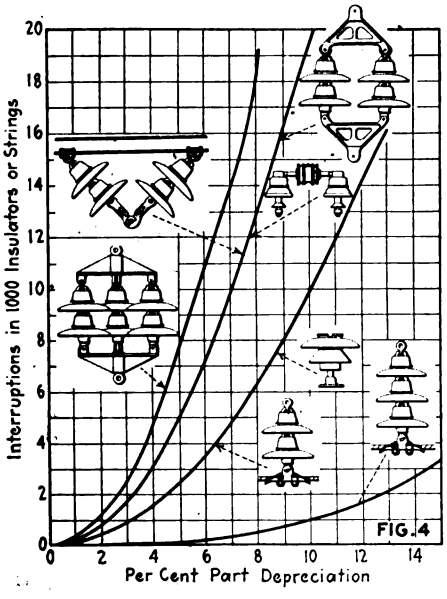

Fig. 4—Comparative reliability or hazard for different insulating systems. Interruptions based on probability of matching up of faulty parts in same insulator with 5 per cent part depreciation.

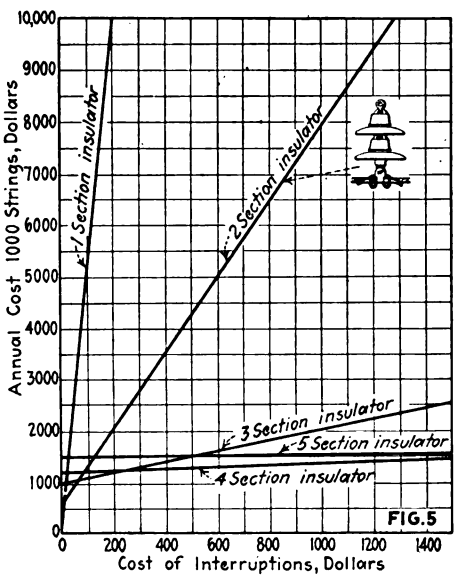

Fig. 5—Annual cost of 1, 2, 3, 4 and 5-section insulators for different interruption costs. Fixed annual charges, 30 cents per section; annual part depreciation, 5 per cent; accumulated part depreciation, 15 per cent.

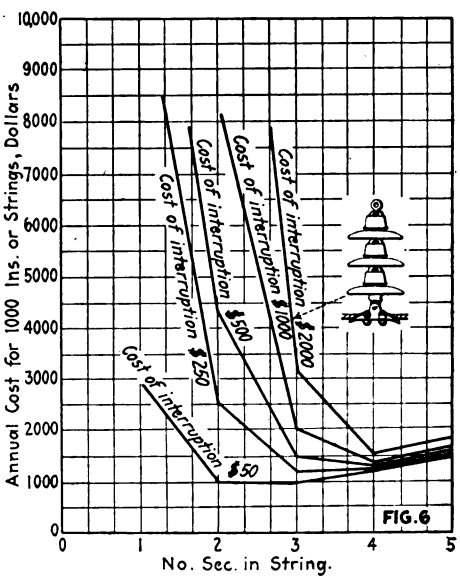

Fig. 6—Total annual cost including fixed charges and probable cost of trouble due to depreciation for different number of sections in insulator, and for different interruption costs. Fixed charges, 30 cents per section; annual part depreciation, 5 per cent; accumulated part depreciation, 15 per cent.

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size and type of insulator, however, might be materially different.

Reliability of Transmission and Distribution System

The reliability of the transmission and distribution system is of even more importance than that of the catenary system.

While a train may coast through a defective section on the catenary system, a complete shutdown results if the main transmission line or distribution system fails. Fortunately, the reliability of the transmission system is much more readily controlled than that of the catenary system. Not only is the hazard very much less, due to fewer insulator strings and supporting structures involved, but in addition, the high voltage system is practically free from lightning and bird trouble.

While it is true that some of the large trunk systems have been subjected to spill-overs under comparatively mild conditions, I believe that there is little question but that these spill-overs may be eliminated by applying our present knowledge of the art.

In studying the trunk or superpower line, it is well to bear in mind that the stored energy increases as the square of the voltage and that this energy feeding into an arc may cause a flashover of the system at a relatively low voltage. While this condition has been quite serious on some large transmission systems, practically no provision has been made to prevent it. Too much attention has been paid to the wet and dry flashover of the large insulator strings at normal frequency and not enough to the possibility of the stored energy feeding into an arc started by a transient.

Fortunately, a system has been developed which makes it possible to prevent an arc forming at the insulator or in the vicinity of the tower under conditions which will cause an arc to strike from the conductor 15 or 20 ft. out on the span. Where conditions of this kind are set up, it is apparent that we need have no concern for the insulator. This matter was treated in a discussion before the N.E.L.A. convention at Chicago in 1921 and in a paper before the International Congress at Paris in 1920.

In this connection it might be well to say something in connection with the frequency. For the very long lines, it is apparent that harmonics are much more likely to develop resonance with a high frequency than with a low frequency. If a high normal frequency for the transmission line is used, it is well to bear in mind that more precautions will have to be taken to insure a good wave form and the absence of disturbances, as these may cause the line to arc to ground, through no fault of the insulator, at 60 cycles, where there would be little or no trouble at 25 cycles.

The control system which has been developed for use on extremely high voltage lines is applicable to catenary lines in order to prevent spill-overs due to lightning or to other transients, and it is possible that old systems which lack clearance, or systems which are having trouble from spill-overs may be materially changed by use of the control system or caged conductor.

Regardless of any difficulties which may have appeared in the past, it is certain that catenary and main-line transmission insulation is on a basis that will permit the highest degree of reliability at a comparatively low cost.

Many Speakers at Indianapolis Utility Meetings

Testimony Was General that State Commission Regulation Is Better than Municipal Regulation or Municipal Ownership of Utilities—Addresses Were from Public Officials, Utility Men and Industrial Leaders

THE folly of public ownership of utilities, care on the part of utilities in rushing into Federal Court under the provisions of the Fourteenth Amendment in appealing from decisions of public service commissions, closer co-operation between utilities and the public, the labor situation and many other matters of peculiar interest to public utilities were discussed at the third annual meeting of the Indiana Public Utility Association, held in Indianapolis on Jan. 25.

The meeting began with a closed session in the morning, at which a general discussion of the report of the committee on public utility information was had and officers elected. The public information committee reviewed the work done during the past year and showed by a mass of documentary evidence in the shape of clippings from virtually every paper in Indiana the value of getting the utilities' viewpoint presented properly before the public.

C. L. Henry, president Indianapolis & Cincinnati Traction Company, was re-elected president. Others elected were as follows: S. E. Mulholland, vice-president Northern Indiana Gas & Electric Company, vice-president; F. J. Haas, vice-president Southern Indiana Gas & Electric Company, vice-president; Marshall V. Robb, secretary Wabash Valley Electric Company, secretary, and Charles C. Perry, president Indianapolis Light & Heat Company, treasurer.

At a noon luncheon Taylor Groninger, corporation counsel of Indianapolis, and Gov. Warren T. McCray of Indiana gave addresses. Mr. Groninger not so long ago was one of the leaders, under the supervision of Mayor Lew Shank, in seeking legislation to abolish the Indiana Public Service Commission. In his address he commended the work of the Public Service Commission, but he also warned utility interests against rushing into Federal Court in rate case appeals before making their appeal to the state courts. He held that state machinery should be used before resorting to the United States courts. "There should be no antagonism whetever between the public and the public utilities," he said. "Public utility property is given over and devoted to the service of the public. Many safeguards have been thrown about it which make investments secure, and the service has been made efficient. A still closer relationship may be fostered if the operators will be more frank with the people and be content with a fair return on the reasonable value of their properties."

Governor McCray in a brief talk declared that he was for the public service commission law and would do all in his power during this and subsequent legislatures to prevent any amendments to the law which will in any way curtail the effectiveness of the work of the commission. He said there was no doubt that the majority of the citizenship of the state wants the commission and is, in the main, satisfied with its work.

By a coincidence Senate Bill No. 35, which provided that all utilities valuations for rate-making purposes should be based on the amount of assessed valuation on the tax duplicates, was postponed indefinitely on the day of the convention.

James P. Goodrich, president National City Bank of Indianapolis and formerly Governor of the state, thought that not one in ten citizens wanted the public service commission abolished. He saw some elements of danger in the large consolidations such as are now being perfected. He also saw a danger in too frequent appeals to the Federal Courts. On this point he said: "There is a savor of public ownership element which might grow out of too many of these appeals, and we all know what we think of public ownership. This court should be used as a case of last resort."

B. J. Mullaney, director of the committee of public utility information of Chicago, gave a talk on the experiences of utilities in Illinois with commission regulation. He traced the law from its inception to the present time, through three state administrations, and declared it was very easy to mistake noise for numbers in agitation against a public service commission. The feature of this talk was the fact he brought out that in Illinois, under the latest provisions of the law, it is possible for any city to vote itself out from under the workings of the law by popular vote and go back to the "home rule" system. In spite of agitation against state regulation, not a city in the state has done this yet, though they have had ample opportunity.

G. B. Maxwell, former secretary of

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the Ohio Public Service Commission, said the public should understand the necessity for new capital for extensions of service and of the problems of utility companies, particularly in the matter of taxation. He told of the troubles of those utilities in Ohio which were not under the public service commission.

TALKS ON DIFFERENT UTILITIES

Short talks then followed on experiences of the different classes of utilities. Arthur W. Brady, Anderson, spoke for the interurbans; Howard Dill, Richmond, for the water companies; T. E. Bohn, Fort Wayne, for the telephone interests; S. E. Mulholland, Fort Wayne, for the gas companies and Harry Reid, Indianapolis, for the power and light interests.

MR. HURLEY SPEAKS ON PUBLIC OWNERSHIP

At the banquet in the evening, customer ownership and not government ownership was urged as the real remedy for economic ills by Edward N. Hurley of Chicago, former chairman of the United States Shipping Board. He said in part:

"The federal government's venture into the field of public management of industrial and public service enterprises demonstrated conclusively that not more than 50 per cent personal efficiency can be obtained under such management. I speak advisedly and out of full and intimate knowledge of the facts, and I do not hesitate to add that this average of 50 per cent gradually decreases the longer the individual manager or the individual employee continues in industrial service under public management. It narrows down to this: Do we get as good service in the city hall as we do in a department store? How long would a department store stay in business with city hall service?

"One indictment that has been made of the American business man is that he neglects public duties. The farmer is quick to put forward every effort to improve his condition. Labor exerts itself to heal its wounds and strengthen its position both with the public and governmental authorities. The business and industrial executive, however, is prone to concentrate upon his business to the exclusion of other things. It results too frequently that he is called on the defensive in legislative matters where there is no need or reason for him to be on the defensive. Many business men do not know the names of their representatives in their state legislatures. What can we expect from men when we display such indifference toward them and their policies?

"Refuse to be on the defensive when you are not really called upon to occupy such a position. Drive home the fact that whereas the public utility owes an obligation to the public, there is an equivalent obligation which the public owes to the public utility company."

The Authority, Duties and Responsibilities of the Safety Chairman*

This Official, the Author Believes, Will Come Gradually to Replace the Claim Agent—An Efficient Accident-Prevention Plan Should Involve Every Person Connected with the Electric Railway Organization

BY NEIL W. FUNK
Director of Safety Louisville Railway

THE principles of safety and of accident prevention have probably developed faster during the past few years than any other ideas in the community. The peace-time call to make travel through our streets and work in our industrial plants safe has been responded to with enthusiasm by the street railway industry. As progress is made in the direction of reducing accidents, the work of the safety department will gradually come to replace that of the claim department. The claim agent will become the safety chairman or director of safety.

The director of safety has "arrived" in the electric railway industry. His primary duty is to organize the rank and file of the company's men along safety lines. This can best be done by having a complete safety unit in every department.

Our policy is to have the men elect their own safety committee men through their welfare association. Three men thus elected select one of their own number as chairman. This unit is supreme in authority as to safety matters in the particular department where it functions. Our idea has been to have from every carhouse, as members of these units, one motorman, one conductor and one motor inspector. This gives co-ordination along safety lines of the mechanical and operating branches. We also have units consisting each of the same number of men from other departments, such as power house, construction department, car shops, etc.

The chairmen of these units should be called together by the safety chairman at least once a month for conference and discussion. This gives an opportunity for the safety chairman to explain the elementary principles of street railway law, which is important because many a man violates the law unwittingly. Little should be heard from the safety chairman after the first meeting, as the chairmen of the units will have suggestions which they are anxious to make and hear discussed.

During two years we have received about 500 suggestions along safety lines, of which probably 425 were useful and practical. It is the duty of the safety chairman to secure action by the company on every possible suggestion made by safety committeemen. Our entire safety organization is changed every three months, so that in time every employee will have had a three months course in safety in one of the safety units.

The safety chairman in our organization accompanies an inspection committee once a month on a tour of the company's property. This committee comprises one motorman, one trackman, one wireman, etc., until we have every division of labor in the company's organization represented. The results of this work have been very satisfactory.

The safety chairman should never become involved in matters of discipline. He should not have the authority either to employ or discharge men. The chairman should, however, have an opportunity to talk to every new platform man employed, and he should know personally every member of the company's organization from the president to the car cleaner. He should know the men well enough so that each considers him a friend.

It has been said that eternal vigilance is the price of liberty; at the same time it is the price of safety. Ordinarily men are not careless, but the work of a platform man in time becomes somewhat monotonous and he is apt to become careless. Our experience is that the older men cost us more money in the way of settling accident claims than the new ones. This occurs because the new man has more confidence in safety appliances than in his own ability, while the reverse is true with the older men. This shows that safety is largely a question of constant suggestion as to the possibility of accident. No safety bulletin should be issued without the approval of the safety department, and such bulletins should be designed by a member of the company organization in order to secure attention.

The safety chairman should be ready to aid all public safety movements in his community outside of his own organization. It should be his duty to support the National Safety Council, which necessarily is of more help in the electric railway industry than in other industries.

In conclusion I wish to mention an important safety development in Louisville, known as the "Life Savers' Club," which is sponsored by the *Courier-Journal* and the *Times*. Every motorman and truck driver who operates for a year without an accident is awarded membership in this club, with a button to indicate such membership. Such recognition furnishes a strong incentive to carefulness.

*Abstract of an address before the annual meeting of Central Electric Railway Association, Louisville, Ky., Jan. 18 and 19, 1923.

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International Engineering Congress Plans for 1926

PLANS for an International Engineering Congress to be held at the time of the sesquicentennial celebration in Philadelphia are well under way and were reviewed at a meeting held under the auspices of the committee on plan and scope in New York City on Jan. 9. At the meeting the following topics were discussed: Scope of the congress, finance, relation of meetings of engineering societies to the sessions of such a congress and publicity. The board of management for the congress has been organized, with temporary officers and with representation from the American Society of Civil Engineers, the American Institute of Mining & Metallurgical Engineers, the American Society of Mechanical Engineers, the American Institute of Electrical Engineers, the Federated American Engineering Societies and the Engineers' Club of Philadelphia.

New England Street Railway Club Will Meet in February

THE February meeting of the New England Street Railway Club will be held at the Copley Plaza Hotel, Boston, Feb. 8. At the afternoon meeting George E. Pellissier, assistant general manager of the Holyoke (Mass.) Street Railway, will read a paper on "Co-operation." The evening meeting will be addressed by Wallace B. Donham, Dean of Harvard School of Business Administration. Mr. Donham was at one time receiver of the Bay State Street Railway.

American Association News

Further Midyear Program

ACCEPTANCES have been received by Secretary Welsh from the following men to discuss the principal addresses at the midyear meeting in Washington, on Feb. 16. The morning address on "Regulation" by the Hon. Dwight N. Lewis will be discussed by Henry L. Doherty, Col. Charles Keller, chairman District of Columbia commission, and C. E. Elwell, member of the Connecticut commission.

The address in the afternoon on "Taxation" by Senator F. N. Davenport will be discussed by Alexander Forward, member of the Virginia commission, and Alfred T. Davidson, general counsel Third Avenue Railway, New York.

At the evening banquet, in addition to the Hon. Albert Bacon Fall and former Vice-President Thomas Riley Marshall, who have already been announced as speakers, President C. E. Emmons will make an introductory address in which he will discuss the fundamental conditions in the industry, and there will also be an address by Thomas N. McCarter, president Public Service Railway.

Way Committee Holds Two-Day Session

A MEETING of the way committee of the American Electric Railway Engineering Association was held at association headquarters, New York on Jan. 25 and 26. The following members were present: W. F. Graves, chairman, Montreal, Canada; H. H. George, vice-chairman, Newark, N. J.; R. C. Cram, sponsor, Brooklyn, N. Y.; C. A. Alden, Steelton, Pa.; V. Angerer, Easton, Pa.; S. Clay Baker, East St. Louis, Ill.; E. B. Entwisle, Johnstown, Pa.; R. B. Fisher, Harvey, Ill.; Charles F. Gailor, New York, N. Y.; J. H. Haylow, Memphis, Tenn.; E. M. T. Ryder, New York, N. Y.; A. T. Spencer, Toronto, Canada; Francis Tingley, Washington, D. C., and W. W. Wysor, Baltimore, Md. S. G. Hughes attended in place of H. Fort Flowers, and H. F. Hile of the Wharton Company was also present.

Mr. Alden, chairman of the sub-committee on subject No. 1, which is making a study of the standardization of frogs and car clearance easements, gave a general outline of the status of the subject and also presented some conclusions of the committee regarding this. An elaborate method for materially reducing the number of standard frogs required in the various layouts was presented. The plan was discussed very generally and suggestions for modification were offered.

Mr. Baker, chairman of the sub-committee in charge of subject No. 2, which is studying design of substitute ties, outlined the problems confronting the committee. The subject was discussed in detail and it was agreed that the sub-committee should proceed to establish in detail the desired and practical features of a substitute tie and then, if possible, determine how nearly the present substitute ties met these requirements.

Mr. Haylow, chairman of the sub-committee in charge of subject No. 3, which is appointed to co-operate with the committee on buildings and structures on the design of small bridges, culverts and trestles, reported results of a meeting with the committee on buildings and structures held at association headquarters on Jan. 24. The committee will continue its work in developing the subject suggested.

Mr. George, chairman of sub-committee No. 4, which is pursuing a study of the design of track construction for paved streets, presented a set of specifications for consideration. These were discussed in considerable detail and a large number of corrections were decided upon.

Mr. Wysor reported on Subject No. 5, which includes an investigation of all forms of welded rail joints and described in detail the design of the proposed rotary testing machine which is being considered by the committee on welded rail joints. This committee will keep in touch with the welded rail joints committee with the idea of assisting and making any suggestions possible.

In connection with Subject No. 6, which consists of a review of existing standards and recommendations for presentation to the American Engineering Standards Committee, C. W. Squier, representative of the association on the sectional committee dealing with the standardization of bolts, nuts and rivets, reported as to the work which was being accomplished in connection with the standardization of track bolts. A print showing the average dimensions of bolts which were obtained from a study of the track bolts being used on a number of representative electric railways was presented to each member of the committee and their criticism was requested.

Mr. Entwisle, chairman of the committee on subject No. 7, which was appointed to revise the specifications for manganese steel switch pieces, reported on the work already undertaken and it was decided to give the matter further study. A further report will be made at the next meeting.

Merchandising Transportation

PLANS for the work for the ensuing year of the T. & T. committee on merchandising of transportation were outlined at a meeting of the committee with Chairman Samuel Riddle in Louisville on Jan. 19. Those present besides the chairman were W. H. Boyce, sponsor; F. L. Butler, J. A. Dewhurst, F. D. Norveil, G. S. Brush, C. L. Van Auken and Labert St. Clair.

It was decided to centralize the committee's study on the weekly pass, methods of increasing the freight business and business producing display advertising through newspapers, window signs and other mediums. A special study of increasing interurban business will be made. Sub-committees are to be announced within the next few days by the chairman.

Stores Accounting

AT a meeting of the Accountants' Association committee on stores accounting, held in New York City on Jan. 23, it was decided to make a study of inventories in co-operation with the committee on purchases and stores, of which B. J. Yungbluth is chairman. After discussion of the joint committee report on stores accounting, presented and discussed at the 1921 convention, it was concluded that the recommendation made then, that the formulated materials classification should be adopted as standard practice, should probably be reaffirmed this year.

The New York meeting was attended by R. A. Weston, the Connecticut Company, New Haven, chairman; C. L. Bartlett, Haverhill, Mass., and A. E. Hatton, Pittsburgh, Pa.

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Maintenance of Equipment

Rearranging Wheel and Axle Shop for Lower Cost and Higher Production

BY H. E. HOCHETTE
Third Avenue Railway, New York, N. Y.

A GENERAL rearrangement of the machinery in the Sixty-fifth Street shops of the Third Avenue Railway has recently been carried out, and along with this has come a complete revision of the facilities for handling wheel and axle repairs. As a result of the changes made, the production of pairs of wheels (drivers and ponies) necessary for supplying the material department and for delivery to the truck overhauling shop and various carhouses has been increased 50 per cent. This increase parallels a 20 per cent reduction in the cost per pair of wheels handled, and, further, the frequent peak demands which formerly caused no little difficulty can now be taken care of without effort.

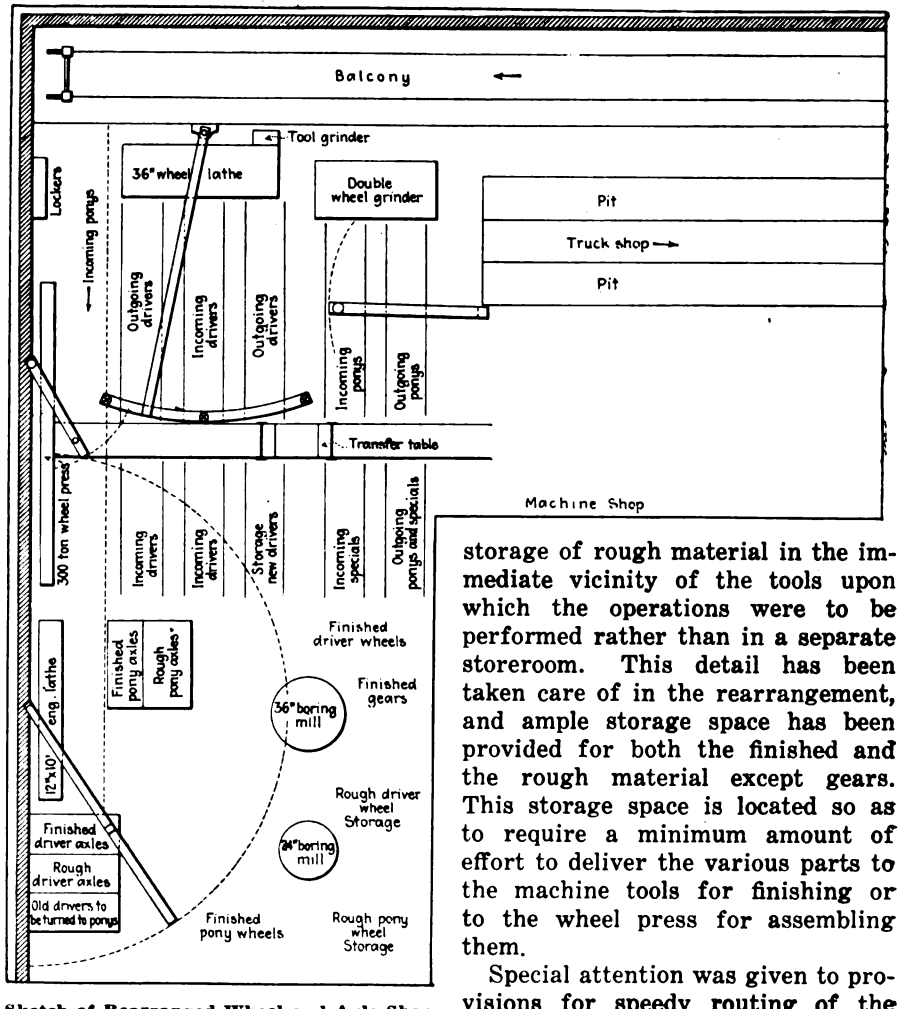
In order to understand the demands made on the wheel and axle department of the Third Avenue Railway, a few of the essential requirements will be enumerated. The company operates 1,600 cars from eleven carhouses. Forty-six per cent of these cars operate over tracks with the underground conduit contact system. Forty-nine per cent use the overhead trolley contact system, and the remaining 5 per cent are storage-battery cars. General overhauling, reconstruction and all but minor repairs are done at the central Sixty-fifth Street repair shop, which simplifies the work to a great extent. On an average twenty-five pairs of steel driver wheels and fifty pairs of cast-iron pony wheels are handled by the wheel and axle department every day.

The men who carry on the work in the wheel and axle shop consist of one boring mill hand, who is also the inspector as well as the leader; one axle lathehand; one wheel lathe hand; one wheel-press man, and a helper, who also handles the wheel grinder and general work. This makes a total of five men in the organization at the present time. Previous to the changes made in this department, there were a total of seven men required.

The accompanying illustration shows the layout of the tracks, the location of the various machines, and the cranes used for handling wheels and axles. The machine tools include one 300-ton wheel press, which has been recently overhauled, and in addition to some minor changes has been equipped with a new cylinder lining, which has increased the output of this press considerably. A hydraulograph was attached to the press, so that a graphic record of every press made is now obtained and detailed studies of these records have furnished much interesting and valuable information. Other machine tools, which were overhauled and relocated, included a 36-in. boring mill for steel driver wheels and gears, a 24-in. boring mill for cast-iron pony wheels, and a 12-in. x 10-ft. engine lathe for finishing and turning both driver and pony axles.

The 36-in. wheel lathe was given a rather extensive overhauling, which included the providing of two new toolposts as well as parts for the old ones, which are now held in reserve. The overhauling and purchase of these new toolposts have provided a very efficient machine and have resulted in increased production and lower unit cost. In addition to this equipment one double-wheel grinding machine was overhauled and the power transmission rigging was greatly improved. A new exhaust system has also been installed.

Previous experience showed that it was advisable to provide for the storage of rough material in the immediate vicinity of the tools upon which the operations were to be performed rather than in a separate storeroom. This detail has been taken care of in the rearrangement, and ample storage space has been provided for both the finished and the rough material except gears. This storage space is located so as to require a minimum amount of effort to deliver the various parts to the machine tools for finishing or to the wheel press for assembling them.



Sketch of Rearranged Wheel and Axle Shop, Third Avenue Railway

Special attention was given to provisions for speedy routing of the parts through the shop. The accom-

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panying layout of the tracks shows the orderly and compact arrangement provided for the assembled units. A transfer table was installed for handling the work to and from the various tracks, and cranes have been located so as to serve all machines and to handle the material in an efficient manner. The wheels and axles are received in this department, either from carhouse supply cars which run into the shop on a balcony, as shown in the accompanying layout, or from the truck overhauling shop, which is adjacent to the wheel shop. Both of these sources are served, along with other departments, by an overhead traveling crane, which delivers drivers and ponies to their respective incoming tracks. After inspection the units are routed in three ways. First to the wheel press for dismounting, if any part is to be scrapped or should the axle need to be turned; second to the wheel grinder, and third to the wheel lathe for turning to gage.

The wheel press is served from the floor by the transfer table and by a 1-ton piston air hoist trolley, which is mounted on a 10-ft. jib crane. A study of the layout will show how the dismounted material is disposed of and how the supply of new material is handled. After the units have been newly assembled, they are routed either direct to the wheel lathe or grinder if work by these tools is required, or to the outgoing tracks for inspection.

The wheel lathe is served by a 1-ton electric hoist trolley mounted on a 22-ft. radial roller crane as shown in the illustration. The wheel grinder is served by a 1-ton piston air hoist trolley mounted on a 10-ft. jib crane. Finished units from either of these two machines are shifted by hand to their proper location for inspection. A 20-ft. jib crane equipped with a 1-ton chain hoist trolley takes care of the axle lathe, while the boring mills are served by a built-in jib crane.

This rearrangement and overhauling of machinery and the provision of the labor-saving devices for handling have not only increased the production and lowered costs to a marked degree, but have also enabled the making of inspections in a more orderly manner, and to visualize the reserve stock of units more easily at any time of the day. A further result of the change is the effect it has had in helping to obtain maximum advantage from the piecework system which is now employed.

The Trucks Line Up Behind the Loader and Are Backed Into Position for Receiving Their Loads

Railway Company's Snow Loader Helps Dig Out Boston Streets

TWO snow-loading machines purchased by the Boston Elevated Railway are being given almost continuous service due to the large snowfall which has occurred during January in the New England district. These machines were purchased from the Barber-Greene Company, Aurora, Ill., and the first was put in operation on Wednesday, Jan. 3, and it continued in service without any overhauling up to Sunday night of that week. Crews were broken in so as to keep the machine working continuously. The second machine was brought into the Huntington Avenue grounds on Wednesday afternoon, Jan. 10, and was unloaded and working on the street at 8:45 p.m. It is thus evident that no time was lost in getting the machine into service.

Accompanying illustrations show the machine in operation. It can load trucks faster than they can take the snow away. As compared with the use of flat cars and shovelers, tip carts and snow sleds, this machine has been able to do the work of 100 shovelers to each shift.

The snow loader is of the crawler traction type. It has full length continuous tread 58 in. long by 8 in. wide and can be fitted with non-slip cleats when extra traction is desired. The track is cast integral with the link and the chain and sprockets are protected. The truck frames are made of fabricated structural sections, the tread links of cast steel, and the carrying rollers of chilled cast iron.

The snow elevator consists of a rubber belt 32 in. wide, which has cross-angle flights or cleats every 20 in. Twelve-inch skirt boards are placed on either side of the elevator to help hold the snow and to gain an effective carrying width of 35 in. Two shaving plates of hardened steel

Scooping Up the Snow and Loading Into Truck

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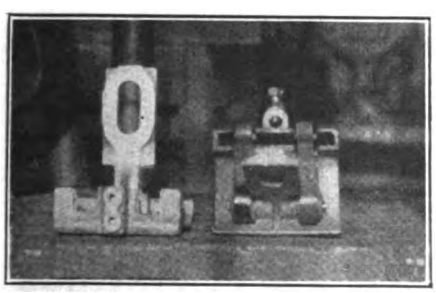
extend out on either side and ahead. These are placed immediately in front of the lower belt pulley and give a cleaning width of 6 ft. The whole arrangement has a quick acting up and down adjustment at the operator's platform. This adjustment is provided for passing any obstructions such as manhole covers or for setting the scraper to shave the surface clean. The machine is driven by a four-cylinder Buda gasoline engine and travels forward at a speed of 40 ft. per minute and has a reverse speed of 107 ft. per minute.

The operator has one lever for steering coupled to outside adjustable brake bands operating on brake drums which are located at each end of the differential shaft. By throwing the lever to the right the machine turns to the right. Forward and reverse motions are controlled by friction clutches connected to another lever. A third lever with a friction clutch operates the elevator belt.

A wheel controls the up and down adjustment of the snow plow for operating. Another lifts it to the traveling position. All are located within reach of the operator as he stands on the platform above one crawler. The machine has an overall length of 25 ft. 6 in., a plowing width of 6 ft. and a length of crawlers over all of 61 in. The maximum height of the machine is 12 ft. 4 in., and its approximate weight is 10,000 lb.

Interchangeable Brush-Holder Designed

THE number of motor failures from grounded brush-holders has been cut in two on the equipment of the Cleveland, Southwestern & Columbus Railway by the use of holders having the connection in the center instead of on the end. With the lead attached in this fashion the connection is removed about an inch further from the motor case and at the same time the holder can be used for either the right or left-hand position. The interchangeable feature has reduced by one-half the number necessary to carry in stock. The original brush-holders, having lead connections on the end nearer the motor shell, could be used, of course, only in the intended location.



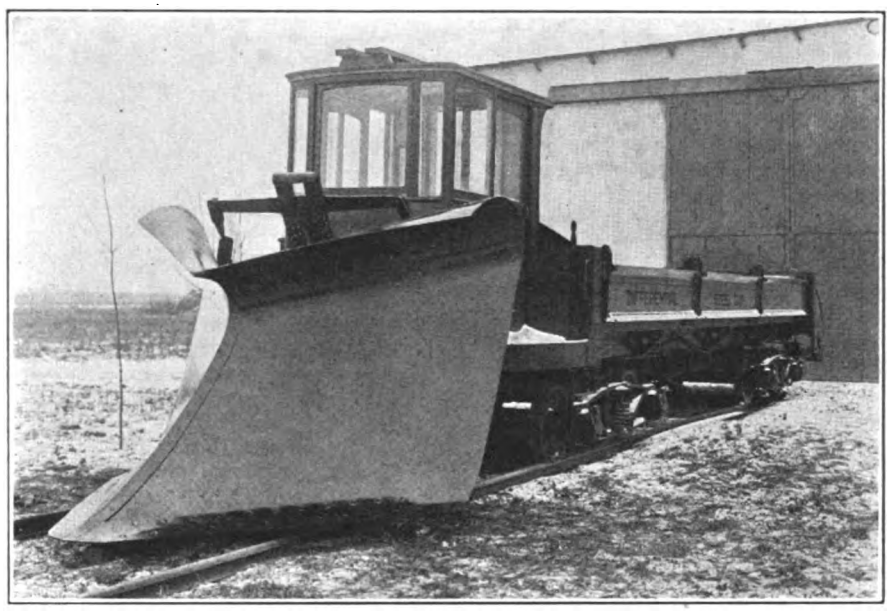
Brush Holder with Center Lead Connection Makes Only One Type Necessary

The new type of holder, which is used on the Westinghouse 93, 112 and 304 motors, is made in the Elyria shops of the company from brass castings. Only a few simple machining operations are required such as smoothing up the arm and drilling and tapping for the spring and motor lead screws.

New Equipment Available

Demountable Nose for Snow Removal

A QUICK demountable snow plow nose as an accessory to the Differential Car has recently been developed by the Differential Steel Car Company of Findlay, Ohio. It is made in both single-track and double-track types. This application is in line with the company's policy of combining as many features as practicable in the Differential Car to make it a general purpose equipment and at the same time to eliminate the possibility of the equipment remaining idle under any seasonal or climatic conditions.



Snow Nose Applied to Car

The plow is readily applied to the car by making only three pin connections. It is raised or lowered by means of an air cylinder and its supports are so arranged that in raising or lowering the plow its action is similar to a pantograph in that the bottom edge of the plow remains always parallel to the track. In this way the height above the rail of the toe of the plow is the same as the height of the heel. The contour of the plates forming the plow is of unusual interest. Geometrically, it is a double warped surface and its action is similar to that of the ordinary plow share. The shape of the plow gives to the snow a rolling motion, tracing a helix, laterally and upward across the face of the snow plow.

Some of the advantages claimed for this plow are that its cost is but a very small fraction of the cost of the ordinary snow plow, and due to the three pin connection construction it can be put on or taken off with little labor and with great speed. Its use on the Differential Car gives a propelling unit of sufficient weight for snow plow duty, hence there is no deterioration of motors due to standing unused for the greater part of the year.

The Differential Car itself is very useful in hauling the snow away and is particularly valuable in large cities where removing the snow from the streets is as imperative as its removal from the tracks.

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The News of the Industry

Huge Terminal Project in Chicago

Plan Evolved for Consolidating Three Terminals on Site of Old Dearborn Station

A new passenger terminal in Chicago, which would cover 50 acres and cost $55,000,000, including electrification, has been planned to take the place of the old Dearborn Street station erected forty years ago and partly burned on Dec. 21 last. The scheme covers the development of all the area from Polk to Sixteenth Streets between State and Clark Streets. The designers assert that this not only would be sufficient for all of the seven roads using the old Dearborn Street station, but also would care for the New York Central and Rock Island lines, now housed in the La Salle Street station, and the Baltimore & Ohio, Père Marquette and other roads using the Harrison Street station.

The scheme outlined is one result of the study of the terminal problem in Chicago. The Illinois Central terminal plant is another. The New York Central lines have been making another plan and the roads using the Baltimore & Ohio terminal have also been studying and investigating. Each group is attempting to ascertain what are the maximum facilities and probable costs of a joint terminal on the area of each of the three present stations. Moreover, each group is attempting to convince railroads in the other groups that they should move to new quarters. The highly encouraging feature of the terminal situation is that all the groups concerned are studying the subject.

This plan proposed by the Dearborn station group would include the opening up of Dearborn Street as a two-level traffic route to the south, and it contemplates the development of the air rights as has been done at Grand Central in New York. This would increase property values tremendously to the south of Chicago's loop.

Co-operative Plan in Buffalo

Mitten Management Formally Adopts Philadelphia Ideas of Application on International Railway

Rapid progress is being made by the International Railway, Buffalo, N. Y., in the organization and development of the new International Railway Company's Co-operative Benefit Association. R. R. Ray, formerly with the Philadelphia (Pa.) Rapid Transit Company, is secretary of the association. The collective bargaining plan has also gone into effect. Former disciplinary measures were set aside on Dec. 31, 1922.

The new association is open to all platform and other employees of the International who have been in service thirty days or more. The membership benefits include life insurance of $1,000 payable at death; sick benefits of $1.50 a day for a maximum of 100 days, and a pension of $40 a month. The dues are $1 a month. Local units of the association have been formed in Buffalo, Niagara Falls and Lockport and the employees in various departments already had elected their representatives.

Herbert G. Tulley, president of the International, says that most of the trainmen employed by the company to take the places of the men who have been on strike since July 1, 1922, have become enrolled in the new organization and there is now on foot a movement in the various departments to have 100 per cent membership.

As for the co-operative plan, a booklet has been issued describing its working under the Mitten management in Philadelphia. Under the Mitten plan in Buffalo, the basic maximum wage of 55 cents an hour has been fixed for one year from Dec. 31, 1922. Thereafter the basic maximum wage will be determined by a 50 per cent employer-employee committee with corresponding adjustments in all departments, consideration being given to cost of living and ability of company to pay. In all other respects the plan as applied to the International follows closely the lines of the plan in effect in Philadelphia.

New Texas Interurban Line Opened

Dallas-Terrell Line, Opened Jan. 14, Is 31.5 Miles Long and Cost $2,000,000—Work of Building Completed in Less than Twenty Months—Right-of-Way 100 Ft. Wide

THE Texas Interurban Railway, extending from Dallas, Tex., to Terrell, 30 miles east, was placed in operation on Jan. 14. The formal inspection tour was made on Jan. 13, when a special car bearing officials of the line, city officials of Dallas, Terrell, Mesquite and Forney, towns touched by the line, and other invited guests made a trip from Dallas to Terrell and return. Cars leave Dallas at 6.15 a.m. and Terrell at 6.45 a.m. daily and thereafter hourly until 11.15 and 10.45 p.m. One hour and twenty minutes is required for the one-way trip.

The Dallas-Terrell Interurban line represents an investment of approximately $2,000,000. The investment of this sum in an electric railway in the face of competition from buses, steam railways and automobiles is regarded as an outstanding mark of confidence in electric railway transportation.

At the time of the granting of the railway franchise in Dallas to the Dallas Railway, in 1917, the Electric Bond & Share Company, New York, and the United Electric Securities Company, Boston, joint owners of the Dallas Railway, agreed with the city of Dallas to build two interurban lines, each at least 30 miles long, from Dallas to points outside. Several extensions of time were granted on account of the war and inability to finance the lines on account of money stringency, but finally the Dallas-Terrell line was decided on as one of the two.

Construction was begun in March, 1921. A contract was previously entered into by the Texas Interurban Railway and the Texas Construction Company, under which the Texas Construction Company agreed to deliver to the newly formed interurban company a completed electric line extending from Dallas to Terrel, 31.5 miles in length, together with all equipment ready for operation. The Texas Interurban Railway is the operating company.

In the organization of the Texas Construction Company, B. R. Brown was named chief engineer. He has had entire charge of all the engineering work in the construction of the Dallas-Terrell line. Sam R. Fowler was named general superintendent of the Texas Construction Company. He has had entire charge of all the construction work. Richard Meriwether, vice-president and general manager of the Dallas Railway, was also named vice-president and general manager of the Texas Construction Company. He has been in close touch with Chief Engineer Brown in supervising the design and construction of the new line. W. R. Burns, assistant secretary and treasurer of the Texas Construction Company, has had charge of all financial matters in connection with the building of the line. H. N. Clagett, Forney, and B. H. Hart, Mesquite, were named resident engineers, the residency of Mr. Hart extending from the Dallas County line to the city of Dallas and the residency of Mr. Clagett extending from the Dallas County line to the city of Terrell. B. F. Cook, electrical engineer, has had charge of the installation of the automatic substation equipment, while the overhead construction has been under the supervision of Frank Steger, general line foreman.

The operating personnel of the Texas Interurban Railway is composed of Richard Meriwether, vice-president and general manager; J. B. Walker, secre-

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tary and treasurer; M. B. Parsons, superintendent of maintenance and operation; L. W. Tate, assistant secretary and treasurer; R. L. McGregor, chief dispatcher, and Mr. Owens, dispatcher.

The Dallas-Terrell interurban passes through Mesquite, 12.1 miles east of Dallas, and Forney, 19.7 miles east of Dallas. Mesquite has a population of 800 and Forney approximately 1,500. The density of population along the line is about 1,200 to the mile.

The country between Dallas and Terrell is fairly level, and the line has been built with a maximum grade of 3 per cent. The curvature is unusually light, there being one tangent of 12 miles between Forney and Terrell and at a point between Forney and Dallas a tangent of 6 miles.

Grading was begun in March, 1921, and track laying was started in June, 1922. The line was completed in twenty months. A total of 468,000 working hours, exclusive of grading, was required in the construction of the line, a force of 300 men being employed.

Although the territory traversed by the line is prairie, a total of 424,525 cu.yd. of dirt had to be removed in the construction of the roadbed, and after grading was finished 2,500 carloads of gravel ballast, 30 cu.yd. to the car, were used. Other materials used in constructing the line aggregated 370 carloads.

There are 4,800 ft. of timber trestles and three steel span bridges on the line. The trestles consist of four treated pile bents, spaced 14 ft. center to center. Where creek beds are rock, concrete footings and 12x12 pine posts have been substituted for piling. Drainage has been well cared for, reinforced concrete pipe having been used in the construction of culverts. The right-of-way for the entire distance is 100 ft.

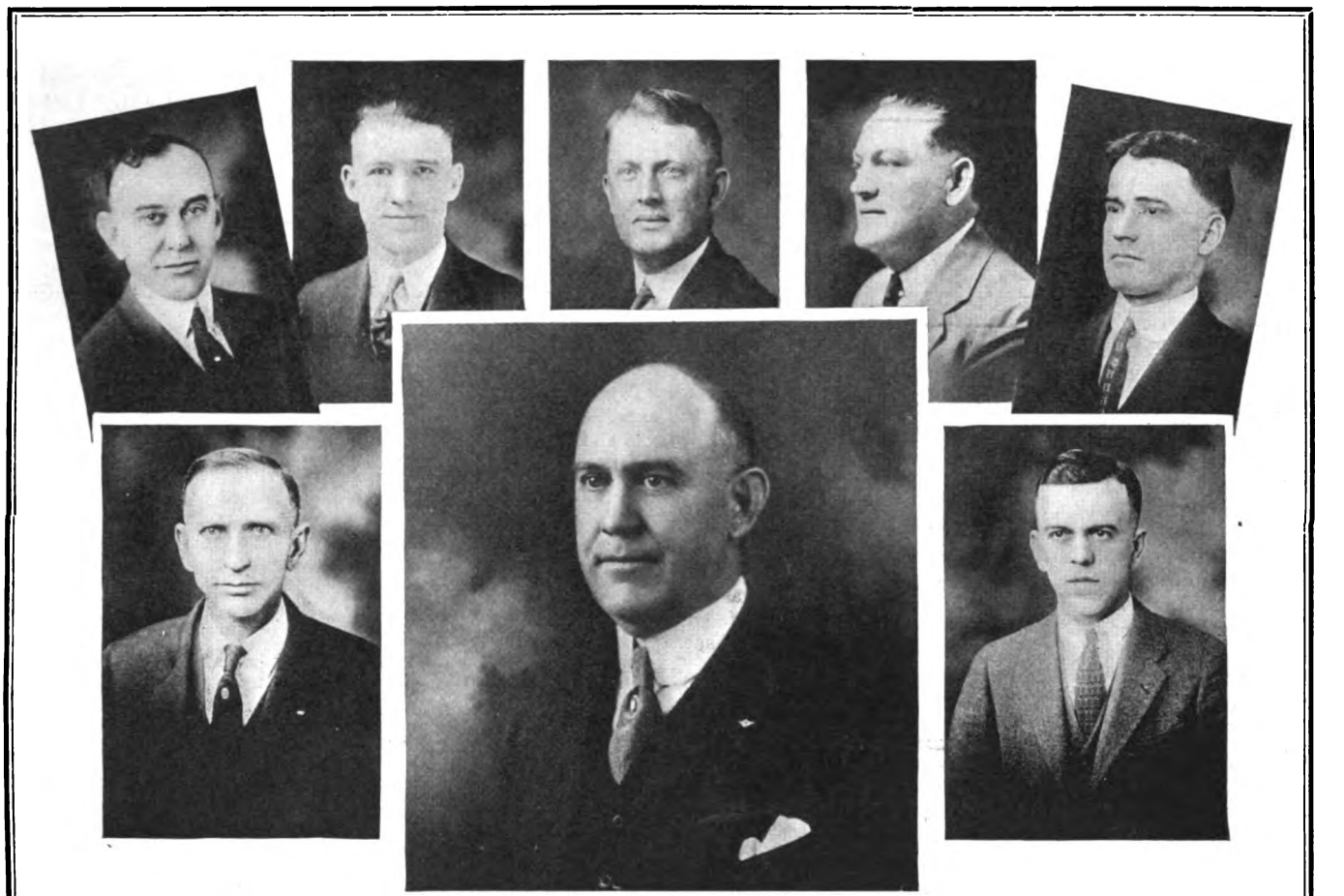
No expense has been spared to make the road safe in every way, and on the entire line there is but one main pipe crossing between Dallas and Terrell. An overhead crossing over the Texas & Pacific has been built just outside the city limits of Dallas at a cost of $40,000.

The track over the entire line is in double-track position, 70-lb. A.S.C.E. rail laid to standard gage, with 6-in.x 8-in.x8-ft. oak ties spaced 2 ft. centers. Specifications for the double track call for gravel ballast with at least 6 in. of gravel under the ties. The overhead construction is of the standard span type, with creosoted 35-ft. pine poles, spaced 150 ft. apart.

Five passenger and two express cars were purchased. They were built by the American Car Company. Specifications of design were submitted by the Texas Construction Company. The cars are designed for operation by one or two men. They will be operated by one man except during the rush season.

There are seventeen stations along the line, exclusive of the handsome brick stations at Dallas, Terrell, Forney and Mesquite.

Two automatic substations have been installed, this being the first time the automatic substation has been used in this part of the country.



OFFICERS OF THE TEXAS INTERURBAN RAILWAY

Top Row (from left to right)—R. L. McGregor, L. W. Tate, T. H. Owens, M. B. Parsons and W. R. Burns
Bottom Row (from left to right)—Sam R. Fowler, Richard Meriweather and B. R. Brown

Electrification of Temiskaming & Northern Recommended

A report recommending the electrification of the Temiskaming & Northern Ontario Railway, which was prepared by S. B. Clement, chief engineer, and J. G. G. Kerry, consulting engineer, of the company, is now being considered by the Railway Commission and Premier Drury of the province of Ontario. The committee said:

We recommend electrification of the main line from North Bay to Cochrane (253.3 miles), and of the Iroquois Falls sub-division (7 miles) and Porcupine sub-division (33.1 miles), as providing a sound and self-supporting investment for the capital funds of the province in a further development and upbuilding of Northern Ontario. We recommend that the commission take immediate steps to secure title and control of water powers on the Amable du Fond, Blanch and Frederick-House Rivers.

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We recommend that after title to these water powers has been secured, opportunities should be given to the companies operating power plants in the district to tender on the supply of electric power for the commission.

In discussing the report, Chairman Lee said:

The margin is so close between the cost of the present operations and that which would occur under electrification that there is some hesitation in proceeding immediately with the scheme. Its success will depend altogether on the volume of future traffic. The estimated cost of electrifying the line to give it a capacity to handle the expected 1925 traffic, calculated at 25 per cent greater than that handled in 1921, is $11,214,778.

The Temiskaming & Northern Ontario Commission, in presenting the report to the Ontario Government, recommended that electrification be postponed for the present, and was authorized by the Government to continue its investigations in the matter.

Toronto Spending Lavishly on Its Municipal Road

Under municipal ownership the city of Toronto, Ont., will have a local transportation service probably second to none anywhere in the world for a city of its size. It is a thorough job that the Toronto Transportation Commission is doing in re-building the lines of the Toronto Railway, but the costs are piling up. Even the Toronto *Globe*, a strong advocate of the idea of city ownership, has shown concern about the matter lately. The *Globe* expresses alarm at the expenditure of another couple of millions on carhouses. That paper continues:

Already sums totalling almost $25,000,000 have been spent on reconstruction. The arbitrators who will determine the value of the system when taken over in September, 1921, have not yet given their award, but it is not likely to be less than $10,000,000. The city's share of the cost of arbitration will be little short of a million. The civic car lines, built before 1921 and now incorporated in the Transporation Commission's system, cost $2,750,000 and interest and sinking fund on them must now be met from street car fares. The total expenditure on which interest must be paid will be more than $40,000,000 when payment is made for the old Toronto Railway and the shops now contracted for are completed.

In the civic estimates of 1922 the amount required for interest and sinking fund charges on the then street railway capital investment of $29,481,000 was $1,835,000. On $40,000,000 it will be, roughly, $2,500,000 a year. The annual charges of the Toronto Railway before the stock ceased to pay dividends were slightly under $1,200,000. The capital charges of the reconstructed road will be more than double those of the Toronto Railway.

Service-at-Cost in Milwaukee

Service-at-cost operation of the electric light and street-railway public utility properties of the Milwaukee Electric Railway & Light Company in Milwaukee and the ultimate purchase of the property by the city are provided for in a contract which the public utilities committee expects to present to the City Council within the next two weeks, according to Fred S. Hunt, chairman of the committee. The contract must be ratified by the Council and authorized by a state law. Then the voters of the city must accept it. The value of the electric light and street railway properties will be fixed and the rate of return to the company agreed upon. The rates to be charged by the company will be fixed by the city, subject to appeal to the State Railroad Commission. Surplus revenues beyond the rate agreed upon will belong to the city.

Newburgh Prepares for Complete Bus Operation

The Orange County Traction Company, Newburgh, N. Y., is preparing to get rid of its electric railway system and to supplant the entire line with buses. This change from railway to bus operation dates back to the fall of 1922 when the company replaced its crosstown railway lines with motor buses and organized a subsidiary, the Newburgh Public Service Corporation, to conduct its bus business. This company has since been granted a franchise by the Council to operate buses over the company's 6-mile route from Newburgh to Orange Lake which passes through one of Newburgh's suburban residential districts. A similar petition is now before the Public Service Commission. The latest development is the plan to turn its main city line over to the bus corporation, effective on May 1, 1923.

The fact that the crosstown bus lines carried more passengers than the trolley lines coupled with the fact that the cost of operation was about 37 per cent cheaper influenced the railway in reaching this decision.

Shore Line Bought—Operation Planned

A. William Sperry of the Sperry Engineering Company and a prominent engineer of New Haven, Conn., is negotiating to purchase from the Shore Line Electric Railway the portion of the line on the east shore road from New Haven, Conn., to Saybrook, Conn. He plans to issue bonds of $400,000 shortly, the necessary amount estimated to put the line in operation. It has not been used since 1919. Mr. Sperry was one of the builders of the road back in 1907. He stated that the power would be furnished by the Connecticut Company and that arrangements were to be made so that cars of one company could operate over the other's tracks. Mr. Sperry also stated that one-man type of cars would be used when the line was put in operation.

Mr. Sperry is confident that under the latest developed methods of electric railway operation the road can be run successfully. He is reported to have said:

Since the shutting down of the road in July, 1919, several parties have negotiated for the purchase, but for various reasons were not successful in financing and putting the proposition together.

It is proposed to re-equip the road with light-weight, double-truck, one-man, safety cars, seating forty-four people, abandon the power house and purchase power in New Haven and build new substations in North Branford and Clinton.

Among the many advantages that the new company will have over the old company are the very small capitalization, the light-weight cars with small cost of operation, the low cost of power, the great reduction in labor devices and the one-man safety cars, the reduction in the cost of highway maintenance and taxes due to state legislation, development in the several towns since the road shut down and the establishing of the large State Park at Hammonassett Beach, Madison. If the economies can be made that appear possible, the Shore Line should prove a profitable venture.

City Administration Proceeds with Rapid Transit Plan

Despite the hostile attitude of City Council and prospects of blocking plans for high-speed transit lines under existing law, Mayor Moore of Philadelphia, and the city administration proceeded on Jan. 23 with plans to advertise for bids for the Broad Street subway by March 1.

Mayor Moore declared many letters have been received by him indorsing his attitude for a return of the 5-cent fare. While these communications were being received, the Philadelphia Rapid Transit paved the way for speeding up the hearings on its property valuation case before the members of the Public Service Commission.

The Mayor issued the following statement:

Director Twining and the Mayor were in conference this morning concerning high-speed transit lines. The Mayor has asked the director for answers to certain specific inquiries and they are being prepared. They are expected to advise the public fully as to work on the Broad Street subway and the comprehensive plans. One of the subjects under discussion had to do with the suggested loop or extension of the Broad Street subway east on Ridge Avenue to Spring Garden, thence to Seventh Street, south on Seventh Street to Christian and west to Broad.

This is Director Twining's suggestion to relieve the fierce congestion contemplated by any right angle eastern extension from Broad Street to City Hall. The Mayor is inclined to agree with the director that the Ridge Avenue-Seventh Street loop would satisfy all interested and would accommodate the greater number of people employed east of City Hall who want to make connections north and south.

This proposed loop extension was under discussion between Director Twining and the engineers of the Philadelphia Rapid Transit Company, and was partially agreed to by Mr. Mitten's engineers before the president of the Philadelphia Rapid Transit Company broke off negotiations. The Mayor said he had no doubt this eastern extension would be brought to the attention of the Council, and when his own inquiries of the director were answered the comprehensive plan, including the Broad Street subway itself, would be better understood.

Appeals to Interstate Commerce Commission

The Supreme Court of the State of California has refused to grant a rehearing to the California Railroad Commission in the matter of the latter body's recent order for constructing a joint union passenger terminal for the steam roads and interurban railway lines entering Los Angeles. The Supreme Court on Dec. 19 annulled the order saying that the commission had exceeded its jurisdiction in ordering the project.

When the court set aside the board's order, the commission announced its intention to appeal for a rehearing. This being refused, the commission, through its chief engineer, Richard Sachse, has now appealed its case to the Interstate Commerce Commission, the commission's chief engineer also appearing in behalf of the city attorney of Los Angeles. The matter has been reviewed in the ELECTRIC RAILWAY JOURNAL, issue of Dec. 30, 1922 and Jan. 6, 1923.

On Jan. 23, 1923, the Municipal League of Los Angeles, in suggesting that the proposed union railroad terminal in Los Angeles be constructed at the intersection of Sixth Street and the

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Los Angeles River instead of at the Plaza Terminal, forwarded to the Interstate Commerce Commission an appeal that an investigation of the situation more far reaching than that of the State Railroad Commission be made.

In the brief forwarded it was suggested that a unification of all terminal facilities, excepting freight depots, including main tracks and spurs from the entrance of the city of Los Angeles to the harbor of Los Angeles be considered. Such an investigation as proposed would cover the entire holdings of the railroads involved in the matter. The proposed site suggested by the Municipal League is owned by the Union Pacific.

With acceptance of this site as a terminal, the league pointed out, unreasonable construction and operation expenses would be curtailed, saving the three transcontinental lines involved huge sums that could be devoted to improvements. In supporting the pleas for the Sixth Street site, the league cited specific undesirable features of the terminal recommendations as made by the State Railroad Commission.

New Bus Proposal in Saginaw

For the first time since the suspension of service on Aug. 10, 1921, by the Saginaw-Bay City Railway the citizens of Saginaw will express their choice March 7 on a definite motor bus proposal for a city wide operation. On that date a franchise will be submitted granting to the Saginaw Motor Omnibus Company, the right to do business. A week ago a franchise was presented to the Council, but on Jan. 27 all action was rescinded, and a new measure approved and ordered submitted. The salient points of the measure are:

Term of grant, ten years.

Streets that will be served are named and cover present routes of the Saginaw United Transit Company, the outgrowth of the jitney buses with some additions. The routes will be determined after a traffic survey has been made by the grantees' engineers.

Council may order additional routes, but if there is a dispute between the city and operating company, it is to be settled by arbitration, each party to choose one, and if the two cannot agree, they are to select the third and the decision of the three is to be final.

All reasonable rules and regulations for the safety, welfare and accommodation of the public are to be made by the city.

All competition is to be prevented by legislative acts of the City Council.

All vehicles are to be of at least twenty-five passenger seating capacity and to be wide tread.

Rate of fare, 6-cent cash fare, eight school tickets 25 cents; universal transfers; firemen and policemen to be carried free. Council may compel company to issue ticket strips for the convenience of the public. The company reserves the right to charge a 5-cent fare to endeavor to increase the revenue passengers and may return to the 6-cent fare at its discretion.

City may purchase the property of the company on fifteen days' notice in writing, value to be fixed by arbitration. The value of the franchise is not to be considered.

The grantees are Leonard A. Henning, Saginaw, and John Wade, Atlantic City, N. J. They can not transfer or dispose of the franchise until a company is organized under Michigan laws, of at least $500,000 capitalization, $100,000 of which must be paid in, in cash, and orders placed for not less than forty buses. In addition to the grantees there are associated in the enterprise, Samuel Bogert and Walter Kutzleb, New York.

Want Road Restored to Owners

The railroads committee of the general Assembly will soon introduce a resolution which, if passed would place the Connecticut Legislature on record as favoring the return of the Connecticut Company to its owners and the discharge of the federal trustees, who are now in charge of the road. By federal decree of some years ago, dividing up the New Haven Road property, the Connecticut Company's affairs have been administered by five trustees, whose total yearly salary is about $35,000.

The road is under jurisdiction of the Interstate Commerce Commission and the General Assembly has no power over it as far as changing its present status is concerned. It is, however, the sentiment of the committee on railroads that some steps should be taken to restore the road to its owners, and a bill to this end will be introduced.

Committee Formed to Promote Better Relations

The Washington Committee on Public Information, with E. H. Thomas, formerly a newspaper man, as director, and offices in the Henry Building, Seattle, has been formed by the power, light, electric railway and a part of the gas utilities of the state. The director said that the purpose was to promote better relations between utility companies and their customers by bringing about a more complete understanding of its business by the general public and a more complete understanding of the general public by the men who conduct this great business. In part he said:

Our committee exists to furnish accurate information and facts about our business to any citizen or group of citizens. We will prepare and send out weekly information about the various phases of our industry.

We do this in the belief that our business, which touches so intimately the domestic, social, commercial and industrial life of the people, is a matter of concern to the public.

In addition, we desire to offer the services of the committee as a bureau of general information on matters pertaining to the public utility business.

News Notes

Crash Demolishes Cars.—More than two score passengers were injured recently on the Buffalo-Niagara Falls high-speed line of the International Railway, Buffalo, N. Y., when a two-car train crashed into an electric locomotive near the Niagara Falls city line. The two cars were practically demolished.

Will Start New Department.—The city of Houston will establish a public utility department within sixty days with a complete staff to handle matters pertaining to the gas, electric light and electric railway companies. The expense of this new department by agreement will be borne by the public service corporations and the city.

Beacon Appears Every Month.—The Elmira Water, Light & Railroad Company, Elmira, N. Y., started some time ago the publication of a monthly entitled *Water-Light Beacon.* The pamphlet is issued in the interests of the Water-Light Employees' Association and devoted to the purpose of increasing co-operation between the customers and employees.

Fire Destroys Building.—The three-story building occupied by the St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo., was almost totally destroyed and wrecked by a fire recently. Several adjoining buildings also were badly damaged. The loss to the railway was approximately $75,000. Two firemen were injured.

Contract Signed.—The 1923 contract between Division 732 of the Amalgamated Association and the Georgia Railway & Power Company, Atlanta, Ga., was signed recently by P. S. Arkwright, president of the company, and B. E. Cook, president, and W. A. Skelton, recording secretary, of the local union. No significant changes were made in the contract.

Electrification Recommended.—In his annual report to the City Council R. C. Turner, city electrician of Atlanta, Ga., has recommended the electrification of all railroads operating within Atlanta's city limits. Mr. Turner believes that all railroads entering Atlanta should be compelled to abandon their steam engines at the city limits and enter under electric power.

Ontario Properties Disagree.—The managements of the Port Arthur and Fort William Railways in Ontario are disagreeing over more frequent service in Fort William and also a higher wage scale for the employees. Port Arthur has not agreed to the arrangement and Mayor Edmeston of Fort William has threatened to dissolve the joint agreement so that two systems shall be run separately. The cars of either city now run through the other.

Bill Requires Full Crews.—A bill introduced by Mr. Higgins in the Senate on Jan. 26 at Albany would require full crews of uniformed guards for subway and elevated trains, of at least one guard to the car. However, the employment of one uniformed guard to operate the entrance and exit doors or gates of not more than two connected cars will be allowed on any subway or elevated passenger road made up wholly of cars having non-automatic and unlocked swinging or sliding doors at either end to permit free movement of passengers from car to car.

Employees Will Have Annual Dinner.—Veteran employees of the Twin City Lines, Minneapolis, Minn., will have their association annual dinner Feb. 3 in the dining hall at the Snelling station in St. Paul. Most of the twenty-three men who entered the service of the company in the 80's are expected to attend. Horace Lowry, president of the company, will return from the south in time to make an address. About 325 men who have been in the service twenty years or more have been invited by F. A. Anderson, social service director. Vice-president T. Julian McGill will give a talk.

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Financial and Corporate

Reorganization Outline

Ohio Roads Will Be Continued in Service —Drastic Changes Proposed in Financial Structure

A plan has been worked out for the reorganization of the Columbus, Newark & Zanesville Electric Railway and the Columbus, Buckeye Lake & Newark Traction Company which provides for continuing both of these properties in regular operation. It also contemplates the payment of the general creditors in full. So far as the security holders are concerned, no provision is made in the plan for any holder of any of the bonds who does not deposit under the respective deposit agreements and assent to the plan and pay his assessment, nor is any provision made for any common or preferred stockholder of either company except such preferred stockholders as may purchase the right to subscribe to the securities of the new company.

Under the plan as now proposed, the successor company will be known as the Columbus & Zanesville Power & Railway Company. With respect to the details of the exchange of the various securities, this is of particular interest only to the holders of them. In this connection, however, it is of interest to note that Day & Zimmermann have submitted an estimate of earnings for the years ended Sept. 30, 1923, 1924 and 1925, with the new securities taken into consideration, which shows a balance of $12,600 available for car trust rentals, amortization, depreciation, federal taxes and dividends for the 1923 year, a balance of $209,900 for the 1924 year, and a balance of $263,700 for the 1925 year.

The reorganization committee points out that the railway lines of the Columbus, Buckeye Lake & Newark Traction Company and the Columbus, Newark & Zanesville Electric Railway constitute a single operating entity. The interurban line connecting Columbus, Newark and Zanesville is a through route, with a large volume of traffic passing between the sections upon which the Buckeye mortgage and the first mortgage are respectively a first lien. The disruption of this through route would largely destroy the earning power of both sections. The first mortgage is a first lien on about 80 per cent of the mileage of the Newark city line, the Buckeye mortgage being a first lien on the balance. A large part of the power used by the light and power property in Zanesville is generated in the Hebron plant, upon which the Buckeye mortgage also is a first lien. On the other hand, substantial and valuable portions of the railway system were constructed out of the proceeds of the general mortgage bonds.

It is pointed out that under such circumstances the segregation of the property according to mortgage liens is impracticable, because it would destroy the earning power of the property and greatly increase the expenses of operation through the multiplication of overhead expenses incident to a number of separate operating organizations. A very substantial equity in earning power, both present and potential, in the Zanesville Light & Power property accrues to the first mortgage (constituting a second lien thereon) and to the general mortgage (which has a third lien thereon). The committee says that the successful reorganization must be predicated upon the retention of the equity in this earning power and the physical property from which it accrues.

An interesting part of the plan is that the reorganization managers will cause the common stock of the new company to the amount of $2,670,000 to be deposited in a voting trust for a period of ten years.

The Columbus, Newark & Zanesville Electric Railway was incorporated on July 2, 1902, in Ohio. On April 1, 1904, it purchased the property and franchises of the Newark & Granville Street Railway. On June 1, 1906, it purchased the property and franchises of the Columbus, Buckeye Lake & Newark Traction Company, subject to the $1,243,000 bond issued in 1901 still outstanding. On June 1, 1906, the property and franchises of the Zanesville Railway, Light & Power Company were also purchased. At the time of this acquisition the property was subject to a mortgage on the electric railway, of which $270,000 was outstanding, due Feb. 1, 1919, extended to Feb. 1, 1924, at 7 per cent. At the present time the bonds have been refunded to the amount of $247,000, leaving still outstanding $3,000. On June 23, 1906, the property and franchises of the company were leased to the Indiana, Columbus & Eastern Traction Company. On Aug. 1, 1907, this lease was assigned to the Ohio Electric Railway. The Indiana, Columbus & Eastern Traction Company and the Ohio Electric Railway became insolvent in 1921, and the leases previously mentioned were terminated.

$1,545,055 Net for Boston Elevated

Reduction in Basic Ten-Cent Fare Awaits Payment of Loans to Cities and Towns and Passage of Legislation to Remove Burdens Unjust to Car Rider—Public Trustees Hopeful for Future

THE fourth calendar year of public operation of the Boston (Mass.) Elevated Railway shows a balance remaining after providing for all costs of service of $1,545,055 after making allowance for delayed charges and credits. In July the trustees having restored the reserve fund to $1,000,000, as required by law, paid $517,196 to the cities and towns on account of their loan to meet the deficit of the first year of public operation. The unpaid balance of that loan is now $3,462,955. A substantial surplus is expected to be available next July for the second payment to these cities and towns, but the trustees report that the probable amount cannot be definitely stated in view of the well-known sensitiveness of railway costs to climatic conditions and market fluctuations in the commodities which are used. The succession of storms during the past six weeks has already cost more than $200,000. Change of a dollar in price of a ton of coal makes a difference of $275,000 in operating expense for the year.

While the trustees were engaged in the financial struggle against operating losses and for restoration of the credit of the railway the public was patient with them, but no sooner did it become known that the road had reached a self-supporting basis than demands began to pour in on them. The taxpaying public urged the prompt reimbursement of their loan of 1919. The riding public appealed for lower fares. An equally large traveling public, less interested in fares than in service, urged larger accommodation. Restricted in law and still limited in revenue the trustees endeavored to meet in part each of these public needs. A large payment was made into municipal treasuries in reimbursement of loan. The 5-cent fare

COMPARATIVE DIVISION OF RECEIPTS AND EXPENDITURES FOR YEAR ENDED DEC. 31

	1922	1921	1920	1919	1918
Total receipts	$32,699,176	$33,277,025	$34,031,636	$29,498,582	$21,062,692
Operating expenses:					
Wages	14,772,340	15,563,255	17,216,445	15,539,105	11,007,362
Material and supplies	2,903,650	3,093,934	3,310,858	3,640,065	3,248,317
Injuries and damages	555,355	518,249	640,165	701,907	792,783
Depreciation	2,004,000	2,004,000	2,004,000	2,004,000	1,184,670
Fuel	1,853,111	1,663,617	2,587,652	1,815,260	1,762,963
Total operating expenses	$22,088,458	$22,843,056	$25,769,122	$23,700,339	$17,996,097
Taxes	1,587,186	1,546,758	1,142,987	1,045,502	917,515
Rent of leased roads (Including Dividend Rental under Chap. 159, Acts of 1918)	3,727,859	4,203,061	4,102,230	4,002,656	3,233,546
Subway and tunnel rents	1,927,150	1,963,737	1,790,432	1,516,047	1,235,974
Interest on borrowed money	1,891,315	1,494,258	1,514,963	1,555,790	1,302,157
Miscellaneous items	65,016	54,707	59,067	60,346	22,343
Total cost of service	$31,286,987	$32,105,580	$34,378,803	$31,880,682	$24,707,633
Loss for year	.....	.....	$347,167	$2,382,099	$3,644,941
Gain for year	$1,412,189	$1,171,444	.....	.....	.....

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has been extended from time to time under the plan adopted for its development. The trustees point out, however, that while the 5-cent fare should completely cover transportation between community centers the 5-cent fare cannot now nor in the future become a general substitute for or an active competitor with the higher basic fare whether that be as at present 10 cents or, as it may be later, a lower charge. No substantial invasion of net revenue can be allowed until cities and towns have been reimbursed nor wherever such invasion would unreasonably postpone reduction in the higher fare. To meet the request for larger accommodation additional beneficial changes have been made in operation.

The accompanying comparative table presents a summary of receipts and expenditures for the past and preceding years.

During the year, with a view to more efficient service, additions were made to rolling stock. Thirty-six new steel cars have been placed in commission in the elevated service. Additional flat cars and snow sweepers have been purchased. In April 100 semi-convertible cars of the most modern type were ordered and seventy-one of them are now in use. These cars may be operated by either one man or by two men. Recently 100 more of this type of cars have been ordered for early delivery. For train service in the East Boston Tunnel forty steel cars have been ordered.

During the year approximately 21 miles of track were rebuilt and 7½ miles improved by substantial repairs. The new elevated car repair shop at Forest Hills is about completed and ready for use. The first unit of the new store house at George Street in Charlestown for the use of the maintenance department is nearly complete and construction of the second unit is under way.

TRAFFIC

The accompanying tables show that 19,341,862 more revenue passengers were carried in 1922 than in 1921 and that the total of 356,593,942 is the largest number carried in any year of public operation. This is ascribed by the trustees in part to the general awakening of business activities and in part to the extension of 5-cent fare routes. The increase of 868,391 in car mileage and of 285,947 round trips in comparison with the record of the preceding year indicates the increase in the service.

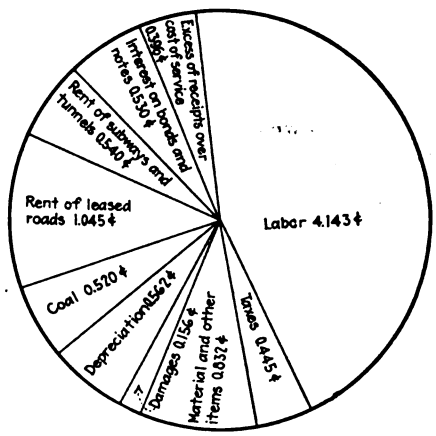
The trustees believe that where there is no compelling need of the most drastic economy the general substitution of the one-man car is not desirable. They are convinced, however, that the one-man car has its proper place on the Boston Elevated Railway, as proper as that of the train or the individual two-man car or the motor omnibus; that its use means more frequent service and often makes possible the development of the 5-cent fare. They do not agree that it is suited to conditions of heavy traffic for the reason that its use is then apt to annoy passengers in boarding the car and to interrupt schedules, causing delays that interfere with convenient and efficient service.

COMPARATIVE PASSENGER STATISTICS
REVENUE PASSENGERS CARRIED

Year	Weekday Average	Saturday Average	Sunday Average	Holiday Average	Total for Year
1922	1,030,303	1,144,320	617,148	691,890	356,593,942
1921	975,745	1,068,295	578,860	696,691	337,252,080
1920	960,737	1,072,319	591,063	703,634	335,526,561
1919	934,918	1,078,635	596,182	706,429	324,758,685
1918	985,384	1,147,809	658,902	775,634	348,664,700
1917	1,073,943	1,249,588	728,847	857,902	381,017,338
1916	1,050,038	1,218,749	718,804	832,962	373,577,908
1915	992,283	1,140,046	685,726	846,860	352,469,586

TRAFFIC STATISTICS—YEAR ENDED DEC. 31

	1922	1921	1920	1919
Round trips operated	6,059,531	5,773,584	5,764,347	6,578,069
Passenger revenue	$31,834,022.77	$32,253,629.59	$33,108,946.48	$28,767,544.11
Passenger revenue per car-mile (cents)	62.94	64.89	64.62	53.74
Passenger revenue per car-hour	$7.09	7.36	7.16	6.06
Passenger revenue mileage	50,575,088	49,706,697	51,237,527	53,533,522
Passenger revenue car-hours	4,487,400	4,381,815	4,627,295	4,749,318
Revenue passengers carried	356,593,942	337,252,080	335,526,561	324,758,685
Revenue passengers carried per car-mile	7.051	6.785	6.548	6.066
Revenue passengers carried per car-hour	79.47	76.97	72.51	68.38



Allocation of receipts per passenger

Twelve Months Ended Dec. 31, 1922. Average Receipts per Revenue Passenger 9.169c.

One of the most important railway measures before the Legislature last winter proposed the extension of the rapid transit facilities from Andrew Square to Fields Corner in connection with the purchase or taking of the Shawmut Branch of the New York, New Haven & Hartford Railroad. A bill to carry out this plan based upon the previous study and recommendation of the Department of Public Utilities is before the present Legislature. The trustees favor this project as the only one that will effectually relieve the congestion at Andrew Square.

On June 10, 1921 the railway property of the West End Street Railway, which had been operated since October, 1897, by the Boston Elevated, under lease from the West End, was consolidated with the railway property of the Boston Elevated under the provision of chapter 740 of the Acts of 1911. The consolidation was effected as provided in the statute by an exchange of the outstanding preferred and common stock of the West End at par for an equal amount at par of first preferred and second preferred stock of the Boston Elevated.

At a hearing before the Department of Public Utilities in September the trustees submitted an outline sketch of possible extensions of service. The plan was suggestive only, was not elaborate in detail, and did not reflect the conclusions of engineering experts. It served its purpose, however, in calling attention to the present need of some comprehensive and harmonious plan to which individual extensions of the Boston Elevated Railway should hereafter conform. One feature of the sketch proposes an independent trunk subway in Huntington Avenue which would provide a future extension to the north of Boston. This would bring additional rapid transit where the need is imperative. It would also provide a permanent improvement in place of makeshift changes at Park Street, making the station there less of a terminal

STATEMENT OF SPECIAL TRUST FUND, DEC. 31, 1922.

BOSTON ELEVATED RAILWAY TRUSTEE

Principal of trust fund as established	$1,500,000
Accretions and accumulations of income to June 10, 1922	707,342
Total special trust fund	$2,207,342
Income from June 10, 1922, to Dec. 31, 1922	20,112
Investmen in marketable securities and real estate	$2,207,242
Cash on deposit	20,212

BOSTON ELEVATED RAILWAY POWER STATISTICS

	1922	1921	1920	1919	1918	1917	1916
Tons of coal burned	273,441	215,870	258,087	287,670	281,677	270,452	254,735
Pounds of coal per kilowatt-hour	2.553	2.714	2.353	2.835	2.772	2.309	2.256
Average price of coal per ton	$6.777	$7.71	$10.07	$5.91	$6.26	$4.19	$5.35
Net cost of power for car service per kilowatt-hour (cents)	1.414	1.172	1.921	1.307	1.158	.620	.534
Net cost of power per total revenue car-mile (cents)	6.153	4.815	8.538	5.439	4.668	2.573	2.137
D. C. annual output (kilowatt-hours)	239,905,874	222,461,060	245,676,503	239,892,118	227,582,057	262,343,882	252,896,235
D. C. maximum hour output (kilowatt-hours)	78.755	75.905	72.295	71.700	67.965	79.535	75.380

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station and a more adequate way station. Another feature of the sketch proposes an extension of rapid transit to the north of Boston through use of the Saugus branch of the Boston & Maine Railroad in connection with the elevated line that now has a temporary terminal in Everett.

In this connection the trustees say that the Metropolitan Planning Board advocated by the Boston Chamber of Commerce and recommended by the Department of Public Utilities could achieve much for the public welfare in the study and determination of the proper methods for the development of railway transportation.

The trust fund is held by the Boston Elevated Railway under Chapter 740, Acts of 1911—"An Act to authorize the consolidation of properties and franchises of the Boston Elevated Railway and the West End Street Railway"—and represents the proceeds from the sale to the Boston Elevated Railway of real estate of the West End Street Railway which was not required in the conduct of the business. The amount so received ($1,500,000) was held by the Boston Elevated Railway and invested by it and allowed to accumulate until June 10, 1922. Hereafter the annual income therefrom will be applied toward the purchase and retirement of the second preferred stock of the Boston Elevated Railway. No part of this fund or its income can be used for any other purpose.

Community Enterprise Makes Money

At the annual meeting of the Tygarts Valley Traction Company, Grafton, W. Va., General Manager Alexander read a report showing the earnings of the company from operation for the year were $47,404; total expense $37,196 and net earnings $10,208. There was deducted from these earnings the sum of $4,126, including taxes and interest on the funded debt, which left a net profit of $6,083.

The company is a community enterprise, having been taken over by a public subscription campaign after the road had been in financial difficulties and was ready to suspend operations. Improvements needed were listed as a rotary converter for substation, more steel ties with which to complete Main Street track and the rebuilding of Doresey Street bridge, in all an expenditure of about $20,650.

Investment Company Organized

The Puget Sound Power & Light Company is seeking a broader market for its securities. As a step in this direction A. W. Leonard, president, and W. H. McGrath, vice-president, have incorporated the Puget Sound Power & Light Securities Company, with a capital stock of $50,000, to handle the common, preferred and prior preference stock of the parent company in the Pacific Northwest territory. The power company has been very successful in selling to its customers, employees and general public its preferred stock and prior preference preferred, in the last two years, having sold more than $3,000,000 of its securities in the Northwest. Officers of the new Securities Company are: A. W. Leonard, president; W. H. McGrath, vice-president; James B. Howe, secretary; F. W. Brownell, treasurer; Frank Dabney, manager.

$6.16 on Common Stock—1923 a Promising Year

For the year ended Dec. 31, 1922, the Twin City Rapid Transit Company, Minneapolis, Minn., and subsidiary companies realized a net income of $1,565,201 after charges and taxes. This is equivalent after deduction of preferred dividends to $6.16 a share earned on the $22,000,000 common stock. The net income for the previous year was $697,304 or $2.21 a share on the common stock. The income account for the year just ended is compared in the accompanying table with the previous year.

STATEMENT OF EARNINGS OF TWIN CITY LINES

	1922	1921
Gross revenue....	$13,772,647	$13,865,581
Net after tax.....	2,606,398	1,735,409
Other income	69,241	55,732
Total income...	$2,675,639	$1,791,141
Interest, etc.	1,110,438	1,093,837
Net income	$1,565,201	$697,304
Prefered dividends	210,000	210,000
Common dividends	880,000	440,000
Surplus	$475,201	$47,304

In his remarks to the stockholders President Horace Lowry referred to the valuation of the property, saying that the companies had completed their own valuations and were ready to submit their case as soon as the State Railroad & Warehouse Commission fixed the date. He said in part:

> Determination of the fair value of the properties is of first importance to both the public and the operating companies, but pending such determination we have explained to the cities the impossibility of spending for extensions, betterments and renewals any sum in excess of the amount charged to operation for depreciation.
>
> It has been made clear to the authorities of the two cities that the companies are trying to accomplish as much as possible with the funds available from this source, but that such funds so used for capital additions must be repaid to the depreciation reserve when the commission shall have finally fixed the value of the properties and authorized the financing necessary to refund outstanding bonds and provide for additional capital expenditures and future betterments.
>
> Your management believes the public has a better knowledge of street railway affairs now than in 1921. This is an important development and should help to bring about better public relations, continued good service, and a reasonable return to the stockholders on fair value of their property.

February Maturities Nearly $18,000,000

Electric railway maturities which fell due on Feb. 1 amounted to approximately $18,000,000. The largest item was the Brooklyn Rapid Transit Company's 6 per cent receivers' certificates of $14,000,000. Other items included the $1,400,000 Consolidated 5s of the Cleveland & Southwestern Traction Company and $565,000 of the Canton-New Philadelphia Railway's first 5s.

Seeks Authority for $7,192,000 Issue

The Interstate Public Service Company of Indianapolis has filed a petition with the Public Service Commission asking for authority to issue $7,192,000 of 6 per cent twenty-five-year first and refunding gold mortgage bonds to be used to retire $4,048,000 of bonds issued by the company and outstanding and to retire $3,144,000 of outstanding bonds of underlying issues on properties bought by the Interstate company. The petition asks for authority to sell the new issue at not less than 89. It is proposed to date the bonds Feb. 1, 1923, and to secure them with a mortgage on all the property of the company. The Public Service Commission issued an order Dec. 22 of last year granting a petition filed a month previous permitting the Interstate to purchase a number of properties.

Pays Rent for Using Viaduct

The Kansas City (Mo.) Railways, through its attorney, Judge James E. Goodrich, has just paid to John B. Pew a check for $34,776 for rent on the Intercity viaduct from Sept. 9, 1920, to July 1, 1922. This is the first money paid by the company to the city for the rental of the viaduct since the cars began to cross the structure in May, 1919. Judge Kimbrough Stone of the Federal court made a recent ruling which gave Kansas City, Kan., and Kansas City, Mo., $30,000 a year for the use of the viaduct by the railway. Kansas City, Kan., will receive 44 per cent and Kansas City, Mo., 56 per cent.

1923 Earnings to Be Used in Muskegon

Alanson L. Lathrop, New York, president of the American Light & Traction Company, made an unusual promise to the directors of the Muskegon Traction & Lighting Company, Muskegon, Mich., at the annual meeting recently. Mr. Lathrop told the directors that not one cent of the earnings of the company would be taken out of Muskegon during 1923. This applies both to the railway and gas services.

It is expected that the earnings of the company will be about $100,000. Plans are being made for the purchase of five cars to be put into service during the next six months, while extensions and improvement in service will also be effected as rapidly as possible.

Mr. Lathrop expressed himself as being pleased with the treatment afforded the company by Muskegon and Muskegon Heights, the two cities served. He also said that the company should not expect a return on its investment until the property had been improved.

"Many people believe we have the cars to accommodate them during the rush hours, but keep them in the carhouse," said George Steinwedel, president. "We believe the people should know that all available cars are in operation, and that we are doing all possible to give service."

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Interborough Has Good Quarter

Net earnings of the Interborough Rapid Transit Company, New York, for December, made public on Jan. 30 amounted to $494,247 after allowing for interest on bonds, leaving a balance of $344,247 after the deduction of the dividend on the Manhattan Railway stock under the plan of financial readjustment now in effect. For the last quarter of 1922 earnings ran well ahead of the requirement for the Manhattan dividend, now at the rate of 3 per cent.

STATEMENT OF NET EARNINGS OF THE INTERBOROUGH SYSTEM UNDER THE READJUSTMENT PLAN

	Month Dec. 1922	Three Months Ended Dec. 31, 1922
Total revenues	$4,959,770	$14,539,959
Operating expenses, taxes and rentals paid city for the old subway	3,402,783	10,158,490
Income available for all purposes	$1,556,986	$4,381,468
Fixed charges:		
Interest on I. R. T. 1st mortgage 5% bonds	$669,203	$2,007,611
Interest on Manhattan Railway bonds	150,686	452,060
(A) Interest on I. R. T. 7% secured notes	190,908	573,747
	$1,010,799	$3,033,418
	$546,187	$1,348,050
(B) Interest on I. R. T. 6% ten-year notes	968	968
Miscellaneous income deductions	50,971	150,630
	$51,939	$151,599
Earnings without deducting the sinking fund on the Interborough Rapid Transit first mortgage 5% bonds ($176,758 for the month of December and $529,895 for the quarter), which, under the plan, does not become operative until July 1, 1926, but which must be deducted from earnings of the system before arriving at the sum available for dividends on Manhattan stock	$494,247	$1,196,450
Dividend on $60,000,000 Manhattan stock at 3% annual rate	150,000	450,000
Balance	$344,247	$746,450

RECONCILIATION WITH REPORT TO TRANSIT COMMISSION

	Month Dec. 1922	Three Months Ended Dec. 31, 1922
Net corporate income as reported to Transit Commission	$167,489	$216,555
Deferred sinking fund (accrued but not paid)	176,758	529,895
Equals above balance	$344,247	$746,45

NOTES: (A) When the plan was consummated it became operative generally as of July 1, 1922. However, as to both note issues the changes in fixed charges intended to be brought about by the readjustment were not effected until almost the close of the year. For both the month and the quarter ended Dec. 31, 1922, the interest on the 7% secured notes, shown above, is calculated on the portion of the entire $38,144,400 of three-year notes of 1918 chargeable to operation, rather than on $34,330,000 of new ten-year notes. Consequently in similar statements for subsequent periods this item will not be so large.

(B) $10,500,000 of the new ten-year 6% debenture notes having been issued on Dec. 27, 1922, the foregoing statement takes up interest on that issue for only four days. Attention is directed to the fact that after deducting all other interest charges there was available for interest on these notes $493,215 in Dec. and $1,197,419 for the quarter. The interest on this entire issue for corresponding periods would be $52,500 and $157,500 respectively.

In commenting on the figures, Colonel Grayson M.-P. Murphy, chairman of the executive committee of the company, declared that while all requirements under the plan were not earned during the last half of 1922, when the plan was operative for the first time, there is every indication that they will be before the end of the fiscal year on July 1, 1923. This belief is based on the fact that if earnings are as good the next two quarters as they were in the last, requirements will be covered by a satisfactory margin.

The Interborough continues to carry out its policy of introducing a number of economies, President Frank Hedley stating that the savings from use of the feather-weight gates have paid for their installation three or four times over during the year.

Col. Murphy also stated that December earnings were large enough to allow a sum of $48,839 to be credited against the city's investment in the rapid transit lines. However, no payments can be made to the municipality until accrued preferentials amounting to $9,536,070 have been taken into account. This $9,536,070 is the amount the subway has failed to earn up to the present time before the city participates in any profits. For the quarter, earnings fell below the preferential requirement, so that payments to the city are farther away than ever.

Colonel Murphy explained that the figures were not in comparative form because the financial readjustment made it impossible except for the items of gross and net. The gross for the three months ended Dec. 31, 1921, was $14,140,048, while the net was a deficit of $194,603, making the showing for the last quarter of 1922 $411,158 better than that for the last quarter of 1921.

Directors Elected

On Jan. 8 a stockholders' meeting of the Olean, Bradford & Salamanca Railway was held in Olean, N. Y., vice-president James P. Quigley presiding, for the election of a board of directors and the transaction of the general business of the company.

The following directors were elected: C. N. Mason, L. W. Osborne, W. O. Hay, Jr., James P. Quigley, W. A. Dusenbury, W. G. Baker, Jr., H. M. Watts, T. Duncan Whelan and E. B. Vreeland.

At a meeting of the board of directors held on Jan. 25 in New York City C. N. Mason was re-elected president of the company, James P. Quigley was re-elected vice-president and C. A. Graves was elected vice-president in charge of operation and to succeed R. H. Wheeler as general manager of the company after April 1.

Toronto Must Pay $11,188,500

The arbitration board which has been considering the amount due Sir William Mackenzie and his associates from the city of Toronto for its seizure of the Toronto Railway in 1921, decided on Jan. 31 on the sum of $11,188,500. The city authorities previously stated they would appeal if the award was greater than $7,000,000.

Auction Sales in New York.—At the public auction rooms in New York, there were no sales of electric railway securities this week.

Net Income of $1,418,020.—The Market Street Railway, San Francisco, Calif., for the twelve months ended Dec. 31, 1922, reports a railway operating revenue of $9,583,437 and operating expenses of $6,860,038. The net income was $1,418,020.

Claims Being Filed.—Creditors of the Northampton, Eastern & Washington Traction Company, Phillipsburg, N. J., other than bondholders, who may claim to have a lien superior in rank to the lien of the mortgage securing said bonds are now filing their claims with Counselor Linton Satterthwaite, 137 East State Street, Trenton. The United States District Court at Trenton has issued an order to the effect that the company's property shall be sold.

Bus to Replace Railway.—In view of the decision of the Supreme Court giving Receiver D. P. Abercrombie permission to suspend operation of the Concord, Maynard & Hudson Street Railway, the Board of Selectmen of Hudson on Jan. 16 decided to grant a bus line franchise of A. J. Lowell, Woburn, to begin operations at once. It is planned to maintain a bus service in the several towns and over the same route as the defunct railway has run since 1901. This is an 18-mile interurban.

Receivers to Request Sale Date.—Properties of the Memphis (Tenn.) Street Railway may be sold within the next thirty days. Receivers of the company will request Judge J. W. Ross to set a date of sale soon. The same interests that purchased the Memphis Gas & Electric Company are expected to buy the railway. City commissioners have been advised that the railway proposes to pay its back taxes amounting to about $200,000 on sale of the companies' properties.

Service Abandoned.—Service on the New Carlisle-Carlisle Junction branch of the Indiana, Columbus & Eastern Traction Company, Cincinnati, Ohio, stopped at midnight on Jan. 27, under orders issued from headquarters in Springfield, Ohio, in accordance with decisions of the courts and State Public Utility Commission authorizing abandonment of the branch. The line is 4.22 miles in length. The branch was built in 1901 as part of the Springfield & Western Traction Company's line, and was acquired in 1906 by the Indiana, Columbus & Eastern Company, then a part of the former Ohio Electric system.

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Traffic and Transportation

Mr. McAdoo Behind Bus Project

Railways in Los Angeles Oppose City Granting Franchise for Huge Bus System

William G. McAdoo, former Secretary of the Treasury, representing business interests in the East, presented an application to the City Council of Los Angeles on Jan. 23 for thirteen franchises for a bus system to serve 60 miles of streets in the city of Los Angeles. The backers of the new bus corporation, organized for $2,000,000, no stock to be offered for sale, is represented by E. F. Simms, vice-president of the Sinclair Gulf Oil Company and Joseph L. Rhinock, both of New York. The director and manager of the company is Richard W. Meade, formerly with the Fifth Avenue Coach Company, New York.

The buses, of the double-deck type, would operate in the congested district and run to all parts of the city, the fare to be 10 cents, with a universal transfer system. The proposed buses would cover practically all territory reached by the Pacific Electric Railway and the Los Angeles Railway, but the fares on the buses would be higher than those on the street railways.

The petition of the bus corporation has been referred by the City Council to the Board of Public Utilities, which body received immediate demands from certain factions to hold a public hearing toward taking action at once on the matter.

The public hearing of the Board of Public Utilities was held on Jan. 26. At it the local railways offered considerable opposition to the city granting the franchise. The Pacific Electric Railway officials threatened to discontinue all improvement work contemplated by it in Los Angeles, including the company's proposed $3,000,000 subway to serve Hollywood and San Fernando valley points, if the bus franchise is granted. Retirement of both the Pacific Electric and Los Angeles Railway companies from the Los Angeles city transportation field, if the city grants the extensive bus franchises, also was threatened by the Pacific Electric officials. Civic encouragement of bus systems, they declared, will be interpreted as an official decision that street railway transportation is obsolete.

Finally the application by Mr. McAdoo was referred to the committee as a whole by the Board of Public Utilities. This action was taken over objection of President Leeds of the board, who urged that the usual routine should be followed and the matter be referred to H. Z. Osborne, Jr., chief engineer of the board for a study and report on the matter, Mr. Leeds openly declaring that reference of the matter to the committee of the whole took the matter out of the hands of the board's chief engineer.

R. W. Meade, proposed manager of the new bus system, outlined the plans of his company before the board, declaring that fifteen routes over which the financial supporters of the bus system plan have asked franchises are tentative and subject to amendment. He stated that instead of taking away patronage from the street railways, the bus lines would work up business of their own. He declared the business on his bus lines would largely come from business men and downtown employees who now use private automobiles to reach their work. The initial investment of the huge bus system is given as $1,750,000.

D. W. Pontius, vice-president and general manager of the Pacific Electric Railway, contended that through the construction of the Hollywood subway, as proposed by the company, immediate relief will be forthcoming to the traffic congestion on both Hill and Sixth Streets. He further stated that the company intends to launch a huge construction and improvement program, which would include the erection of a viaduct and overhead system out of the company's Sixth and Main Streets terminal, costing $18,000,000, which it was declared would serve all outlying cities with rapid interurban service to the north, northeast, south and southwest of Los Angeles.

The railway officials argued that both railways would like to test the need for railway extensions through the installation of bus line service, and cited the fact that the Pacific Electric now has before the Board of Public Utilities of the city of Los Angeles various applications for bus franchises for lines to serve as feeders for the company's routes in the Hollywood district.

Mr. McAdoo, attorney for the new bus corporation, in addressing the Board of Public Utilities contended that the proposed franchise for bus transportation facilities is extremely desirable in the form in which the application has been submitted to the city and that bus lines operated as it is proposed to do under the new grant never hurt street railway patronage.

"El" Tells Patrons How to Spend Vacation

Railways are always performing services but seldom a service such as the Chicago Elevated did for its patrons just prior to Christmas. Believing that a lot of people don't know what to do with a vacation when they have it the company issued a four-page pamphlet suggesting trips at low costs which would be instructive as well as entertaining to wile away the hours during the exceptionally long winter holiday. If the vacationist desired to indulge in botanical wonders in Garfield Park or if he preferred to revel in the rug collection at the Art Institute or watch the birds and elephants in the Field Museum of National History the Chicago Elevated promised to transport all to their "Seventh Heaven" speedily, safely and cheaply. The pamphlet was of intrinsic value for preservation because of the map it contained and because of the possibility of its use as a future guide to the wonders of the city of Chicago.

Bill Proposed to Permit City Bus Operation

The Legislature of the State of Washington has been asked to consider a bill introduced by Senator Dan Landon of the appropriations committee, and a resident of Seattle, which will permit the city of Seattle and other cities of the first class owning municipal railways to own and operate buses in conjunction with the railway systems within the corporate limits of the city. The bill expressly removes any jurisdiction which the State Department of Public Works might have over such buses, and leaves their supervision entirely within the hands of the cities.

The bill is said to be for the purpose of permitting Seattle to operate buses in outlying districts, instead of extending the lines of the municipal railway. At the same time, it is also said to give the city the right to parallel and operate buses along the line of the Rainier Valley railway system, which did not fall into the hands of the city when the Seattle electric railway properties were taken over.

Five-Cent Fare Experiments to Be Terminated

Bringing to a close a test period of fourteen months on one line, and nine months on all lines in Norwalk, the Public Utilities Commission of Connecticut issued an order terminating on Feb. 4 the experiment which has been conducted to determine the adequacy of a 5-cent trolley fare.

On that date, the West Avenue line of Norwalk will permanently become a 5-cent line, and all others of the Norwalk division which have operated on a 5-cent fare basis since May 21, 1922, will be raised to the general state rate, which provides for a base fare of 10 cents or three rides for a quarter by the purchase of tokens.

Norwalk is the first city in the state to secure favorable action by the Public Utilities Commission to test the 5-cent fare. On Nov. 6, 1921, the commission put into effect on one line in Norwalk the pre-war rate of a nickel and the resulting increase of business was considered sufficient to warrant a further test of this rate.

A further order extended the 5-cent fare to all lines in May, 1922. The results of this test, however, show that riding did not double along lines in sparsely settled sections, and at the low rate of fare the company showed a deficit. Norwalk returns to the three rides for a quarter with the exception of one line, for a short period only, the

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Public Utilities Commission having recently announced that a fare rate of two rides for 15 cents would become effective throughout the state on April 1, and the lines of every division, except those radiating from Main Street and Fairfield Avenue, Bridgeport, and the West Avenue line, so called, in Norwalk. The recent two rides for 15 cents decision of the commission was referred to in the ELECTRIC RAILWAY JOURNAL, issue of Jan. 27.

Massachusetts Companies Petition to Operate Buses

Massachusetts is now taking up in earnest the question whether the electric railways shall own and operate buses as feeders to the street cars. Under current discussion is the move of the Eastern Massachusetts Street Railway to establish such a feeder line system. This company has a petition before the Massachusetts Department of Public Utilities asking for authority to acquire, own and operate jitney lines. Having secured the approval of the Utilities Department, which is almost a foregone conclusion in view of the attitude of this department toward the general proposition, the Eastern Massachusetts company will go before the authorities in the cities of Malden and Revere and ask for licenses to operate an auto bus service.

The company proposes to operate buses in Linden and in Malden proper to pick up passengers in territory formerly served by the electric railway. In Revere the company proposes to operate in Park Avenue. But both of these cities have demonstrated hostility toward the proposition and are likely to decline to issue any licenses to the company. For the present the Eastern Massachusetts has no plans under consideration for introducing the bus in any other city or town, but after the Malden and Revere question is settled it is expected to survey the field for bus service elsewhere.

The Springfield Street Railway has already secured approval from the Public Utilities Department to acquire, own and operate such feeder lines and is planning to go to the local authorities in its district for the requisite licenses. In fact, the company has already started bus service under plans reviewed in these columns.

The Boston Elevated Railway was granted this authority some time ago, and the Northern Massachusetts Street Railway has a bus petition pending before the Department of Public Utilities.

Additional Buses in Use.—The Puget Sound International Railway & Power Company, Everett, Wash., has recently received two additional buses, to be used in the company's motorized transportation system. Six buses are now operating, or about one-half of the contemplated change. Manager George Newall reports that the company and its patrons are well satisfied with the new mode of transportation.

Opposed to Lower Fare

Committee Discusses With City Officials Handling Railway Warrants—Comptroller Prepares Statement

A committee appointed by the Seattle Clearing House Association, and composed of three prominent bankers in the city, recently met with city officials to discuss the handling of the Seattle (Wash.) Municipal Railway warrants. The line went on the warrant basis on Jan. 25, warrants being issued for the half month salaries of employees and for supplies, amounting to virtually $224,000, the warrants to be redeemed at the rate of $18,000 a day. The line was put on a warrant basis for the purpose of meeting the interest payment on the street railway bonds on March 1.

At the joint meeting, the Clearing House Committee advised strongly against the present proposed plan of returning to a 5-cent car fare on March 1, pointing out that the present 8½-cent car fare must be retained in order to continue the present status of the street car system. J. A. Swalwell, chairman of the committee, stated that recommendations to this effect will be presented to Mayor E. J. Brown, who favors the 5-cent fare. The committee states that it would require a 46 per cent increase in patronage to justify a 5-cent fare, and that in its opinion, such an increase cannot be expected.

A statement prepared for the committee by City Comptroller H. W. Carroll showed that even with 1,000,000 more patrons monthly, following reduction to a 5-cent fare, the city car lines will face a local indebtedness covered by outstanding 6 per cent warrants totaling $1,138,400 by next Christmas.

The statement of Comptroller Carroll shows possibilities of a constant increase of indebtedness month by month. It not only allows for added patronage under a 5-cent car fare, but the 1¼ cents to be charged for transfers. After setting aside $1,223,975 for interest and redemption on Feb. 1, for the March 1 payment, on the railway debt, the city will have but $36,926 with which to operate the ten days between Jan. 20 and Feb. 1. On Feb. 1, the comptroller estimates the railway will have $167,000 warrants outstanding and on March 10, only $98,400. The system will be placed on a 5-cent fare basis March 1, so on April 10, the net warrant obligation will mount to $187,400. Then the warrant obligation steadily increases to more than $1,000,000 by the end of the year. With estimated daily collections reduced from $17,700 to $14,000 on March 1, added patronage and transfer charges have been generously considered, the City Comptroller states.

Superintendent of Utilities George F. Russell, in his report to the City Council on Nov. 1, 1922, estimated a deficit of $1,000,000 at the end of the year, but allowed for no increase in traffic in his report. He now states that there is no reason to doubt that the city lines will handle 12,000,000 passengers monthly on the 5-cent basis, which is the number handled in December, 1919, at 5 cents. His estimated increase in traffic is 4,000,000 monthly against the Comptroller's 1,000,000. He also states that the management of the lines expects to effect a saving of nearly $400,000 this year in operating costs.

Half-Fare Rates for School Children Proposed

A bill amending the public utilities act of the State of California to make mandatory the granting of half-fare rates to school children by street railways was introduced in the State Assembly, on Jan. 24 by Assemblywoman Saylor of Berkeley. It is claimed that under the present laws it is optional with the street railway lines in the state; while some of them do grant half-fares to school children, others refuse to do so. In the proposed bill it is the intent to place the matter under the power of the State Railroad Commission. Half-fares are now allowed school children in San Francisco, Los Angeles, San Diego, Fresno and numerous other cities in the state, but they are not allowed in Oakland and Berkeley.

Will Not Bid on Bus Franchise —Proposes Six-Cent Fare

No bids will be submitted by the Pacific Electric Railway to the city of Santa Monica, Calif., on the bus transportation franchise advertised for sale by the city. Feb. 9 is the final date for receiving the bids. The railway has informed the city of Santa Monica that it will submit to the city its proposals for a comprehensive local service with a 6-cent fare. The terms of the city's proposed blanket bus franchise calls for a 5-cent fare. The present bus lines in the city of Santa Monica operate in competition with the local service of the railway. The company stated that for business reasons it would not bid on the bus franchise on a 5-cent fare basis.

Seven-Cent Fare in Effect.—The Danville Traction & Power Company, Danville, Va., put into effect on Jan. 1 the 7-cent fare recently approved by the City Council. The ticket rate is five for 30 cents.

Sells Tickets on Corners.—The Nashville Railway & Light Company, Nashville, Tenn., has started the practice of selling tickets for cars on the uptown corners. It is the belief that this will speed up service, while the passengers get on and off the cars.

To Make Traffic Survey.—To settle the problem of traffic congestion in the downtown business district of the city, the Los Angeles (Calif.) Railway will have a traffic survey made. Electric railway transportation has been handicapped by the congestion.

Higher Fares Wanted.—It is said that if the City Commission of Waco, Tex., does not give the Texas Electric Railway permission to increase its fares from 5 cents to 7 cents the company will operate only one-man cars on an eighteen-minute schedule.

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Personal Items

New Commissioner

J. T. Whittlesey, Engineer Well Known in East, Appointed to California Railroad Body

James T. Whittlesey, prominent consulting engineer of San Francisco, has been appointed to a two-year term as commissioner on the California State Railroad Commission. After his graduation from Yale Mr. Whittlesey was with the Thomson-Houston Electric Company from 1889 to 1890. He then went to New York as consulting engineer, and in 1892 he entered electric railway service in Brooklyn. During the succeeding two years he was chief

J. T. Whittlesey

engineer of the Brooklyn Rapid Transit Company. In 1898 he became superintendent of the Stephenson Car Company of New Jersey. For three years following 1900 he was chief engineer of the United Electric Company of New Jersey, and following this held the same position with the Public Service Corporation of New Jersey. In 1912 Mr. Whittlesey removed to California and was retained by the Spreckels interests of San Francisco to advise them on utility matters. During the past five years he has been director of the Pacific Coast branch of the Engineering Business Exchange, with offices in San Francisco. He is a member of the A.I.E.E., A.S.M.E. and American Electrochemical Society.

Mr. Webster May Manage New Road

F. W. Webster, general manager of the Fresno (Cal.) Traction Company, will probably accept the managership of the Minarets & Western Railway, but will not withdraw from electric railway work. The new road, for such is the Minarets & Western, will operate between Fresno and High Sierra, handling minerals, lumber and passengers. It is a wonderful territory through which the road will run, and apparently has very bright prospects. In addition to being general manager of the Fresno Traction Company Mr. Webster is also manager of the Visalia Electric Railway, Stockton Traction Company and Central California Traction Company.

J. L. Longino Manager

As Vice-President and General Manager of Alapco He Will Relieve President Couch of Details

J. L. Longino has been made vice-president and general manager of the Arkansas Light & Power Company, which is serving forty-five cities and towns in Arkansas from eight central power stations in that State. The position of general manager was created in order to relieve H. C. Couch, president of the company, of many of the details of management which he has been handling and with the view of promoting even greater efficiency in the operation of the properties.

Mr. Longino was formerly operating superintendent of the Arkansas Light & Power Company and has served as its secretary and treasurer since organization. He was made manager about two years ago of the Pine Bluff Company, an associated public utility company, which operates the electric railway, power and water services in Pine Bluff. Mr. Longino will continue to manage the Pine Bluff Company, but will be relieved of some details by L. B. West, auditor of the company. The secretaryship of the Arkansas Light & Power Company has been taken over by L. Garrett. No other changes in the official personnel of either company are contemplated, according to a bulletin issued by President Couch. In addition to its eight steam plants using for fuel oil, gas and pulverized coal from the Arkansas fields, the Arkansas Light & Power Company is now completing a small hydro-electric power station on the Illinois River near Russellville, Ark. It will distribute the electrical energy to be generated by the Caddo River Power & Irrigation Company, which is to erect three dams and power stations on the Ouachita River near Hot Springs National Park, Ark. Anticipating early completion of the Caddo River Power & Irrigation Company's initial power station the Arkansas Light & Power Company has recently completed a 66,000-volt line from its present system of transmission lines to Malvern and Arkadelphia within a few miles of the site selected by the first power plant of the Caddo River Power & Irrigation Company.

Charles L. Henry, president of the Indianapolis & Cincinnati Traction Company, Indianapolis, Ind., was re-elected president of the Indiana Public Utility Association at the meeting of the association held in Indianapolis on Jan. 25.

Mr. Casey at Atlanta

General Superintendent of Transportation at Buffalo Resigns to Join Georgia Company

William M. Casey has resigned as general superintendent of transportation of the International Railway, Buffalo, N. Y., to become superintendent of transportation of the Georgia Railway & Power Company, Atlanta, Ga. Mr. Casey's position has not yet been filled. Mr. Casey came to the International Railway three years ago from Washington, D. C., where he held the position of superintendent of transportation of the Washington Railway & Electric Company.

Mr. Casey was born in Ireland in 1870. He came to the United States at an early age. For many years he lived in Lawrence, Mass., where he received his early schooling. He went West in

W. M. Casey

1888 and enlisted in the United States Army. He served with distinction in many insurrections of the Indian tribes and in 1891 he received an honorable discharge. A year later he entered the employ of the Denver City Cable Company, as gripman. He was promoted to carhouse foreman in 1893 and served in that capacity until 1902, when he was promoted to division superintendent of the Denver Tramway. Seven years later he was made trainmaster in charge of traffic and discipline and later superintendent of transportation..

Mr. Casey left the Denver system in 1916 to joint the staff of John A. Beeler, traffic expert, then engaged on a survey of the traction lines at Washington, D. C. Five years ago he was appointed superintendent of transportation of the company and served in that capacity until he went to Buffalo. Mr. Casey succeeds S. E. Simmons with the Georgia Railway & Power Company.

P. R. T. Traffic Engineer Appointed to Buffalo

R. Harland Horton has been appointed assistant to the vice-president of the International Railway, Buffalo, N. Y., in charge of traffic over the local and suburban lines of the company, according to announcement made by

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Herbert G. Tulley, president of the International. Mr. Horton comes to Buffalo from Philadelphia, where he had been associated with the Philadelphia (Pa.) Rapid Transit Company as traffic engineer for several years. Mr. Horton fills a new position created by President Tulley as assistant to Edgar J. Dickson, vice-president of the International.

Mr. Dell with Association

Office of Director of Exhibits Will Be Filled by Former Association Attache

Frederick C. J. Dell has been made director of exhibits of the American Electric Railway Association. Mr. Dell will enter upon his duties at once. It would not do to say that they are new duties to him, for they are not. He is thoroughly acquainted with them by previous experience. In fact, it was his able discharge of similar duties in the past that made Mr. Dell the one man above all others to whom the association knew it could intrust the responsibilities of the job. His appointment in fact illustrates again the correctness of the remark of Emerson about the world making a beaten path to the door of the man who does his job better than any one else. Metaphorically, that is just what the association did. It beat a path to the office of Benjamin A. Hegeman, the president of the National Railway Appliance Company, New York, in quest of Mr. Dell. Mr. Hegeman was, of course, reluctant to relinquish his claim upon Mr. Dell as secretary of that company, but Big Ben, as Mr. Hegeman is familiarly known, has again done a generous thing primarily in the interest of Mr. Dell, but a still bigger thing in the interest of the association.

Freddie Dell, as he is best known, has carved his own career from the very beginning. His business record entitled him to several *cum laude* degrees, but that record was made in the school of hard knocks and not in the classroom or laboratory. Mr. Dell took the business world by the tail, as it were, in the office of the Interborough Rapid Company in 1904. It wasn't much of a job that he had at the start, that of application clerk in the office of Frank Hedley, vice-president and general manager, but it was the opportunity and not the job that Mr. Dell was after. From Sept. 15, 1904, to March 1, 1911, Mr. Dell was with that company. An application clerk with keen powers of observation can learn a lot about human nature. Mr. Dell was such a clerk. In consequence he took with him a fund of such information gained in that position and the other posts which he filled with the Interborough, all carefully classified, when on March 1, 1911, he became assistant to the secretary and treasurer of the American Electric Railway Manufacturers' Association.

This position with the association he retained until May 15, 1916, when he was made assistant to the director of exhibits for the Atlantic City convention of the American Electric Railway Association. This was the first exhibit handled by the association itself after the manufacturer members had accepted the invitation extended by the parent organization to join its ranks.

Long before that, however, Mr. Dell had been an active participant in the work of directing the arrangements for the yearly conventions. In fact, he attended the Denver convention of 1909 as assistant to Secretary-Treasurer George Keegan of the Manufacturers' Association and the 1910 convention in a similar capacity. Meanwhile several of the manufacturer members of the association began to cast furtive glances in the direction of Freddie, but that was all the good it did them. On Jan. 17, 1917, however, Mr. Dell did succumb to the proffer made to him by Mr. Hegeman and entered his employ as secretary. Mind you, that was in January, 1917. One year and eleven months later Mr. Dell was made secretary of the company of which Mr. Hegeman is the head. To be exact this was on Dec. 24, 1918—

F. C. J. Dell

a Christmas present. Meanwhile Mr. Dell had been elected secretary of the American Electric Railway Manufacturers' Association. This was on Oct. 1, 1916, and he continued in that capacity until the association was disbanded on Jan. 8, 1920.

Mr. Dell's first work for the association now will be to enter actively into the work of the Committee of 100 in its campaign for additional funds. He will also be assigned to assist the membership committee in its continuous campaign for new members in the association. Mr. Dell has two hobbies. One of them is work. The other is his family. He is a member of the Lotos Club and is assistant to the secretary of the club. He is also a member of the New York Railroad Club.

Mr. Cadle in Engineering Practice

Charles L. Cadle, formerly chief engineer of the New York State Railways, plans to establish an office in Rochester as a consulting engineer, specializing in the problems of electric railway, light and power properties. Mr. Cadle retired on Jan. 17 as state superintendent of public works, in which post he was in charge of the Barge Canal. During his administration tonnage carried on the canal almost doubled, and the gain last year was approximately 48 per cent.

From 1904 to 1906 Mr. Cadle was with the Cleveland Railway. He next became manager of the Electric Railway Improvement Company, Cleveland, and in 1917 went to the New York State Railways as electrical engineer. Two years later he was appointed chief engineer of the New York & Harlem Railroad. Meanwhile, however, he continued his duties with the New York State Railways in Utica, Syracuse and Rochester.

Changes Announced in Tennessee Commission

Dorsey B. Thomas, Camden, has been elected secretary of the Tennessee Railroad & Public Utilities Commission. He succeeds J. H. Corbitt. Porter Dunlap, McKenzie, has been sworn in as a commissioner to succeed W. N. Beasley, Halls, Republican, who held office only a few months. Gen. Harvey Hannah, Oliver Springs, long a member of the commission, has been elected chairman.

Changes Announced in Byllesby Organization

In addition to the election of Francis C. Shenehon as vice-president and director of the Byllesby Engineering & Management Corporation, New York, N. Y., in charge of all engineering and construction, effective Jan. 1, 1923, the election of Halford Erickson as vice-president and director has been announced. He will be in charge of operation of all of the subsidiary utility properties which are included in the system of the Standard Gas & Electric Company.

Mr. Erickson for many years was a member of the Railroad Commission of Wisconsin, and for two years, 1915 and 1916, he was chairman of that commission. For the last five years he has been vice-president of the Louisville Gas & Electric Company.

The following have been elected vice-presidents of H. M. Byllesby & Company:

R. G. Hunt, who has been with the organization for nineteen years and for seventeen years has been assistant to the vice-president in charge of operation of Byllesby Engineering & Management Corporation.

Joseph H. Briggs, who has been connected with the organization for fourteen years, and for the last four years has been manager of the bond department.

B. W. Lynch, who has been connected with the organization for eighteen years and has been auditor of the Byllesby Engineering & Management Corporation.

M. A. Morrison, who has been connected with the organization for fourteen years as assistant secretary and assistant treasurer.

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F. W. Brown Superintendent Western and Northwestern Michigan Lines

New appointments on the Michigan Railway have become effective because of the resignation of H. P. Harrsen, assistant general manager, who, as noted previously in the ELECTRIC RAILWAY JOURNAL, becomes identified with the Electric Bond & Share Company, New York.

F. W. Brown, formerly traffic manager, now is general superintendent of the western and northwestern divisions.

J. H. Weldon, formerly chief of the tariff bureau, is traffic manager.

O. J. Hansen, formerly chief clerk, is superintendent of western division.

J. C. Taylor, formerly trainmaster, is superintendent of the Northwestern division.

C. P. Gerth, formerly local freight agent, is chief of the tariff bureau.

S. E. Simmons Leaves Atlanta Company

Important changes are announced in the personnel of the railway department of the Georgia Railway & Power Company, Atlanta, Ga.

S. E. Simmons, for a long time superintendent of transportation, has relinquished that position to go to Florida for the benefit of his health. W. H. Flury was acting superintendent, but William M. Casey has been appointed to succeed Mr. Simmons.

W. H. Matthews, also with the company for many years, has resigned from the position of assistant superintendent to enter business for himself. His successor has not yet been selected.

W. F. Edwards has been made an assistant superintendent of transportation of the company succeeding Edward Gramling.

John G. Huntoon, vice-president of the Tri-City Railway, Davenport, Iowa, has announced his candidacy for the Mayoralty of Rock Island, Ill., in the spring elections.

C. A. Graves has been elected vice-president in charge of operation of the Olean, Bradford & Salamanca Railway, Olean, N. Y. He will also succeed R. H. Wheeler as general manager, effective April 1.

Thomas E. Mitten, president of the Philadelphia (Pa.) Rapid Transit Company, was sworn in on Jan. 1 as a member of the Philadelphia Board of Education. He succeeds in this capacity the late John Wanamaker.

R. R. Ray, formerly with the Philadelphia (Pa.) Rapid Transit Company, has been appointed secretary of the new Co-operative Association, organized among the employees of the International Railway, Buffalo, N. Y.

Cornell S. Hawley, president of the Consolidated Car Heating Company, has been appointed a deputy administrator by Gen. George W. Goethals, state fuel administrator of New York. Mr. Hawley succeeds Guy D. Hills, resigned.

Gen. Lincoln C. Andrews, recently appointed receiver for the New York & Queens County Railway, Long Island City, N. Y., has also accepted appointment as general manager of the Long Island Electric Railway and the New York & Long Island Traction Company.

C. W. Eby, assistant chief engineer of the Waterloo, Cedar Falls & Northern Railway, Waterloo, Iowa, read a paper "Taxation of Motor Buses and Trucks on State Highways" before the Iowa Engineering Society on Jan. 24. It is expected that this paper will be abstracted for publication in an early issue of *Bus Transportation.*

Matt Spitz has been appointed superintendent by the board of directors of the Gary & Southern Interurban line operating between Gary and Crown Point, Ind. C. J. Fifer, who had charge of the interurban line for several years, is returning to Akron, Ohio, to engage in business.

Col. Charles Keller was re-elected chairman of the Public Utilities Commission of the District of Columbia by the commissioners at a board meeting on Jan. 26. Commissioner Rudolph praised the work of Commissioner Keller as chairman of the commission since his appointment as engineer commissioner of the District.

I. W. Ross, formerly vice-president and chief engineer of the Tuscaloosa Railway & Utilities Company, Tuscaloosa, Ala., has now become president, general manager, chief engineer and purchasing agent. J. S. Billings, formerly treasurer, auditor, general freight and passenger agent, now assumes the title of secretary and treasurer, relinquishing the title of general freight and passenger agent.

Frank H. Gaskill, formerly a member of the secret service staff of the Philadelphia (Pa.) Rapid Transit Company, has been appointed superintendent of intelligence of the International Railway, Buffalo, N. Y. Mr. Gaskill has been in Buffalo since the outset of the strike of employees of the company July 1, 1922, and played an active part in the investigation which brought about the indictment by the federal grand jury of thirteen striking employees and State Senator Robert C. Lacey on charges in connection with the dynamiting of the Buffalo-Niagara Falls high-speed line car last fall.

H. E. Chubbuck, vice-president executive of the Illinois Traction System, Peoria, Ill., was elected a director of the Merchants' and Illinois National Bank of that city at the Jan. 9 meeting of the stockholders of that institution. Mr. Chubbuck has long been a stockholder in the bank and his election to the directory is highly pleasing to his Peoria friends. Mr. Chubbuck has been seriously ill, but his condition is now reported to be much improved. Some of the down state newspapers recently ran rather startling news as to the nature of his illness, but this was found to be untrue. He is now expected back to the office in due time.

Obituary

Henry M. Whitney

Henry M. Whitney died at his home in Brookline, Mass., on Jan. 25 at the age of eighty-four. Until his retirement from active business affairs several years ago Mr. Whitney was an international figure as financier and transportation magnate. He had a good deal to do with laying the foundation for the system now known as the Boston Elevated Railway. In fact, in 1887, largely through his instrumentality, eight horse railways at Boston were consolidated into the West End Street Railway with Mr. Whitney as president. No sooner had the roads been brought together than Mr. Whitney began to cast about for a better method of propulsion of the cars. His plans for installing the cable were already far advanced when his attention was invited to the possible use of the electric motor.

A visit to Allegheny City, Richmond and Washington convinced Mr. Whitney that the new system was what he desired. A contract was made by him for the equipment of the line to Allston, partly with conduit and partly with the overhead trolley. The conduit portion was a failure and the portion equipped with the trolley was extended later downtown. This was the beginning of full electrification in Boston. The step of installing electricity at that time was a bold one but the success of the Boston lines was recognized and had a great deal to do with the extension of the electrical system.

It is interesting to note that while Henry M. Whitney was thus the leading figure in the transit development of Boston, his brother, William C. Whitney, was undertaking similar work in New York through the Metropolitan Street Railway, with the co-operation of Messrs. Widener and Elkins of Philadelphia. Henry M. Whitney continued for many years to be a factor in the transit situation in Boston, but gradually turned his attention to his many other interests, including steamship lines and mining. He was one of the organizers of the Dominion Coal Company, out of which grew the present coal and iron industry at Cape Breton, N. S. It was said of him that "no American ever did more for Canada."

William H. Simms, for eight years librarian of the Department of City Transit of Philadelphia and formerly general manager of the Philadelphia & Western Railway, is dead. He was a native of England.

E. T. Nye, general manager of the West Jersey Electric Company and the Five-Mile Beach Electric Railway, died on Jan. 30 at his home in Wildwood. He had been with the above mentioned companies for the past sixteen years, and prior to his going to Wildwood, had charge of the electric light company in Pleasantville, N. J.

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Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Deliveries Lengthening in Car and Car Equipment Purchases

It has been some time since this department of the JOURNAL carried the news that the electric railways would do well to be forehanded in looking after their needs for new cars and car equipment. But that situation has again come to pass, for most of the car builders' and motor manufacturers' plants are now scheduled to capacity for some time to come. Railways that hold off in placing orders until they actually are badly in need of the new equipment are likely to have to wait several months for delivery, according to present indications.

Deliveries are rapidly lengthening and orders placed now with some of the car builders are not likely to be filled before well toward the end of the year. Furthermore, the prices of cars and motors and other car equipment are in prospect of increasing, on account of the demand and on account of the recent increases in steel costs, averaging about 5 per cent, which presumably will be reflected in the manufacturers' prices when present steel stocks have been exhausted.

One car builder recently refused an order for 100 cars, duplicates of those ordered by the same company recently. on the basis of the same price and delivery within 1923. This gives a definite indication of the condition of the market. From general knowledge of the situation, it seems timely to warn the railways that they will do well to plan considerably ahead on their new rolling stock requirements.

$240,000,000 Is Conservative Estimate

As detailed in the Jan. 6 issue of ELECTRIC RAILWAY JOURNAL, the editors estimated that the electric railway industry would expend $240,000,000 in new plant and equipment during 1923, as compared to the actual expenditure of $151,000,000 in 1922. In the few weeks since that time, the editors have had opportunity to discuss this estimate with numerous railway officials and have found that without exception they have felt that the estimate was very conservative. Recently one of the editors discussed the matter with the members of the committee on purchases and stores of the American Electric Railway Engineering Association during luncheon. There were present at this meeting a number of purchasing agents and engineers from various parts of the country. Not only did none of these men think that the estimate of expenditures was high, but nearly every one felt that, in view of the large expenditures his own company was planning, the total for the industry must be much larger than $240,000,000. Men from Indianapolis, Washington, Baltimore, Pittsburgh, Richmond and elsewhere spoke of expected large expenditures. The whole tone of the purchasing agents' meeting seemed highly optimistic and to foretell a very busy year for them. Recent visits of the editors to various properties have also brought out information of expected large expenditures in all departments.

Arthur W. Berresford Resigns

Arthur W. Berresford, vice-president of the Cutler-Hammer Manufacturing Company, has resigned after serving the company for twenty-two years. Mr. Berresford will in the future devote his time to work for the various associations of which he is a member. These include the American Institute of Electrical Engineers, American Association of Manufacturers of Electrical Supplies and others.

While "working for experience" he was connected with the Brooklyn railway system in carhouse work and line building. Later he became identified with the Riker Electric Company and the Ward Leonard Electric Company. In 1898 with two others Mr. Berresford purchased the assets of the Iron Clad Rheostat Company from the receiver and formed the Iron Clad Resistance Company, of which he became vice-president and manager. In 1900 this company was purchased by the Cutler-Hammer Manufacturing Company and he then entered the engineering department of the latter concern. In 1901 he was made superintendent; in 1902 secretary; in 1905 general manager and in 1907 vice-president and general manager.

Turbine Installation in New Haven

The Connecticut Company has ordered from the Westinghouse Company a 12,500-kva. turbine, to be installed in the railway company's power station on Grand Avenue, New Haven, known as Station A. The generator will generate 25 cycles three-phase, and the distribution will be at 11,000 volts. There will also be a 33,000-volt transmission line to Meriden, to which point power will be transmitted from New Haven.

To accommodate this turbine, the company is building a 36-ft. extension on the power station structure. It is expected that the turbine will be delivered in September. As an auxiliary the company will add a twin jet condenser with motor and turbine drive on each side.

Notable Achievements Win Recognition

Benjamin G. Lamme, chief engineer of the Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., was presented the Joseph Sullivant medal by the Ohio State University.

Mr. Lamme, who was graduated from Ohio State in 1888, is the first person to receive the Joseph Sullivant medal, which will, in the future, be awarded

ELECTRIC RAILWAY MATERIAL PRICES—JAN. 30, 1923

Metals—New York

Copper, electrolytic, cents per lb.	15.00
Lead, cents per lb.	8.07
Nickel, cents per lb.	27.50
Zinc, cents per lb.	7.35
Tin, Straits, cents per lb.	40.25
Aluminum, 98 to 99 per cent, cents per lb.	22.50
Babbitt metal, warehouse, cents per lb.:	
Fair grade	42.00
Commercial	25.00

Bituminous Coal

Smokeless mine run, f.o.b. vessel, Hampton Roads	$8.125
Somerset mine run, Boston	4.55
Pittsburgh mine run, Pittsburgh	3.375
Franklin, Ill., screenings, Chicago	2.675
Central, Ill., screenings, Chicago	1.625
Kansas Screenings, Kansas City	2.50

Track Materials—Pittsburgh

Standard Bessemer steel rails, gross ton	$43.00
Standard open hearth rails, gross ton	43.00
Railroad spikes, drive, Pittsburgh base, cents per lb.	2.90
Tie plates (flat type), cents per lb.	2.525
Angle bars, cents per lb.	2.75
Rail bolts and nuts, Pittsburgh base, cents, lb.	4.175
Steel bars, cents per lb.	2.10
Ties, white oak, Chicago, 6i n. x 8 in. x 8½ ft.	1.50

Hardware—Pittsburgh

Wire nails, base per keg	2.75
Sheet iron, (28 gage), cents per lb.	3.35
Sheet iron, galvanized, (28 gage), cents per lb	4.35
Galvanized barbed wire, cents per lb.	3.35
Galvanized wire, ordinary, cents per lb.	2.45

Waste—New York

Waste, wool, cents per lb.	12.00
Waste, cotton, (100 lb. bale), cents per lb.:	
White	11.5
Colored	9.5

Paints, Putty and Glass—New York

Linseed oil, (5 bbl. lots), cents per gal.	93.00
White lead, (100 lb. keg), cents per lb.	13.125
Turpentine, (bbl. lots), per gal.	$1.505
Car window glass, (single strength), first three brackets, A quality, discount*	84.0%
Car window glass, (single strength), first three brackets, B quality, discount*	86.0%
Car window glass, (double strength, all sizes, A quality), discount*	85.0%
Putty, 5 lb. tins, cents per lb.	5.50

*These prices are f.o.b. works, boxing charges extra.

Wire—New York

Copper wire base, cents per lb.	17.125
Rubber-covered wire, No. 14, per 1,000 ft.	7.25
Weatherproof wire base, cents per lb.	17.00

Paving Materials

Paving stone, granite, 4 x 8 x 4, f.o.b. Chicago, dressed, per sq.yd.	$3.60
Common, per sq.yd.	3.15
Wood block paving 3½, 16 treatment, N. Y., per sq.yd.	2.63
Paving brick, 3½ x 8½ x 4, N. Y. per 1,000 in carload lots	50.00
Crushed stone, ¾-in., carload lots, N. Y., per cu.yd.	1.75
Cement, Chicago consumers net prices, without bags	2.05
Gravel, ¾-in., cu.yd., N. Y.	2.00
Sand, cu.yd., N. Y.	1.00

Old Metals—New York

Heavy copper, cents per lb.	12.25
Light copper, cents per lb.	10.87
Heavy brass, cents per lb.	6.905
Zinc, old scrap, cents per lb.	4.625
Yellow brass, cents per lb (heavy)	7.00
Lead, heavy, cents per lb.	6.75
Steel car axles, Chicago, net ton	20.75
Old car wheels, Chicago, gross ton	27.25
Rails (short), Chicago, gross ton	23.25
Rails (relaying), Chicago, gross ton	33.50
Machine turnings, Chicago, net ton	12 75

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once in every five years for "an admitedly notable achievement on the part of a son or daughter of the Ohio State University."

Mr. Lamme has been a prolific inventor. Most of the early rotary converter patents were in his name and he alone is the father of the 60-cycle converter. The single-phase railway motor, which was once said to be impossible, also stands to the credit of Mr. Lamme's genius. To turbo-generator design and all Westinghouse alternating-current apparatus, which are numbered among the greatest accomplishments in the electrical world, Mr. Lamme has contributed much.

Rolling Stock

Department of Street Railways, City of Detroit, Mich., it is understood, is considering the purchase of 100 new cars.

Muskegon Traction & Lighting Company, Muskegon, Mich., is planning to purchase five cars to be put into service during the next six months.

Pennsylvania-Ohio Electric Company, Youngstown, Ohio, is considering the purchase of ten or twelve cars, for use on one of its interurban lines, which will be as elaborately equipped and finished as a limousine.

Chicago, North Shore & Milwaukee Railroad, Highwood, Ill., has placed an order with the General American Car Company, Chicago, for fifteen gondolas, and with the Standard Steel Car Company, for twenty drop bottom cars.

Los Angeles (Calif.) Railway is planning to build its own cars. Eighty-two cars will be built this year in the new brick carpentry mill being erected at the South Park shops. Two motors of the latest type will be used on each car with equipment for multiple control so that two-car train service can be given. The cars will be 48 ft. long and will seat fifty-two passengers.

Springfield (Mass.) Street Railway suffered the loss of a carhouse and thirty-five open cars in a fire on Jan. 25. The estimated loss is $300,000. All the cars that were burned were of double truck type. General Manager H. M. Flanders says that the company will not buy open cars to replace those destroyed. Whether an order would be placed for new closed cars he was not prepared to say.

Track and Roadway

Los Angeles (Calif.) Railway will soon start the reconstruction of East Ninth Street between Mateo Street and Santa Fé Avenue line. This improvement involves 700 ft. of work in which new girder rail will be installed.

Toronto, Canada—Improvements will be made to the three divisions of the Toronto & York Radials purchased by the city and operated by the Hydro Commission. The City Council recently approved of an issue of $600,000 City of Toronto bonds for this purpose.

Knoxville (Tenn.) Power & Light Company will lay a block of track on Walnut Street between Union and Clinch Avenues, and the special work at the intersection of this track with the Union and Clinch Avenue lines will probably be started in March. This improvement is designed to alleviate traffic congestion.

Power Houses, Shops and Buildings

Northwestern Elevated Railroad, Chicago, Ill., recently installed in its Wilson Avenue shop, a new 400-ton wheel press manufactured by the Niles-Bement-Pond Company.

United Railways & Electric Company, Baltimore, Md., will probably place an order before long for three or four automatic substations, including two 25-cycle, 1,500-kw. units in each station.

Public Service Corporation of New Jersey, Newark, N. J., through a subsidiary company has purchased a new building in Newark to provide for the company's needs due to its growth.

Moncton Tramways, Light & Power Company, Moncton, N. B., has negotiated a contract with the city of Moncton under the terms of which it will distribute the hydro-electric current in Moncton and suburbs.

Georgia Railway & Power Company, Atlanta, Ga., is constructing a new storage yard and carhouse near its present substation in East Point. According to the plans there will be thirteen tracks providing storage and repair room for sixty cars. The structure when completed will represent an expenditure of approximately $40,000.

Trade Notes

Railway Switch & Crossing Company, Rutherford, N. J., has been incorporated at Trenton, N. J., with $100,000 capital to deal in railway supplies. Guy L. Fake of Rutherford filed the papers.

United Traction Company, Albany, N. Y., has just placed an order with the Economy Electric Devices Company for 273 watt-hour meters equipped with car inspection dials. This will make a complete equipment for the city lines in Albany.

Omaha & Council Bluffs Street Railway, Omaha, Neb., has placed an order for 101 more Economy watt-hour meters for equipping another division. One division was equipped with eighty meters some time ago and this second order has been based upon the performance on the first division.

R. W. O. Taylor has been engaged as sales engineer by Nic Le Grand, Inc. Mr. Taylor has been connected with the rolling stock department of the Michigan Railway, where he has gained experience that should qualify him to present to the railways the merits of the safety devices and car parts manufactured and sold by the Le Grand Company.

Frank Nickerson, for nine years connected with the San Francisco office of the Midvale-Cambria Steel Company, has severed his connections with that company to accept the position as southern California manager for the Bethlehem Steel Corporation. Recently he opened an office in the Washington Building, Los Angeles, Calif., for the Bethlehem Steel Corporation, covering all of southern California and the entire state of Arizona.

The Mine and Smelter Supply Company, with branches in Denver, Salt Lake City and El Paso, has taken over exclusive representation of the Wilson Welder & Metals Company for the states of Colorado, Utah, Nevada, Wyoming, New Mexico and Western Texas for Wilson plastic-arc welders and Wilson color-tipt welding metals. The Wilson machine and metals became internationally known during the World War, when it was used extensively in repairing the damage done to a large number of the interned German vessels. The mine & Smelter Supply Company will carry in stock at each of its branches a supply of all grades of Wilson color-tipt metals and plastic-arc machines for distribution throughout its territory.

Horace L. Howell, until recently connected with the National Railway Appliance Company, New York City, as manager of research and information in behalf of the London Underground Group and the London General Omnibus Company, is now associated with the Johnson Fare Box Company, Chicago, as sales manager and engineer. Mr. Howell has been engaged in transportation matters and electric power developments in the United States and Canada for a number of years. He has been connected with the Chicago City Railway, the Toronto Power & Railway Company, the Chicago Board of Supervising Engineers, and Weston & Company, Philadelphia. More recently he presented testimony in connection with the rate case of the Public Service Railway of New Jersey before the New Jersey Public Utilities Commission. Mr. Howell recently returned from England, where he was engaged in connection with the installation of fare collection devices in London. Mr. Howell was educated in England.

New Advertising Literature

Haskelite Manufacturing Company, Chicago, Ill., has issued a blueprinted booklet with diagrams entitled "Haskelite and Plymetl for Street Cars."

The Texas Company, 17 Battery Place, New York, N. Y., producers of Texaco petroleum products, has just issued a sixteen page booklet entitled "How Many Dollars Did You Spend This Year to Keep Your Cars Running?" This booklet treats of the costs and problems of street railway lubrication and gives figures and conclusions regarding their solution.

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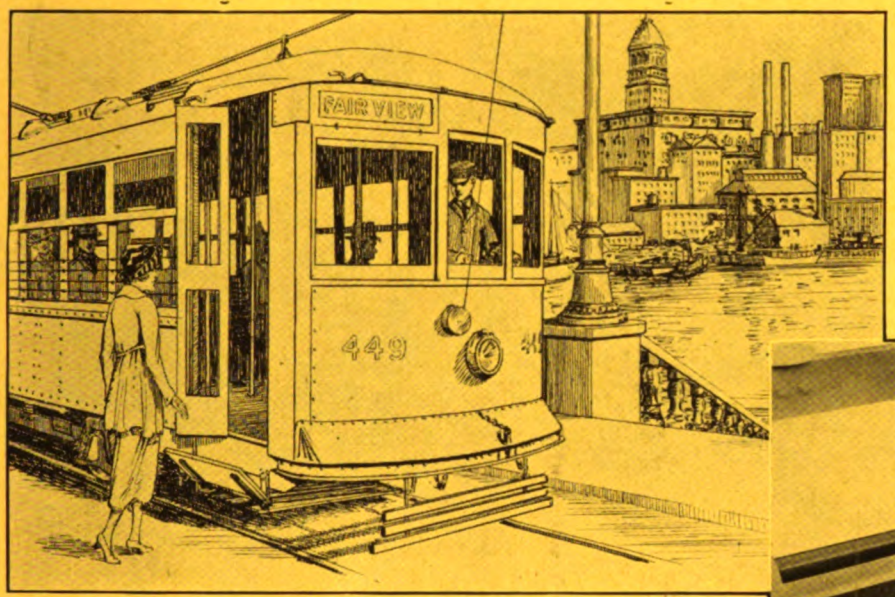
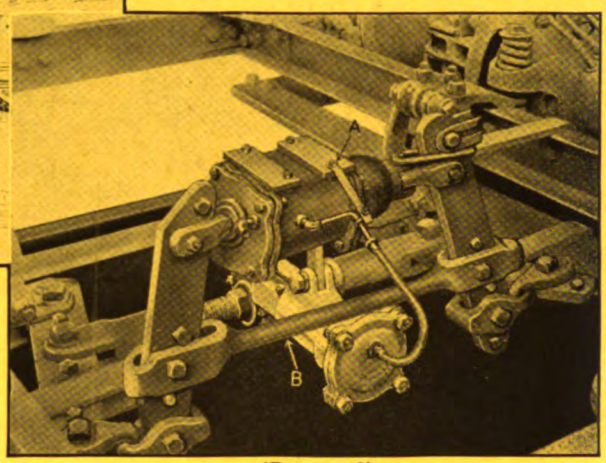
Equip your Safety Cars with Brill Automatic Slack Adjusters

(Air Operated)



No waste of air
No lost revenue
No excessive maintenance
No interference from dirt or grit
No unnecessary operation



(Patented)

Applied direct to truck bottom brake rod where hand adjustment would ordinarily be made

The Brill Automatic Slack Adjuster for Safety Cars operates only when necessary to compensate for wheel and brake shoe wear, instead of with every application of brakes. This elimination of useless operation not only saves compressed air but also assures longer life for wearing parts.

It is entirely enclosed, keeping out dirt and grit, which might interfere with the efficiency of its operation, and consequently requires less attention from the maintenance department.

As this Slack Adjuster is installed and operates directly on the truck bottom brake rod, where the actual brake rigging slack has been taken up by hand adjustment, the vertical levers are constantly retained in their normal positions.

No alteration of the brake rigging of Brill 78-M or 79-E safety car trucks is necessary to accommodate the Brill Automatic Slack Adjuster, and it can be quickly installed. The Brill Automatic Slack Adjuster guarantees effective braking at all times and eliminates the necessity for bothersome hand adjustment.

Leaflet No. 256 mailed upon request.

THE J. G. BRILL COMPANY
PHILADELPHIA, PA.

AMERICAN CAR CO. ST. LOUIS MO. — G.C. KUHLMAN CAR CO. CLEVELAND, OHIO. — WASON MANF'G CO. SPRINGFIELD, MASS.

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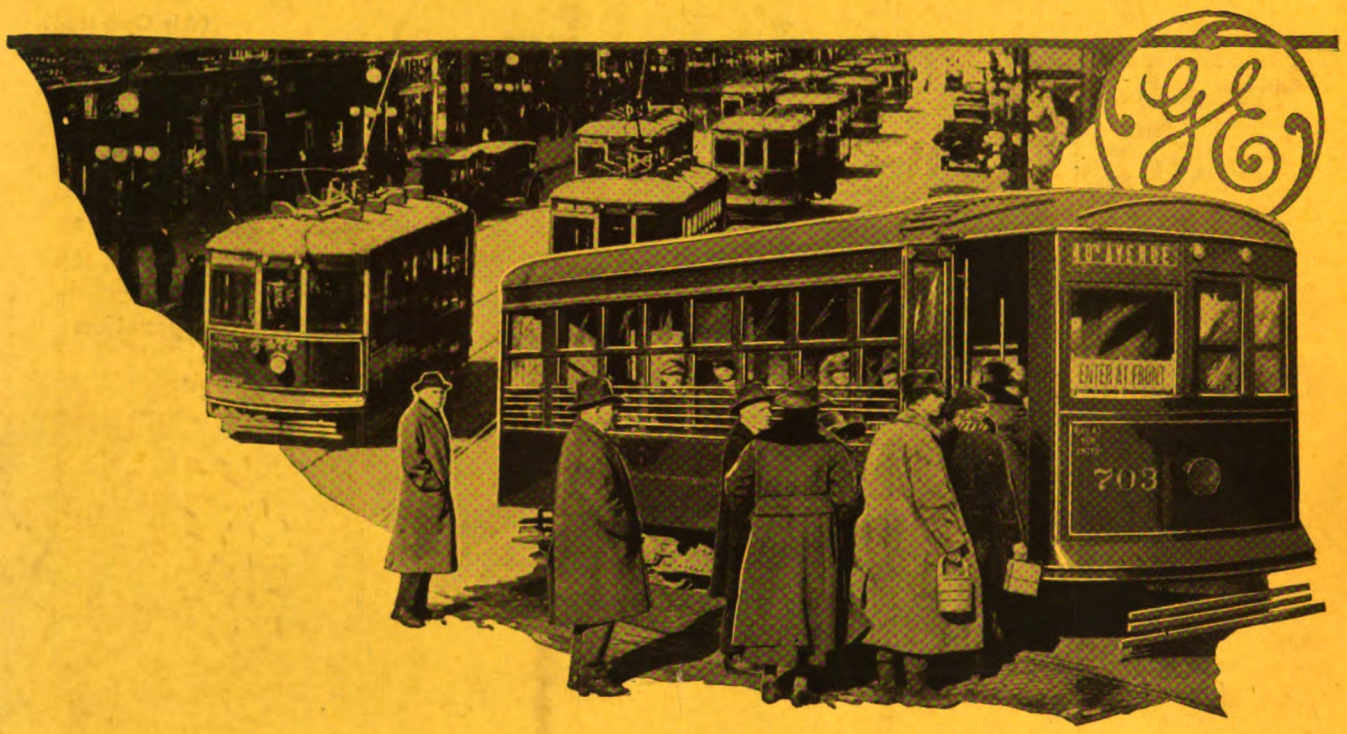
In 1923

More Safety Cars will serve the public



A Universal Car

Approximately 5300 Safety Cars are now in service (January, 1923).

During the year 1922 more than 400 Safety Cars were introduced on properties which had not previously used them. About 350 new equipments were added to existing installations.

It is a significant fact that the orders for most of these 750 new cars specified "G-E equipped." This means that they will have the same motive equipment which has largely insured the success of the Safety Car since its inception.

General Electric Company

General Office Schenectady, N.Y.

Sales Offices in all large cities

25-193

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McGraw-Hill Co., Inc. February 10, 1923 Twenty Cents Per Copy

ELECTRIC RAILWAY JOURNAL

Correct Lubrication
—*a mole-hill in cost*

What really interests executives is revenue from fares.

In their minds the cost of idle cars is a mountain—the cost of the most effective lubrication obtainable is a mole-hill.

The ability of the Vacuum Oil Company to lower ultimate operating costs through the use of high-grade lubricants is known throughout the world wherever street railways operate.

This knowledge and experience is at your disposal. We suggest that you get in touch today with our nearest branch office.

GARGOYLE

Lubricating Oils

A grade for each type of service

Domestic Branches:

New York (*Main Office*), Boston, Chicago, Philadelphia, Detroit, Pittsburgh, Indianapolis, Milwaukee, Minneapolis, Buffalo, Rochester, Des Moines, Kansas City, Kan., Dallas, Oklahoma City

VACUUM OIL COMPANY

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The Flexibility of Alternating-Current Electrification.

Pennsylvania Railroad

New York, New Haven & Hartford R. R.

Norfolk & Western Ry

A striking illustration of the flexibility of Alternating-Current Railway Systems is presented by recent orders for 19 large alternating-current electric locomotives from the Pennsylvania R.R.; the New York, New Haven & Hartford R.R.; and the Norfolk & Western Ry.

Here are three radically different types of locomotives, built for different classes of service, each of the roads calling for a type to fit its own particular needs, as follows:

The Pennsylvania R.R., 3 single-cab locomotives, for freight service, each 3,300-hp., 200 tons, 11,000 volts.

The New York, New Haven & Hartford R.R., 12 single-cab locomotives for high-speed passenger service, each 2,400 hp., 181 tons, 11,000 volts.

The Norfolk & Western Ry., 4 double-cab locomotives, for heavy grade freight service, each 4,000 hp., 382 tons, 11,000 volts.

The Pennsylvania type is particularly noteworthy, having in view the possibility of a single type of locomotive for both main-line passenger service in the New York Terminal, and for freight service similar to the Altoona grade.

Westinghouse Electric & Manufacturing Company
East Pittsburgh, Pa.

MEMBER AMERICAN ELECTRIC RAILWAY ASSOCIATION AERA

W WESTINGHOUSE ELECTRIC

Westinghouse

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ELECTRIC RAILWAY JOURNAL

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Company, Inc.

HENRY W. BLAKE and HARRY L. BROWN, *Editors*

Volume 61 New York, Saturday, February 10, 1923 *Number* 6

Last Call for Midyear Conference

THE midyear conference of the American Electric Railway Association stands out as an event second only in importance and magnitude in the electric railway industry to the annual convention. This year the program arranged and the speakers selected are such that it behooves every executive who can possibly get away from his regular duties to be in attendance in order to get the spirit of the meeting and carry away with him its full value.

The morning session is to be devoted to the subject of taxation, one of the particular burdens of the electric railways, because much of their share of taxation is inequitable. This will be treated primarily by Senator Davenport, who has come to be recognized as one of the eminent authorities of the country on the subject. The advent of the motor truck and motor bus have raised new problems in the field of taxation, on which Mr. Davenport has probably made the most exhaustive study yet made public. Another session will be devoted to the subject of regulation, of even greater import to the electric railway field. On this subject, again, the conference is to be addressed by the man who may be considered the most eminent authority in his field, as he stands at the head of the regulatory profession as president of the National Association of Public Utility Commissioners.

Both these subjects will be discussed from all angles by men selected for their particular ability along the lines of the topic. Then there will be the banquet, which, with the Secretary of the Interior, the former Vice-President of the United States and a prominent railway executive as speakers, should be in itself a great attraction. Some seventeen committee meetings, arranged for on Feb. 15 and 16, will call others to Washington. Altogether, the outlook and reservations to date indicate an attendance of 800 or more.

Traffic Studies Are Instructive to All

ONE of the most valuable portions of electric railway literature is that embodied in traffic survey reports and other studies of ways of improving operating conditions in different cities. These studies are sometimes carried out by an official of the railway company or by some member of the staff of the regulating commission, but more often they are made by an outside engineer or staff of engineers engaged to do this work by the company, the commission or the city in which the system is located.

Unfortunately for the industry, complete copies of these reports are rarely available for all who are interested in the subject of economical electric railway operation. While there is nothing secret in regard to their contents, the conditions under which they are produced bring about this scarcity. They are usually part of a public record and there is not enough popular demand for any individual report to warrant its being printed and placed on sale through the bookstores like a commercial book. In fact, most of these reports are not even printed. Enough copies are mimeographed to supply a copy to members of the City Council, the officials of the railway company concerned and the newspapers in the city in which the survey was made, with perhaps a few over. Even with those more ambitious reports which are put in book form, not many more copies are printed. Nevertheless, as stated, progress in thought in the electric railway industry, particularly in regard to transportation methods, often first finds expression in these reports.

It is because of the realization of this condition that the ELECTRIC RAILWAY JOURNAL has always given extended treatment to reports of this kind. Its editors realize that the primary aim of a report of this kind is the solution of the local problem to which it is devoted. Nevertheless, they feel that through the methods of approach adopted for these local problems managers of electric railway properties can often derive helpful information and suggestions as to how they can best administer their own properties. For this reason rather extended abstracts have been published of practically all pertinent studies.

The Saving of Patrons' Time Is the Main Object

IN THE report on Richmond service, by John A. Beeler, the significant statement appears that: "Any street car system has as its main object the saving of time for the patrons." With this as a basis, the report goes on to show how time can be saved to a greater extent than at present by improved methods of fare collection, better destination signs, less frequent stops for passengers, more regular headways, the introduction of electrically operated switches instead of switches moved by hand, and so on. All of these methods save the time of the patron and so are of benefit to him.

Of course the definition of the objects of an electric railway might be made much longer than the expression of the five words in the caption at the top of this editorial. The stockholders will think the enterprise a failure if it does not show a profit. Good service to the passenger, also, implies his safe transportation and a certain degree of comfort, but in a sense these are understood to be accompaniments of any system of transportation. Experience with jitney competition, however, shows that a considerable number of people are willing to put speed above either comfort or safety.

The extent to which a railway company is also interested in increasing the speed of its cars is shown by the figure given in the Richmond report of 5 cents as being the cost of each minute lost by each car, and that

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the saving of but a minute on each trip of a car would amount in a year to $100,000. Presumably a two-man car was being considered. Five cents a minute corresponds, of course, to $3 a car-hour, and as the saving includes not only the platform cost but a certain amount of the investment in both cars and carhouses, it will be admitted that the estimate is by no means high. Yet there are many nickels in this form lost on the average electric railway. If each schedule maker could realize that nickels at the rate of one a minute are dropping from each car during every unnecessary delay without doing good to anybody, he would pay more attention to seeing that the stream of nickels was diverted from the street to the treasury of the company.

But it should be remembered that the schedule maker alone can do little. He must receive the support of the transportation department to the extent that the schedules which he prepares are actually made and not that they simply appear in the time-table. Cars must be kept to these schedules, not behind nor ahead of time.

An Impetus to Chicago's Electrification and Terminal Problem

RECENTLY the group of railroads using the Dearborn Street Station in Chicago made public a proposed plan for a magnificent new terminal project on the present site to serve as a consolidation of the three stations located just to the south of Chicago's loop—the Dearborn, La Salle and Harrison Street stations. This plan was designed by the same engineer-architect who laid out the Grand Central Terminal in New York City. The Chicago project is an even greater one. While this plan is only one of several similar studies that are being made, its presentation to the public portrays such a great practical improvement that it must surely serve as a great impetus to the execution of some such plan.

This particular plan has merits which very logically must form elements of any alternative proposal. It is close to the Loop district (two blocks south of Van Buren Street), but far enough removed so that there is available, without undue cost, plenty of ground for making ample provision for pedestrian and vehicular movements. It contemplates the opening up of Dearborn Street, which now ends at the present terminal, by a two-part, two-level traffic way extending through the terminal to the south. It would open up to a wonderful development all the air rights, by virtue of electrification, over the area now occupied only by tracks, and result in a tremendous increase in property values to the south of the Loop district. It would also effectively break down the imaginary barrier to expansion to the south of the "iron-bound loop," just as this barrier disappeared on the north with the construction of the Drake Hotel.

The possibilities in civic improvement, in property enhancement and in advantages to the railroads and the traveling public are so great that they appeal to all concerned. In addition to the development of the immediate neighborhood of the new terminal, the plan would release a very large proportion of the territory south of Van Buren Street between State Street and the river, which is now largely occupied by railroad tracks, or whose presence make the remaining area undesirable for any high-grade use. With the Illinois Central and Union Stations now under way completed, and this proposed Dearborn Street development carried out, Chicago's terminal project would be well solved.

The Toronto Valuation Was a Notable One

ONE of the most extended arbitration proceedings ever conducted to determine the value of an electric railway has just been finished in Toronto. Hearings were begun June 28, 1921, and it was not until Jan. 30, 1922, that the arbitrators appointed to determine the price to be paid by the city for the trolley system, which it took over on Aug. 31, 1921, handed down their decision. During this time the board worked assiduously, as is shown by the immense volume of testimony taken, which amounts to about 5,000,000 words, the equivalent of thousands of typewritten pages.

In one way the work of the arbitrators was simplified, or perhaps it was complicated, by the fact that the original agreement between the company and the city, made some thirty-one years ago, specified the basis on which the valuation should be made. The arbitrators did not have, therefore, to decide what valuation method to adopt, but they did have to construe the meaning of certain terms which were the subject of dispute between the city and the company. Perhaps the most important of these questions was what was meant by the expression "a railway of the best kind and system then in operation" as applicable to service in Toronto. The arbitrators also had to decide what part of the property of the company "was necessary to be used in the working of the railways at the termination of the said period of thirty years." It also had to determine the time at which the prices for materials valued should be taken.

This latter question might seem at first easy to answer by taking the time when the railway was taken over, namely, Aug. 31, 1921. But the great variation in prices which occurred during the period 1918 to 1922 made this matter of date very important, and there was no direct reference to it in the original agreement. The company's counsel put up an able plea for 1919 and 1920 prices, on the theory that if the city had been obliged to construct a railway system, it would have had to begin three years earlier than Sept. 1, 1921, to be in as good a position as it was on that date. Such a plan would have led to a higher value than 1921. On the other hand, the city's attorney urged the adoption of such a price schedule as he claimed would have prevailed if there had been no war. These figures obviously were much lower than those of Sept. 1, 1921. The arbitration board answered both of these arguments by saying that "so far as the principle of reproduction cost, less depreciation, is availed of, it must be a reproduction cost at the time of the arbitration."

Allowances for organization and legal expenses, going-plant value, etc., while admitted by the board to have a place in some valuations, were ruled out by the simple statement that the words in the agreement and authorizing statute declared that the payment should be for "actual and tangible property" only.

While press reports from Toronto say that the decision may be appealed by the city to the London Privy Council, the work of the arbitrators is a notable one. It helps establish the principle in British possessions, and to some extent in all English-speaking countries, of the reproduction cost, less depreciation, method of valuation, based on prices current at the time of the arbitration. It also points to the desirability in any agreement of this kind of anticipating in advance, so far as is possible, all kinds of questions which may come up and providing for them in the agreement.

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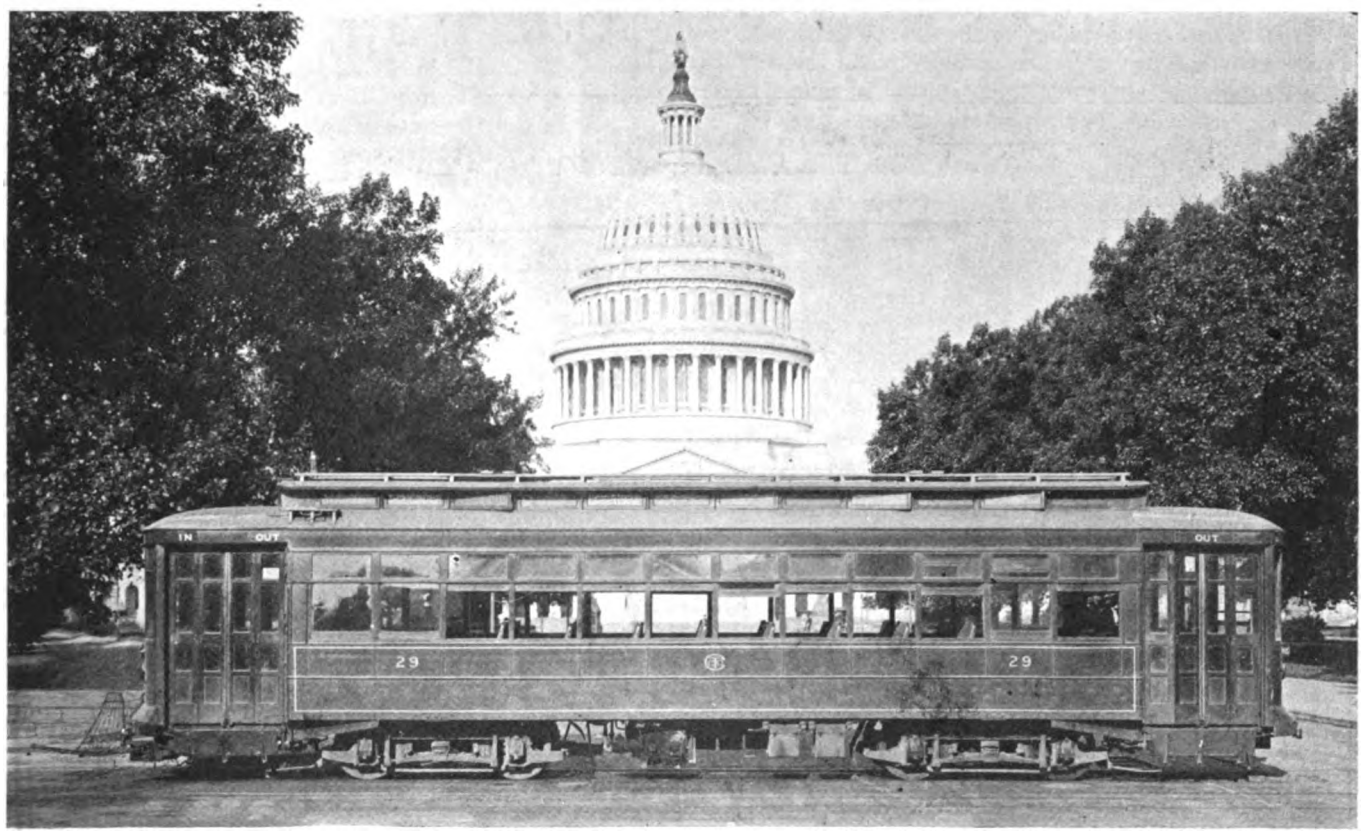
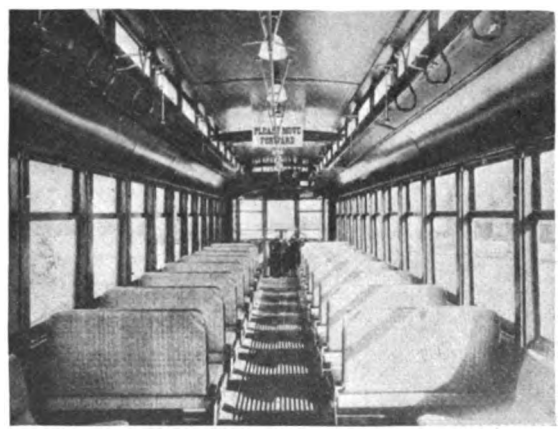
Points of Interest About the Capital Traction Company

By R. H. Dalgleish
Chief Engineer Capital Traction Company, Washington, D. C.

A General Idea of the Physical Characteristics of the Property Are Given, Together with Interesting Information on Some of the Construction and Maintenance Practices



THE Capital Traction Company furnishes transportation in the city of Washington to approximately 70,000,000 passengers yearly. It has 69.4 miles of single track. The schedule speed for the system is 10.25 m.p.h. between terminals. The longest run is made by the Chevy Chase cars, which run from Chevy Chase Lake to Seventh Street Wharf, a distance of 10.31 miles. On 20.9 miles of single track the power is collected from an overhead trolley and on 48.5 miles the power is collected from the conductor rails located in the conduit below the track



Latest Type Car Purchased by the Capital Traction Company

The use of the conduit system adds very materially to the construction and maintenance costs and makes operation more difficult. The illustration on page 237 shows a cross-section of the running rails, conduit, etc. Cast-iron yokes spaced 4 ft. 6 in. and set in concrete, support the running rails and slot rails. The insulators supporting the conductors are hung from the slot rails.

Fig. 3 on page 236 shows a photograph of a contact plow. Two parallel bars fastened to the truck engage in the slots in the top of the plow. These bars are parallel to the axles so that the plow is free to move sideways. It is guided entirely by the slot rail and the conductors. Since the slot is only $\frac{3}{4}$ in. wide the plow is limited to a $\frac{5}{8}$-in. piece. In this $\frac{5}{8}$ in. the two leads must be carried down to the shoes and kept well insulated, and the plow must be strong mechanically. Thus it is seen that the design of a satisfactory plow is not simple. The plow is removed from the truck at openings in the slot rail which permit it to be rotated so that it disengages from the truck. The leads are connected to the car wiring by plug and

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Features of Capital Traction Construction and Maintenance

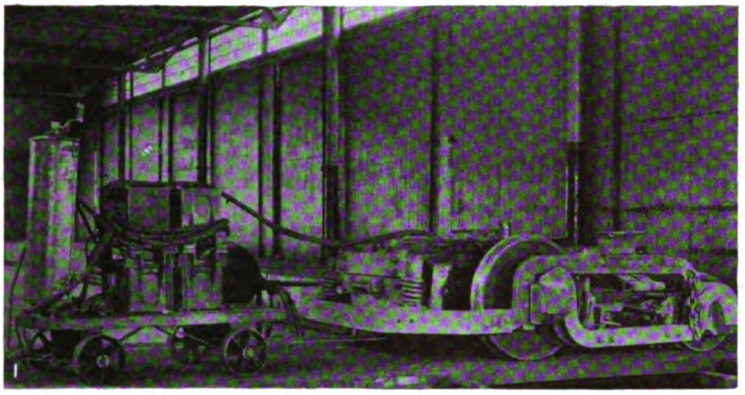


Fig. 1—A hand truck carrying a controller and resistance is used in moving car trucks under their own power.

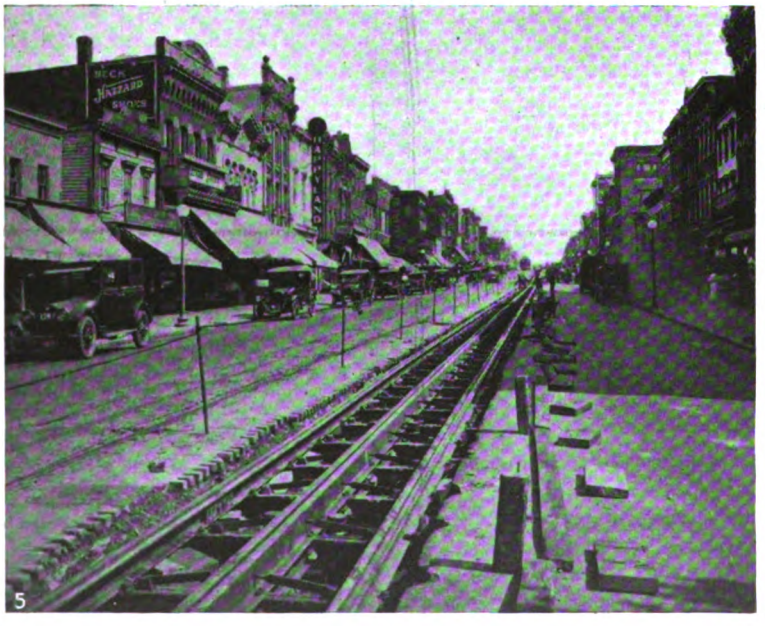
Fig. 2—Tinning axle bearing shell.

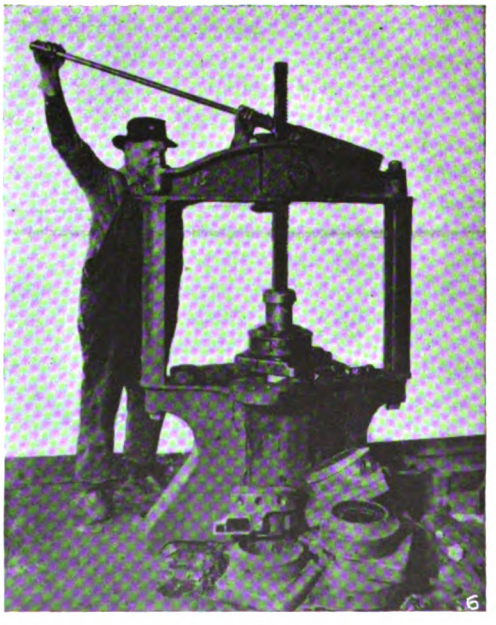
Fig. 3—Plow used with underground conduit, showing leads and contact shoe.

Fig. 4—Georgetown carhouse and general office building.

Fig. 5—New conduit track ready for concreting.

Fig. 6—Hand press used for pressing armature bearings in the housings.





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socket connectors so that the plow may be easily removed from the truck at any point where slot hatches are provided for the purpose. The contact shoe is insulated from the spring so that when an arc is drawn between the shoe and contact rail it will tend to break from the cast-iron shoe rather than to jump to the spring and burn it.

At the corners where the plow comes in contact with the slot rail, ⅛ in. thick spring steel hardened wearing plates are added. These must be replaced frequently, especially during wet weather, due to the grinding action of grit.

An idea of the life of the plows may be gained from the fact that during the past year 400 new plows were built and 3,777 were repaired, or a total average of 13.4 plows per car in service per year. During the year 1922, of all delays to service of two minutes or over, 44 per cent were attributed to the conduit system. Table I shows that the cost of maintaining plows for 1922 was 0.12 cent per car-mile, or 62 per cent as much as the cost of maintaining the motors.

The type and number of cars in operation is shown in Table II. In addition to this equipment there are also twenty-one open thirteen-bench cars equipped with Westinghouse 101-B motors. These cars are not in operation at present. All the cars are of the two-man pay-as-you-enter type except the open cars and one car equipped with safety features for one-man operation. The latter is used on an outlying line. In addition to the passenger equipment the company has the following service equipment: Eleven snow sweepers, five sand cars, one instruction car (shop), six dump cars and two work cars.

The illustrations at the head of this article show exterior and interior views of the latest type of cars purchased. The cars purchased in 1920 were equipped with four Westinghouse 514-C motors using 7½ deg. helical gears. These gears have made approximately 125,000 miles with practically no wear. The cars are noticeably quieter than cars equipped with spur gears. As a result of the operation of these gears and previous experimental sets, all replacements of worn-out gears are of helical design.

The cars are operated from five carhouses located as follows:

Name of Carhouse	Location	Number of Cars
Georgetown	Thirty-sixth and M Streets	82
Seventh Street	Water and P Street, N. W.	56
Fourteenth Street	Fourteenth and Decatur	67
Chevy Chase	Chevy Chase Lake	16
Navy Yard	Eighth and M Streets, S. E.	97
Total		318

Every effort is made to keep the cars in first-class condition by systematic inspection and overhaul. Light inspections only are made at the five carhouses, all overhauling being made at the main shops located at Thirty-second and M Streets, N.W. Definite rules are laid down for lubricating the car equipment in the form of a lubrication chart shown as Table III. Prior to use of this chart each oiler used his own judgment and the

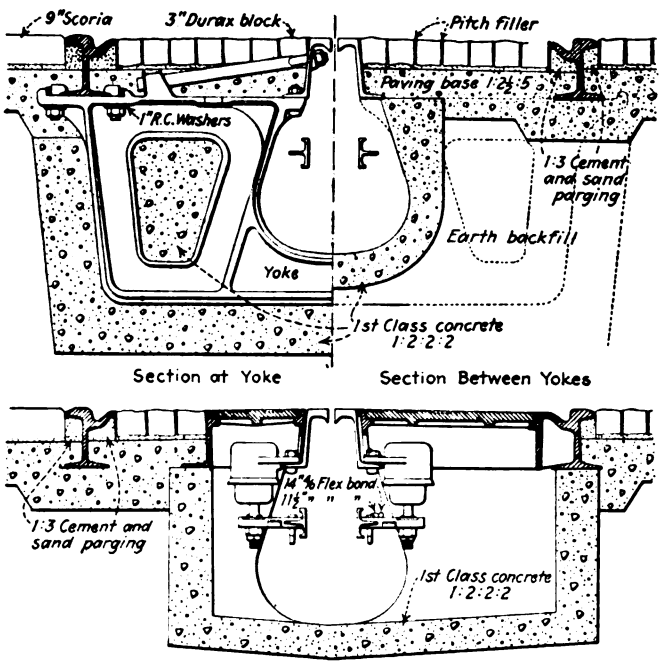
TABLE I—COMPARATIVE MAINTENANCE EXPENSE IN CENTS PER CAR-MILE FOR YEARS 1921 AND 1922

	1921	1922
Painting and varnishing	0.260	0.253
Body repairs	0.398	0.352
Truck repairs	0.542	0.504
Air brake equipment	0.057	0.055
Overhauling and carhouse work	0.103	0.108
Total cost bodies, truck, etc.	1.360	1.272
Car motors	0.195	0.194
Miscellaneous power apparatus	0.103	0.086
Repairs to plow	0.152	0.120
Overhauling and carhouse work	0.172	0.172
Total electrical equipment	0.622	0.572
Other expense*	0.248	0.262
Total equipment mintenance expense	2.230	2.106

* Including superintendence, shop expense, vehicle and service equipment maintenance.

results were far from satisfactory. Now, with definite rules laid down, the operation is largely removed from the judgment of the oiler and the results since the adoption of this chart have been very satisfactory.

The cars and equipment are thoroughly overhauled on



Sectional Drawings of the Washington Conduit Track Construction

a 40,000-mile basis. At this time the bodies are removed and put on temporary trucks and moved to the body repair shop and painted or varnished, depending upon their condition. The motors are removed from the trucks and opened up and thoroughly cleaned. The armatures are dipped and baked and the bearings are inspected and replaced if necessary. All bearings are pressed into housings as shown in Fig. 6. Any bearing which goes in too easily is rejected. This press is also used for all miscellaneous work where relatively small pressures are required.

Fig. 2 shows the babbitting and tinning equipment. Two furnaces are used, one to heat the babbitt metal and the other for tinning the bearing shells. All malleable iron bearing shells are tinned before babbitting.

TABLE II—CAR EQUIPMENT OF THE CAPITAL TRACTION COMPANY

Number of Cars	Motors per Car	Truck	Weight, Lb.	Seating Capacity	Length Over Bumpers	Motor	Total Motors	Gear Ratio	Gears Pitch	Gears Type	New Wheel	Pony Wheel	Control
20	4	Standard 0-50	48,000	44	43 ft. 8 in.	W-101B$_2$	80	18/66	3	Spur	33	.....	K29B
5	4	Standard 0-50	48,000	44	43 ft. 8 in.	G.E. 200C	20	16/65	3	Spur	33	.....	K29B
40	4	Brill 77E1	41,000	48	43 ft. 11½ in.	W514-C	160	15/76	3½	Helical	31	.....	K40AR$_2$
20	4	Brill 77E1	45,000	48	43 ft. 11½ in.	G.E. 247D	80	15/63	3	Spur	31	.....	K66A$_2$
43	2	Brill 39E	33,000	40	41 ft.	W101B	86	15/69	3	Spur	31	21 in. outside	K27
39	2	Standard 0-45	36,000	40	42 ft.	W306	78	14/70	3	Spur	31	21 in. inside	K27
50	2	Brill 39E	33,000	40	41 ft.	W306	100	14/70	3	Spur	31	21 in. outside	K27

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TABLE III—THE CAPITAL TRACTION COMPANY CHART FOR LUBRICATION FOR ALL CARS

Car Numbers	Type of Equipment					Armature Bearings		Motor Axle Bearings		Journal Bearings		Gears Pinions		Air Compressors			Brake Cylinders	Brake Slides	M'r'm'n's Valve	Center Bearings	Side Bearings	Trolley Equipment		Controller
Closed Cars	Trucks	Motors	Control.	Compressor		Lubricant Galena Elec. Car Oil	Frequency	Lubricant Galena Elec. Car Oil	Quantity per Bearing	Lubricant Galena Elec. Car Oil	Frequency	Lubricant Galena Compound	Frequency	Lubricant Galena Comp. Oil	Frequency	Quantity per Compressor	Lubricant Galena Air Brake Comp	Lubricant Cent. Plate Grease	Lubricant Gal. Brake Valve Oil	Lubricant Cent. Plate Grease	Lubricant Cent. Plate Grease	Lubricant Compressor Oil	Lubricant Vaseline	Lubricant Vaseline
1 to 20	Standard O 50	WH 101B	K	D2 EG		Keep 1 In. Oil in Well	15 Days	1 Gill		Replacing as follows—April and October. On all suburban cars 6 months On all city cars 12 months All old waste to be removed from journal boxes and replaced with properly soaked and drained waste.	30 Days	Pound	15 Days			Fill to within ¼ in. of top of filling elbow. Leave just enough room to screw plug into place. Do not fill when compressor is running.	All brake cylinders to be lubricated on general overhauling period. The cylinders are to be cleaned thoroughly and the entire wall covered with a thin coating of Galena Air Brake Compound. All piston leathers to be treated with Galena Air Brake Compound in a like manner.	At each 15-day inspection period all brake slides and friction points are to be thoroughly greased with Center Plate grease. The dirt is to be cleaned from under ratchet wheel on hand brake staff and lubricated with Elec. Car Oil.	At each general overhauling period valves to be opened and cleaned. At each 15-day inspection period, all brake valves are to be lubricated with a few drops of Galena Brake Valve Oil.	All center bearings to be lubricated every 30 days with Elec. Car Oil. All ball and roller center bearings are not to be lubricated.	All side bearings to be lubricated every 30 days with Center Plate Grease.	Wheels to be inspected and lubricated every 2 days with Galena Air Compressor Oil. All V.K. wheels "No Lubrication."	At each general overhauling period, Bases to be cleaned and lubricated with Vaseline.	Every 4 days inspection period Vaseline to be applied to contact fingers, segments, shafting, bearings and other operating parts. This to be done with a piece of felt to avoid using too much and causing bad contact.
20 to 25	"	GE 200	"	"		"	"	"	"	"	"	"	"	"	"	"								
26 to 45	Brill 77 E 1	WH 514	66 10	D1 F DH 16		"	"	"	"	"	"	"	"	"	"	"								
46 to 85	"	"	"	"		"	"	"	"	"	"	"	"	"	"	"								
101 to 103	Brill Eureka	" 101B	" 9	D1 F		"	"	"	"	"	"	"	"	"	"	"								
107-108,123	Brill	"	"	"		"	"	"	"	"	"	"	"	"	"	"								
104 to 131 except 107,108,123	39 E 1 Balt. Brill	"	"	"		"	"	"	"	"	"	"	"	"	"	"								
132 to 143	39 E 1 Standard	"	"	"		"	"	"	"	"	"	"	"	"	"	"								
151 to 189	O-45 Brill	" 306	27	"		"	"	"	"	"	"	"	"	"	"	"								
601 to 750	39 E Brill	"	"	"		"	"	"	"	"	"	"	"	"	"	"								
Open Cars	Eureka	101B	9	CP 25 D1 F		Keep 4 In. Oil in Well	"	"	"	"	"	"	"	"	"	"								
801-802-804	Balt.	"	"	D2 EG Nat. A3		"	"	"	"	"	"	"	"	"	"	"								
803-805	"	"	"	"		"	"	"	"	"	"	"	"	"	"	"								
806-809-10-16-17-18	"	"	"	"		"	"	"	"	"	"	"	"	"	"	"								
811-12-13-14-25-31	"	"	"	"		"	"	"	"	"	"	"	"	"	"	"								

On Westinghouse Motors Nos. 101 B-306-514 the high mark in oil well to be 4 in. low 2½"

On G. E. Motors No. 200 the high mark in oil to be 2½ in. low 1"

On G. E. Motors No. 247 the high mark in oil to be 4 in. low 2½"

The tinning equipment is shown in the foreground. Before the practice of tinning the bearing shells was started a large amount of trouble was encountered with the babbitt breaking away from the shell. The tinning of the shells has practically eliminated this trouble.

In order to move trucks and cars around the shop a transfer truck, illustrated in Fig. 1, is used. The truck has mounted on it a controller, resistance and leads to connect to the power supply and also leads to be connected to the leads of one motor. By this means a truck or car may be easily moved around the shop. The equipment on this hand truck is also used to test out the motors on the car trucks before the latter are assembled under the car.

The cars are revarnished once each year, one coat being applied. This policy has made it possible to eliminate much of the repainting and at the same time keep the cars in good condition. It is necessary only to repaint parts of the cars where the paint has been damaged. During 1922 none of the cars was completely repainted, 153 cars were partly painted and varnished, and 124 cars were revarnished only.

Power Source and Economy Measures

Coasting recorders were installed during 1919 and the resulting savings in the cost of operation are given in Table IV. After the recorders were installed one man was detailed to give full time to analyzing the results and instructing the motormen in the best methods of operation. The company considers the proper follow-up of results absolutely necessary in order to get the greatest savings.

TABLE IV—COASTING RECORDER ECONOMIES

	1916-17-18 Average	1919	1920	1921	1922
Coasting percentages	*22.0	*27.0	36.0	38.1	36.8
Kilowatt-hours generated per car-mile	3.67	3.52	3.23	3.08	3.18
Percentage reduction over 1916-17-18 average		4.3	12.0	16.1	13.4
Gross saving in fuel for power		$11,509	$44,529	$52,553	$39,961
Savings due to increased life of brakeshoes		.....	$5,000	$5,300	$2,914
Total		$11,509	$49,529	$57,853	$42,875
Cost of operating recorders, including maintenance, instruction and clerical expense		4,927	8,093	7,799	7,431
Net saving		$6,582	$41,436	$50,054	$35,444

* Recorders installed on all cars in June, 1919. Based on early records obtained from recorders, it is estimated that the coasting percentage previous to installing the recorders was approximately 22 per cent.

Power is generated in the company's Georgetown Power Station, located at Wisconsin and K Streets. The generating equipment consists of the following: One 7,500-kw. G. E. turbine and one 5,000-kw., one 3,000-kw. and two 1,500-kw. Westinghouse turbines.

The power is generated at 6,600 volts, three phase, 25 cycles and transmitted to four substations having a combined rotary capacity of 15,750 kw. The location and installed capacity of the substations are as follows:

Substation No. 1, located at Fourteenth and V Streets, N.W., has one 2,000-kw. G. E. rotary converter and one 1,500-kw. and two 1,000-kw. Westinghouse rotary converters. Substation No. 2, located at First and B Streets, N.W., has two 2,000-kw. G. E. converters and two 1,000-kw. Westinghouse converters. Substation No. 3, located at Georgetown Power House, has two 1,000-kw. and one 750-kw. Westinghouse converters. Substation No. 4, located at Connecticut Avenue and Fessenden Street, N.W., has two 750-kw. Westinghouse rotary converters.

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New Repair Shops at Boston

Boston Elevated Railway Is Spending $5,000,000 for New Shop Facilities—How the Work Will Be Routed Through the Various Departments, Which Are so Arranged as to Keep the Travel of Heavy Parts to a Minimum

THE EXTENSIVE repair shops which the Boston Elevated Railway is now building near the Everett terminal will occupy a tract of 22½ acres, thus making them one of the largest of the kind in the world. The floor area of these shops will be 493,478 sq.ft.

For a number of years the Boston Elevated Railway has had shops which were admittedly inadequate. The greater part of the car equipment repairs has been done in the Albany Street shops, which are largely the result of circumstances. These shops were originally part of the Hinkley-Williams Locomotive Works, which were purchased by the company in 1889 for power station purposes. In addition, the company has what it calls its Bartlett Street shops, which were originally built for horse-car repair, and it has a shop fitted primarily for inspection purposes, at its Sullivan Square terminal.

Decision to build adequate shops for the company was reached after the present shops had been outgrown and the necessity of new facilities became not only a question of economy but even a physical necessity for the furnishing of satisfactory service. Through the trustee form of management under which it operates, the company is able to secure credit for the construction of an extensive undertaking of this kind, and erection is now under way. The company hopes that the work on these new shops will be far enough along so that the tools now at the Bartlett Street shops may be transferred to the Everett shops about November, 1923, or in about eleven months, and at the end of the following twelve months that the Albany Street shops may be closed and the Everett shops will be able to take care of all of the work.

A preliminary perspective drawing and a plan of the shops were published in the issue of this paper for March 19, 1921. The plan, with some modifications, is reproduced on page 240, so that the following explanation of the shop arrangement will be understood.

It will be noted that there are four buildings, arranged for the handling of cars, two on each side of the transfer-way; i.e., wood shop, paint shop, equipment shop and repair shop. Track connections to transfer tables for surface cars are through the open space between the wood shop and equipment shop and for rapid transit cars through space between paint shop and repair shop. There is also a steam railroad track connection to the transfer table at the south side of the wood shop. The transfer tables will be of such dimensions and capacity as to permit the handling of loaded steam railroad freight cars, the largest rapid transit cars or the smallest surface cars. The arrangement of shops and transfer-way permits flexibility in the movement of cars from one shop to another as the progress and the nature of work may require. The transfer tables will be covered so that cars may be moved in stormy weather without their getting wet. To facilitate quick movement, transfer tables are equipped with two 40-hp. motors and air brakes. Operating cabs are provided at each end of transfer table. An electric winch is also provided for handling dead cars.

The blacksmith shop is located adjoining the equipment shop and wheel and axle shop, the latter being also connected with the truck shop, which is in the repair shop building, and also with the first floor of the storehouse. A storage yard is provided for wheels, axles, trucks, etc. This yard is partially surrounded by the blacksmith shop, wheel and axle shop and storehouse and is served by a 10-ton crane. Scrap bins are also located in this yard which will permit the handling of scrap by electromagnet. Provisions are made for the handling of materials between yard and wheel shop, truck shop and blacksmith shop by a 5-ton telpher.

The motor and armature shop is located directly over the truck shop and the machine shop over the wheel and axle shop adjoining the motor shop and second floor of the storehouse, thus affording direct communication between these departments. Further detail description is as follows:

Paint Shop

This is a one-story building having twenty-two tracks and a capacity of fifty-two 50-ft. cars. A balcony 40 ft. wide is provided on the side opposite from the transferway about two-thirds the length of the building. The balcony will be used for miscellaneous painting, such as doors, sash, signs, etc., and locker rooms. Beneath the balcony is located the paint stockroom, glass storage, toilets, etc. A basement under the paint stockroom is provided for the tank storage of paint materials which can be drawn from outlets on the main floor.

Wood Shop

The wood shop is similar in construction to the paint shop, having twenty-two tracks and a capacity of thirty-six 50-ft. cars. The mill room occupies a space 60 ft. x 150 ft. in the southwest corner of the building, and a balcony 35 ft. wide extends from the mill room to the end of the building on the west side. This balcony will be used for upholstering and cabinet work, locker rooms, etc. Dry kiln and lumber storage is provided in separate buildings adjacent to the mill room.

Equipment and Steel Car Shop

The equipment and steel car shop is a one-story building of similar construction to the paint and wood shop but with additional height to accommodate traveling cranes which will serve practically the entire area of the shop. There is one craneway having a span of 60 ft. and a capacity of 25 tons; another having the same span of 10 tons capacity and one with 16-ft. span and 3 tons capacity. An 18-ft. balcony is provided extending the entire length of the building on the west side. This balcony will be used for miscellaneous light work, locker rooms, etc.

Pits are provided for one car length on each track

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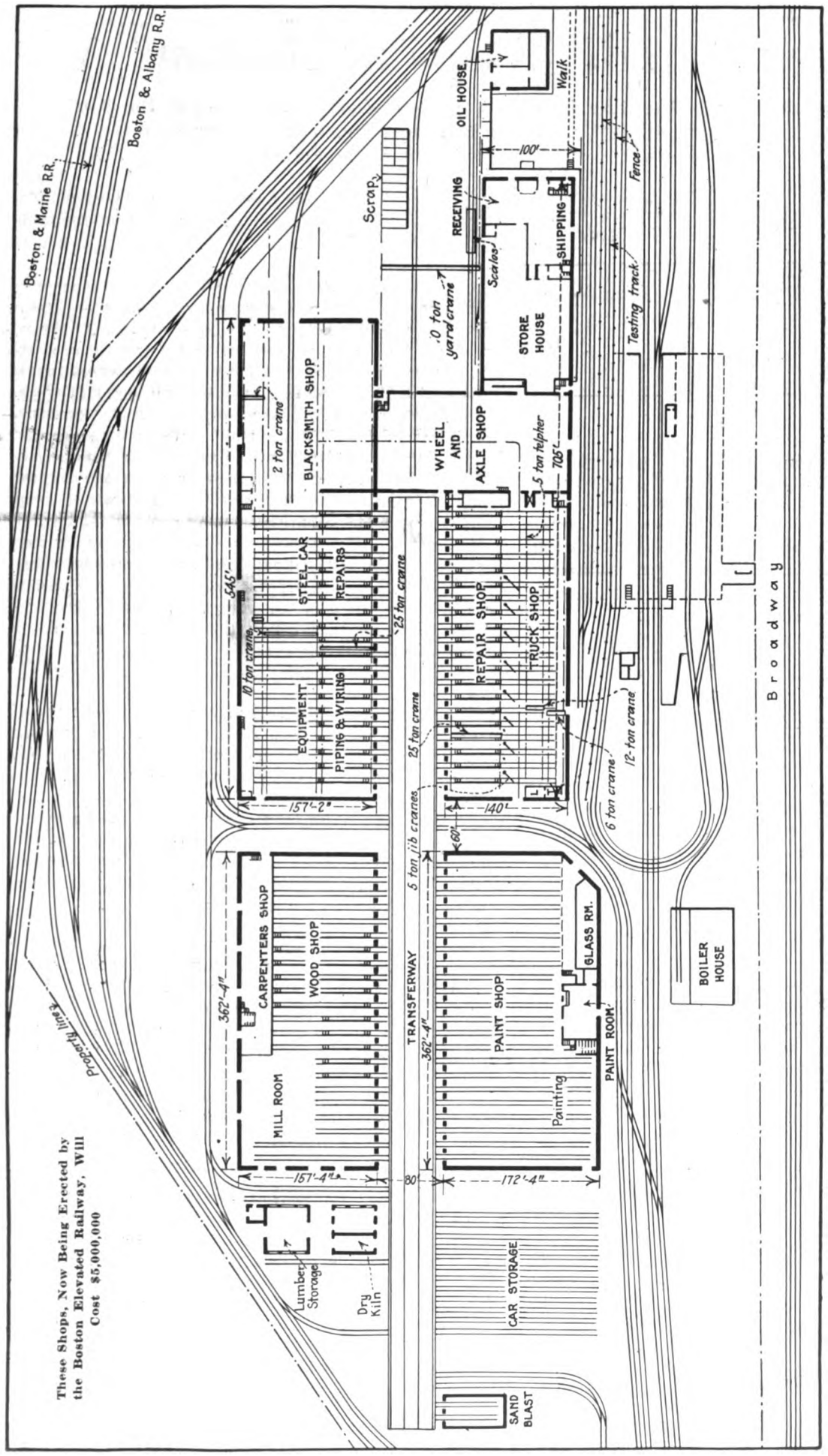

These Shops, Now Being Erected by the Boston Elevated Railway, Will Cost $5,000,000

on the transfer-way side. The 3-ton and 10-ton craneways extend into the blacksmith shop, which will permit convenient handling of heavy or fabricated materials from that point to the location of assembling. There are twenty tracks giving a capacity of forty 50-ft. cars and an additional working and storage space 30 ft. wide the entire length of the shop.

REPAIR SHOP

The construction of this building on the transfer-way side for a width of 65 ft. will be one story, the same as the equipment and steel car shop section next to the transfer-way. There are twenty tracks having a capacity of that number of cars; pits are provided on each track. This section will be served by a crane, having a span of 60 ft. and capacity of 25 tons. This crane will be arranged with two trolleys, each trolley carrying two hoists properly spaced so that the hooks drop each side of the car body. This will permit the raising of car bodies by attachment at four points on the car sills without the necessity of using cumbersome spreaders and slings.

The truck shop section is 75 ft. wide and extends the whole length of the shop. The tracks extend into the truck shop so that when the car body is raised the

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trucks can be moved forward on the tracks into the truck shop. For handling motors and trucks there will be provided ten 5-ton jib cranes each serving two tracks, one 12-ton crane running lengthwise of the shop and having a span of 24 ft. and another 6-ton crane with a span of 24 ft. In a space between the jib cranes and craneways a 5-ton telpher rail is provided. This extends through the truck shop and wheel and axle shop to the blacksmith shop and storage yard and will be used largely for handling wheels and axles.

Motors will be taken off and installed in trucks in the truck shop, but motors will be repaired in a motor shop located on the second floor of the building above the truck shop. Motors may be handled between truck shop and motor shop by truck and elevator, or entirely by cranes, there being a hatchway provided in the motor shop floor through which motors may be hoisted from the truck shop by traveling crane on the second floor.

Wheel and Axle Shop

This shop occupies the first floor of the building at right angle to the repair shop and connects with the truck shop, blacksmith shop and storehouse. Two tracks run into the building for the receipt or shipment of wheels and axles by cars. A part of this shop will be used for such work as gear-case repairs, electric welding of truck parts, etc.

Blacksmith Shop

The blacksmith shop is a one-story building with construction similar to the equipment and steel car repair shop with craneways of the two shops connecting. A track running into the shop provides for receiving material by car. The craneway extending through the end of the shop into the yard serves iron storage space adjacent to the receiving track.

Wash and locker rooms are located on a balcony at one side of the shop. A part of this shop will be used temporarily for a brass foundry.

Motor and Armature Shop

As previously described, the motor and armature shop is located over the truck shop. A craneway extending the entire length of the shop is provided in the center section. This crane is of 5-ton capacity and has a span of 24 ft. Lighter traveling cranes are also provided in the other sections for handling motors and armatures. The impregnating and dipping room is arranged to be adjacent to baking ovens at the end of armature shop.

After the armatures are removed from motors in the motor shop they are cleaned and blown out by compressed air. They then pass down one side of the armature shop for winding, inspection and repairs. Then they pass through the dipping and baking process and return through the other side of the shop where they undergo commutator inspection and repairs, shaft inspection and repairs, banding and testing, arriving again at the motor shop ready for service. This plan provides, it is believed, for the least possible travel or handling of armatures. After the motors are assembled, they undergo a stand test to make sure that they are in perfect condition before being placed in service.

The present practice of supplying carhouses with spare armatures and field coils for motor repairs will be changed. Complete motors which have been thoroughly tested will be delivered to carhouses and defective motors will be returned to the motor shop for repairs. To facilitate the handling of such motors, which are transported by truck or service, a 2-ton telpher is arranged in the motor shop extending over tracks at the side of the building so that the motors can be delivered on trucks or cars, or vice versa, with but one handling. On each side of the shop and running its entire length are 25-ft. balconies which will be used for coil winding, controller and miscellaneous electrical repair work. Toilet and locker rooms are provided at each end of the shop on both floors.

Machine Shop

The machine shop is located over the wheel and axle shop and its arrangement is similar to that of the motor and armature shop, with a main floor and balconies. The central section of the main floor is served by a 10-ton crane having a span of 45 ft. All heavy machine tools will be located in this section so that heavy parts can be handled by crane. Smaller tools will be arranged on and under the balconies. A 10-ton elevator is located so that it serves all floors of the machine and motor shops. In addition to this there is a balcony provided at the main floor level of the machine shop and projecting over the storage yard so that tools or material can be handled direct from cars to the machine shop floor by the yard crane.

Storehouse

This building is three-story with basement. The basement, first and second floors are occupied by the stores department, and the third floor by the department general office, drafting room, cafeteria, etc. This building is equipped with both freight and passenger elevators. The first floor is 4 ft. above grade and a platform is provided around three sides of the building at the shipping and receiving end at car-floor height. A steam railroad track is located on the yard side and surface car tracks on the opposite side, leaving the end platform clear for teams and truck service.

The oilhouse is located adjacent to the storehouse and connected to it by an extension of the shipping and receiving platform. The storehouse track also serves for the delivery of oil, etc., to the oilhouse by carload lots. Oil will be stored in tanks in basement and be drawn from outlets on the main floor, which is divided to provide for waste and packing storage, and a room for preparing and cleaning journal packing and filtering and reclaiming used oil. A large part of the oils and packing will be used at these shops, but the present practice of furnishing carhouses with oil and dry journal packing will be discontinued. Journal packing for the whole system will be prepared ready for use at the oilhouse and shipped to carhouses in suitable receptacles with weekly stock supplies, and all packing removed from cars will be returned to the oilhouse for cleaning, sorting and resaturation.

Overhauling Begins in Repair Shop

The work of overhauling will be begun in the department marked in the plan "Repair Shop." It is expected that every car will be overhauled about every twelve or eighteen months. When a car enters the shop for overhauling, the body is raised by a crane, which serves all of the tracks. The trucks are then run out into the truck shop for overhauling. Other equipment which is in need of overhauling, such as trolleys, circuit

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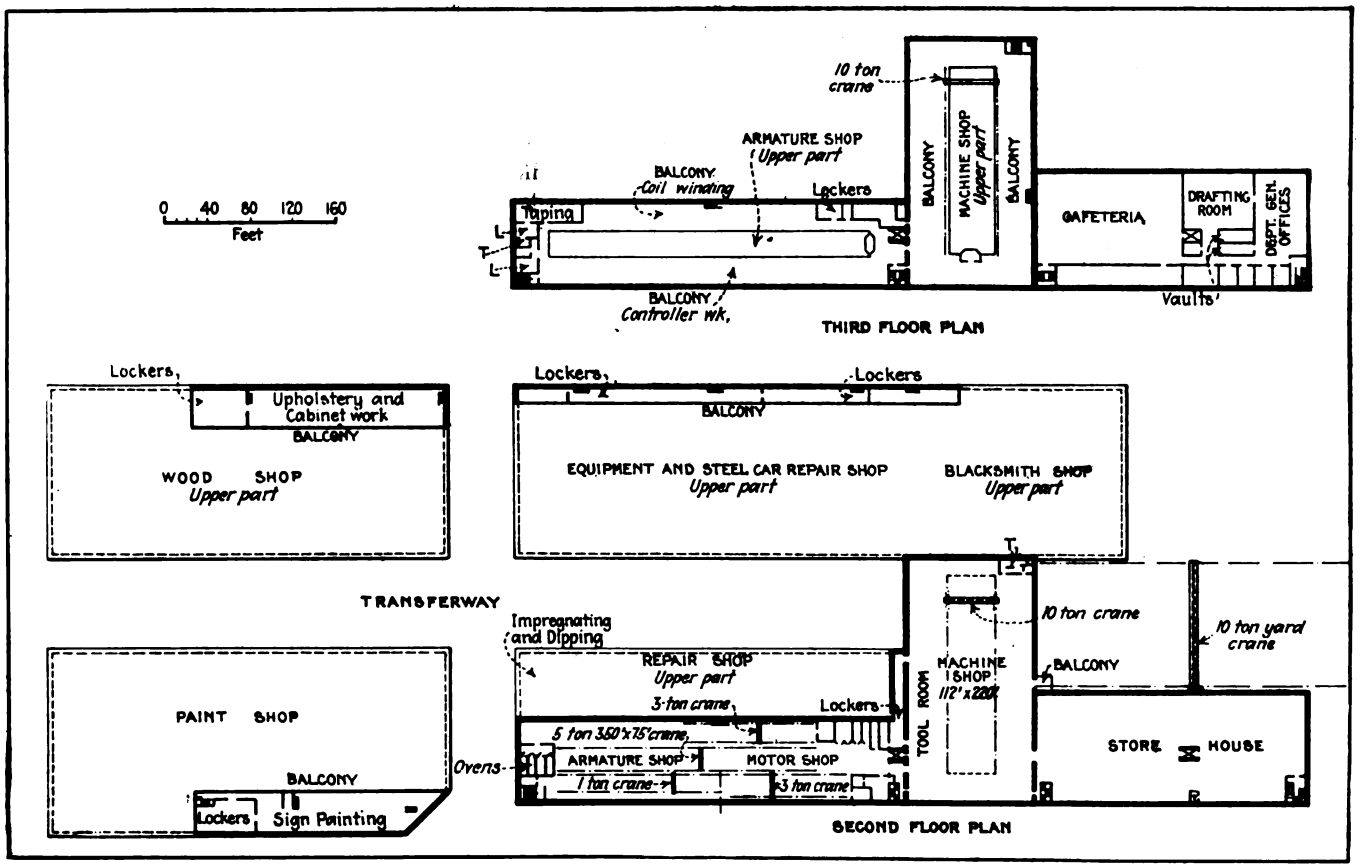
breakers, controllers or contactors, compressors and wearable parts of air-brake equipment, will be removed from the car and sent to the proper department for repairs. The car body, having been placed on dummy trucks, is then taken to the various shops, depending upon the class of work to be done. If piping or wiring repairs are required, it goes to the equipment shop; for woodwork repairs, it goes to the wood shop; then to the paint shop and finally returns to the repair shop for trucks and equipment which have been overhauled, thus holding the car out of service the least possible time and reducing to a minimum the spare equipment requirement.

is nearly due. Likewise there will be a large number of elevated cars which will go to the repair shop only for change of motor or wheels, as owing to the large number of curves on the Boston rapid transit lines, it is necessary, on account of wheel wear, to remove wheels frequently for grinding and turning. This amounts to ten or twelve cars per day. It is the intention to do all overhauling work for both surface and elevated cars at the general shops, leaving only cleaning, inspection and light repairs to be done in the carhouses.

It will be about a year and a half before the company will have to buy any new tools for the shops. Much of the tool equipment of course will be taken from the



Plans for the Second and Third Floors of the New Boston Elevated Shops

Adjacent to the repair shop there will be a test track which has a level tangent of approximately 900 ft. This will be equipped with both overhead trolley and third rail, the feeders for which will pass through a test room in the motor shop, where a graphic recording ammeter is installed. After cars have been through the shops for overhauling they will be given a running test on the test track to determine their braking efficiency, smoothness of operation, etc. By means of the graphic recording ammeter installed in the test track, feeder circuit faults in wiring connections, resistance grouping, automatic relay setting or control functioning can quickly be determined without the necessity of connecting test apparatus in the car wiring. This is somewhat of a departure from the practice of other electric railway companies so far as is known and simplifies greatly the work of the test engineers.

The foregoing details outline the routine of cars going through shops for general overhauling, but of course cars for collision damage repairs will not go through this routine unless their time for overhauling present shops. The company's equipment of tools is quite complete except where it has been impossible to install new tools because of lack of room.

Estimated Savings

It is estimated that the savings resulting from the shorter time that will be necessary to hold cars out of service for repairs and overhauling and the reduction in the number of cars taken out of service on account of failures will be equivalent to a gain of 100 cars at an average value of $12,000 each. It is also believed that there will be a 50 per cent reduction in the number of car failures with a great saving in lost time of crews, pull-in mileage, loss of fares and other items. These savings, outside the gain in more efficient car service, have been estimated by the company at $332,500 per year. Other savings, including an estimated 10 per cent in efficiency in labor, amount to $376,360 a year. Detailed figures on the various estimated economies to be secured from this shop were given in the article in the issue of March 19, 1921, already referred to.

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Better Service Possible in Richmond

In Mr. Beeler's Report on Organization and Service, He Tells How, Through the Co-operation of the City and the Company, Electric Railway Service in Richmond, Va., Can Be Speeded Up and Other Improvements Made

THE third portion of the report on the Richmond railway division of the Virginia Railway & Power Company, being prepared by John A. Beeler, has just been submitted to the City Council of Richmond, Va. This is the concluding portion of the report which Mr. Beeler was engaged by the Council to make on the Richmond railway situation. The first portion, abstracted in the issue of this paper for Dec. 9, 1922, considered the finances of the company. The second was a valuation report and was reviewed in the issue of this paper for Jan. 27. The third portion comprises about 150 typewritten pages with maps and diagrams. It takes up the organization and operating methods of the company and contains recommendations for improvements in both, as well as for comprehensive rerouting. An abstract is published below of the comments on organization and methods. A review of the rerouting suggestions will appear in a later issue.

History and Present Organization

The Richmond street railway system is one of the earliest in the United States. The first of its constituent companies came into existence as early as 1860. To Richmond is accredited the honor of the first electric railway system. This was consummated as far back as 1888, when the Sprague system was installed on a portion of what now is known as the Clay Street line. Originally independent companies competing for the patronage of the public, the properties have been merged and consolidated into the present single system. These consolidations have not always been effected in such a manner as to afford the best results from the standpoint of either public or company. Much duplicate track remains, and even where parallel tracks have been replaced by single lines, duplicated service has been operated on the one street. With public and company now ready to get together, a greater economy and efficiency of the service should result.

As at present constituted, the Virginia Railway & Power Company consists of two main districts, that comprising Richmond and vicinity and that comprising Norfolk and vicinity. The principal officials of the company divide their time between the various phases of the company's activity. These officials seem anxious to take any steps that will better the service rendered the public, but their willingness to adopt suggestions and ideas does not always appear to be communicated to their subordinates. There is a certain amount of lost motion in the execution of any policies whose application is not directly in the hands of the higher officials.

The Richmond railway division is one of the main departments of the company and earns a large share of the gross revenue. There is, however, no responsible head who devotes his whole time and energies to this most important section of the property. The present plan of having one official in charge of both the railway and light and power divisions, not only in Richmond but in other parts of the system, is not securing the best results. A better method would be to have a manager for this division alone, who would report to the president directly.

Any street car system has as its main object the saving of time for the patrons. Regularity, frequency and speed are prime requisites in obtaining this result. Delays and lost motion must be minimized. Each minute of street car time costs the company on an average about 5 cents. A saving of but one minute on each single trip would amount in a year to $100,000. Since people want more rapid service it works both ways, as

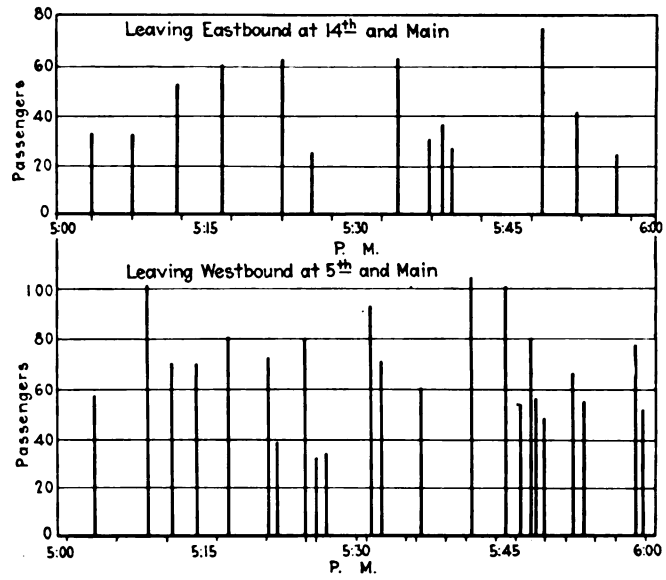

Chart Showing Irregular Car Spacing and Loading on Main Street Line During Rush Hours

(The observed time and load of each car are indicated above the base line; the schedule time is indicated below the base line. Observations were taken on Aug. 31, 1922.)

the patronage will be increased. Thus efficient service and successful management go hand in hand. A campaign for saving seconds would be a good start on the road to thrift.

Track and Track Equipment

Speaking generally, the track in Richmond is in fairly good physical condition, but the existing special trackwork has been designed almost entirely for the operation of the regular routes, and the arrangements for emergency movements or revision of the present routing are poor. The company's engineers should give careful attention to this subject, and future orders for special work should include such additional connections as may be desirable. In any rerouting some left-hand turns in the business district could be taken out to advantage.

Almost without exception the curves on double track, whether plain or in special work, are not designed to permit cars of any type now in use to pass each other. From an operating standpoint this is almost the equivalent of the introduction of a stretch of single track. This condition causes delays, especially during rush hours, when the streets should be utilized to their full capacity. All layouts for future construction should

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provide for clearance of the largest cars in service. The city should co-operate with its approval of such plans, even though it may be necessary to revise the curb lines at some corners.

While electric switches are advisable wherever the headway on joint track is more frequent than approximately five minutes, there is none in operation today in Richmond. At several heavy junctions switchmen are employed during rush hours only, but at other times all switches are thrown by hand. The usual practice is for the motorman to leave the car, walk in front, with a hand switch-iron move the tongue, and then return to his position. This operation wastes valuable time and in the rush hours is a cause of congestion. With safety cars the operator cannot always leave his post until after alighting passengers are off the car. Entering passengers begin boarding while he is off the car, making it difficult to check up the fares, and possibly resulting in a loss of revenue. The installation of electric switches is recommended at all regularly used junctions in the business districts, and at any other points outside where the headways are sufficiently close to justify them. In addition to eliminating switchmen at certain locations in rush hours, it will speed up car movements at all times.

Spring switches should take the place of loose-tongue switches at all entrances to double track and turnouts. Where this cannot be done without extensive reconstruction of the switch, rubber blocks should be installed at once to perform the same function.

Types of Car Equipment

At present numerous types of cars are in use, but the safety car is the most suitable for Richmond requirements. This is the latest type purchased by the company, and future purchases should be confined to this type. The specifications, however, should call for front doors wide enough to accommodate two streams of passengers and rear doors wide enough for one stream. The front doors then can be used at all times of day to allow passengers to board and alight simultaneously or for the movement of a double file, as the demands occur. The rear doors will be used by street collectors in the rush periods only, to allow passengers to alight or board, thus keeping the rear of the car better filled. More modern fare boxes, in which it will be easy to drop coins or tickets, should be used.

Destination Signs

A feature of great importance in giving satisfactory service is the use of legible and distinctive designations by means of which the prospective passenger may determine if the car approaching is the proper one for him. This is particularly necessary at night, as the headways are longer and the cars difficult to distinguish.

At present there is no standard practice in the signs used in Richmond. Some of the cars have them in the monitor deck, others on top of the platform hood, while still others use illuminated signs in the front vestibule windows. A few cars also have painted dash signs. On some cars the most valuable space available, in the front vestibule window, is taken up with a sign calling attention to "Safety First." This admirable sentiment is being displayed to the detriment of the service, as the space should be used for its proper purpose.

The present practice in Richmond seems to be to display a name for the route, which is used at all times for both directions of travel of the car. This is confusing to any but constant riders on the line. A better plan is to display some distinguishing route name, and in addition the terminal toward which the car is moving.

Cars serving railroad stations should be marked distinctly. Special signs can be used for the purpose, so that strangers can find the correct cars readily.

Passenger Stops

The number of stops made by a street car has a great bearing on the quality of the service and its cost. The more stops a car must make, the slower the speed. The comfort of the riders is less with added stops, on account of the jerking in stopping and starting the car. Frequent stops usually lead to irregularity of headways. One of the common complaints in Richmond is the slowness and unevenness of car operation.

The usual argument in favor of many stops is the added distance that must be walked by the patrons if they are reduced. This is true, of course, and it must be weighed against the advantages from reduced stops. In most cities it is found that a balance is reached at from six to eight stops per mile. This spacing is sufficiently close that no inconvenience is suffered by the riders in having to walk great distances to car stops, while the schedule speed can be increased materially and better operation obtained.

The amount of service rendered by each car is increased if it is run on a faster schedule, as it can make the trip in less time and cover more car-miles in a day's run. The extra cost of power and other items is but a trifle compared with this. In fact, if properly operated, the cost per car-mile may be less with the higher speed, as it is easier to train the men to run the cars well. The quicker service will attract riders who might otherwise walk or seek other means of transportation, so that the patronage may be increased.

In the city of Richmond there are many places where the stops are too close together for good operation. To determine the existing condition the routes were divided into mile sections and the stops in each counted. It was found that in the territory within 1 mile from the center of the business district there are sixteen or more stops on practically every route, except those on the viaducts and bridges, on which of course few stops can be made. In certain other sections the spacing is even closer.

Such stop spacing is not justified. Reasonable schedule speeds under such conditions are impossible. One of the worst features is that, while the use of these stopping places may be restricted somewhat during the mid-day, the cars are obliged to stop at practically every one of them in the rush hours. This was found in observations of the number of stops actually made on each route. For example, on the Main Street line in the mid-day the stops averaged thirty-four and one-half for the trip. In the evening rush this increased to fifty-seven stops made in the maximum direction. In the other direction fifty stops were made. This took an addition of seven minutes to the running time. The observed speed in the mid-day was 8.8 m.p.h., while in the rush, westbound, the speed was only 7.2 m.p.h. In other words the cars were making their scheduled speed in the non-rush, while in the rush the speed was nearly 20 per cent slower.

The average stop spacing in Richmond is in the neighborhood of 330 ft., or sixteen per mile. This is just twice the spacing considered good practice in many progressive cities. A spacing of 660 ft. has been found very satisfactory where it has been tried, and there is

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no reason why it should not be applicable to Richmond. A somewhat greater spacing has been used in Washington for the past five years with highly satisfactory results.

In the application of any spacing such as the above, it is essential that all conditions be studied carefully, so that the locations chosen for stopping places will serve the public best. Much of the difficulty of various plans for stop spacing has been due to ill-chosen locations. The company should make a careful study of the subject, with a view to the adoption of an improved spacing.

There are certain places where a rearrangement of stopping places can be made to advantage regardless of the number involved. A stop should not be made on single track if there is a possibility of one on double track serving the location. For instance, stops should not be made at the entrance to a turnout if it is possible to make a stop in the middle of the turnout. By this means cars moving in the direction opposite to that of the car stopping will not be delayed. This is important, as maintenance of meets on single track is vital in keeping reasonable schedules.

Positive Stops and Stop Signs

Positive stops are observed where it is presumed they add to the safety of car and vehicle operation. At certain points they serve a very useful purpose. It is, however, common practice to have positive stops ordered for various reasons which have nothing to do with safety, and sometimes they are enforced long after the disappearance of conditions for which they were installed. A study of Richmond conditions shows that the city has an excessive number of positive stops. Boulevards are important arteries of passenger travel, but the number of persons in automobiles accommodated by requiring every street car to stop before crossing is small compared with the number of car patrons discommoded by the practice.

At street car intersections positive stops are made by cars approaching on all lines. This is unnecessary, as the heavier or more important line can be given the right-of-way and the other line required to observe the stop. This will speed up considerably more than half of the cars with no reduction in safety.

The company should make a careful investigation of this subject, and all positive stops should be eliminated except those serving such definite purposes as at steam railroad grade crossings, going down steep hills, or at street car intersections as recommended in the preceding paragraph. The city and company should co-operate to keep the number of such stops down to the minimum essential to safety.

Considerable confusion now exists in Richmond as to the exact locations of stopping places. This tends to slow down service and annoy patrons. The condition can be remedied by the installation of signs at all stopping places indicating exactly where patrons should stand to be at the entrance to the car, and cars should be stopped at this point. Positive stops should be marked by signs on the trolley wire unless they also serve as passenger stops, in which event both signs should be displayed.

A yellow disk bearing the words "Car Stop" has given satisfaction in Washington and elsewhere. It may be useful in the Broad Street business district in Richmond, where the trolley poles are in the center of the street. Such signs should be placed at the curb, directly opposite the stop. For the other locations, the trolley poles can be painted with yellow bands about 3 ft. wide and bearing the words "Car Stop" thereon in black letters. The use of signs of this type has been found excellent where it has been tried, and it is much cheaper and more permanent than any other device proposed.

The success of any plan for revision of stopping places will depend in a large measure on the care with which the stop locations are indicated.

Double-Berthing and Safety Zones

Double-berthing or loading of cars in pairs should be employed at all important stops included within the congested district. The first car to approach the stop always should take the forward position. When a second car arrives while the first is still standing, it invariably should take the second berth, and when it goes forward after taking on and discharging passengers, it should proceed without stopping at the forward position.

At the more important stopping places in the congested district there should be well-defined safety zones in which passengers may congregate for boarding a car. Such zones can be installed with satisfaction in roadways with a width of 43 ft. or more. In locations where safety zones are permissible it may be equally possible to use raised loading platforms. These platforms should be long enough to accommodate two cars and from 8 to 10 in. high. They may be built of wood or concrete. While the concrete forms a more permanent structure, wood has the advantage of quick installation and may be used temporarily.

Loading platforms are more desirable than the safety zones, since they bring the waiting car patrons close to the level of the car step, thus in effect eliminating the first step from the street into the car. Platforms should be installed at the heaviest points of loading where the street width will permit. It is desirable that platforms should be at least 5 ft. wide, and approximately 2 ft. are needed from the gage line of the outer rail to provide clearance from the car steps. This makes necessary a minimum width of roadway of 49 ft. if platforms are to be used with success.

When either loading platforms or safety zones are installed they will fail of their purpose unless traffic is kept moving. Regulations should be such that vehicles will not be required to stop behind standing street cars, but will proceed past the safety zone or platform whenever the traffic officer permits. Of course no vehicles should be allowed to stop opposite the platforms or safety zones at any time, except for traffic control. Generally speaking, it is preferable for the city to own the platforms and police them, since better observance of rules can be obtained if these rules are backed up by public authority.

Fare Collection

One source of delay in car movement in the congested district is the time required for loading, which is determined to a considerable extent by fare collection. Any odd fare takes longer to collect than an even one, such as 5 cents or 10 cents. Recently the company has begun the sale of tokens at the regular cash fare rate, and the public can co-operate by using them to the exclusion of cash, particularly in the rush hours. The company should make the purchase of these tokens as easy as possible.

At certain congested corners the company now has

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supervisors to direct the public and assist in car loading, but their duties keep them from devoting their entire time to fare collection. At such points it is desirable that men be stationed to devote their time solely to this. These men should sell tickets, collect fares and assist passengers. This practice has been used with success in various cities, both with one-man and with two-man cars. If properly carried out, the use of street collectors results in more even loading of the cars and reduces the time lost at stops.

VEHICLE PARKING

One source of delay to street cars and vehicles alike is parking in the congested district. Parking should be prohibited during the rush hours on Main Street between Sixth and Fourteenth, and at other places where it may be found to cause difficulty in vehicular and street car movement. Of course, parking opposite a car stop should be prohibited throughout the city.

RUNNING TIME

The running time used by a street car in making its trip is of vital importance in the quality of service and its cost. The slower the running time the poorer the service and the greater the cost. Everything should be done to keep the cars moving, since it tends to increase the receipts and decrease the expenses. Of course the limits are safety and maintenance of schedules, but experience in other cities indicates that schedule speeds of from 10 to 12 m.p.h. between terminals can be maintained on nearly all portions of the Richmond system without sacrifice of these essentials.

The running time that can be adhered to usually cannot be the same at all periods of the day, due to variations in number and length of stops and interference from street traffic. The allowed running time at each period of the day should represent the average that can be maintained. Strictly speaking, this would require a different running time for each trip, but usually two schedules, one for the rush and one for the non-rush, are sufficient to provide good service at reasonable cost.

The present schedules in general do not provide layovers at line terminals. Better operation will be obtained by including a layover in the schedule. The speed of the cars on the street then can be increased, and when delays occur the time lost can be taken out of the layover time. Faster transportation for the street car patron results and adherence to schedules is closer.

HEADWAYS AND SERVICE

The headway of the cars is a vital point in service. There are two prime considerations as regards headway—frequency and regularity. In Richmond the frequency of the service is as great or greater than needed to give adequate accommodations to various parts of the city. Experience has shown that when the interval between cars exceeds five minutes, some even division of the hour makes the service more satisfactory to the habitual riders. By this arrangement it is a simple matter to tell when to expect a car, no matter what the time. For example, with a ten-minute headway the cars will be scheduled to pass any point at equal intervals after each hour, while with a nine-minute headway there is no way of telling unless one knows every leaving time on the schedule. The closer spacing is then a disadvantage to the regular rider.

To fit average conditions in the non-rush hours even headway should be provided over extended periods, with changes only as necessary to take care of wide differences in demand. For instance, service should be adjusted after 8 p.m., as the counts show that riding is much less after that time on most of the lines.

Headways on joint track which are a combination of different spacings are not efficient, although in some cases they are unavoidable. For instance a four-minute headway on one line and a five-minute headway on another cannot give good spacing. Such headways should be avoided if possible, and especially so if the cars run for long distances on the same track.

RUSH HOUR HEADWAYS

In the rush hours the headways should depend on the traffic to be carried by each line. The cars should be scheduled to give as regular service as possible consistent with the fluctuations of the loading. The method generally in use in Richmond is to continue the base service through the rush and add "tripper" cars placed in between the regulars. This does not always meet the requirements. The practice in use on some lines of having the base headway supplemented by a separate rush hour schedule with an entirely different headway is especially to be condemned. For instance, a six-minute headway is improved relatively little for rush service by the addition of a separate seven-minute headway. This makes a condition almost impossible to carry into operation. The uneven spacing and bad loading that result from this practice on certain routes are illustrated in the diagram on page 243, which shows observed conditions on the Main Street and the First and Viaduct lines. In this diagram the scheduled time and the actual time are given for comparison. The bad results of such scheduling are apparent.

This can be remedied by making a special timetable suited to the conditions existing on the line in the rush hour and providing whatever cars are needed to meet the demand. The regular cars can be fitted into this schedule to the best advantage and extras added to complete it. In this way it is possible to modify the headway so that all cars can be given their proper share of the load. This tends toward better and faster service.

SUPERVISION

Even though the schedules are corrected, they will do little to improve service if the trainmen do not adhere to them. With proper headways and running time, the supervisory force must see that they are maintained. It is an advantage to have close inspection at all times and have the trainmen know that irregularities must be accounted for.

Trainmen must understand that the timetables are made up for a definite purpose, and that they must be followed as closely as possible. Reference to the diagram shows that there is no serious attempt made to keep to schedule. It will be noted that several cars apparently arrived ahead of time. This is a practice absolutely without justification and should be dealt with as a serious offense. It will be noted that considerable of the bunching is due to one car arriving late, followed almost immediately by another car that is early. The first car usually was overloaded, while the second car did not have a seated load and in some cases was almost empty.

Accurate timepieces are absolutely essential to maintain good schedules. A car one minute off time will cause a 50 per cent variation in the headway on a five-

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minute line. Trainmen's watches should be of such quality that they can be relied on to keep reasonably accurate time. They should be approved and inspected by a competent watch inspector and should be checked daily against a standard clock.

POWER-SAVING DEVICES

All cars should be equipped with some one of the power-saving devices now on the market. The results obtained by the use of such appliances are far-reaching. Minimum power consumption with a given schedule requires uniform acceleration and a minimum of braking at a uniform rate. These features give smooth operation. The power-saving device tends to insure this. In some cities it has been found that schedules are made more easily with reduced power consumption. Not only is power saved but equipment maintenance is decreased as the result of better operation. The elimination of jerky stopping and starting ordinarily gives the operator better control of his car and tends to reduce accidents. Smooth operation in general will be appreciated by the public.

Toronto System Worth Nearly $12,000,000

Two Arbitrators in the Long-Drawn-Out Toronto Case Render Decision for This Amount—City Appointee Disagrees—Case Will Probably Be Appealed to Privy Council

ON JAN. 31 a majority of three members of the Toronto Railway board of arbitration announced that a decision had been reached by two of their number as to the value of the Toronto street railway system, which was taken over by the city on Aug. 31, 1921. The majority decision is signed by the chairman, Hume Cronyn, K. C., M. P., of London, Ont., and by Sir Thomas White, who represented the company. The third arbitrator, Sir Adam Beck, made a minority report.

ABSTRACT OF MAJORITY DECISION.

The decision first recites the conditions of a contract made Sept. 1, 1891, between the city and Messrs. Kiely, Mackenzie, Everett and Woodworth, incorporators of the Toronto Railway, by which they secured the right to operate the line for thirty years, after which the city could take it over under certain conditions as to valuation. This contract declared, among other things, that:

> At the termination of this contract the city may (in the event of the Council so determining) take over all the real and personal property necessary to be used in connection with the working of the said railways at a value to be determined by one or more arbitrators (not exceeding three) to be appointed as provided in the municipal act and the acts respecting arbitrations and references, and to have all the powers of arbitrators appointed under such acts, and each party shall bear one-half of the cost of the necessary arbitration at conclusion of term of lease, but the city shall only pay for the land conveyed by it to the purchaser what it is worth, without reference to its value for the purpose of operating a street railway or railways. . . .
>
> In arriving at such value, the arbitrators are to consider and award only the value of the said several particulars to the city at the time of the arbitration, having regard to the requirements of a railway of the best kind and system then in operation and applicable to the said city.

The majority report divides the property into two parts. Part A includes all of the property, real and personal, which the city took over from the company and accepted as part of the property necessary to operate the line and Schedule B the part which the city claims to be entitled to reject.

Particulars of Toronto Valuation

(From the Toronto *Evening Telegram*)

Arbitration began	June 28, 1921
Toronto Railway acquired by city	Sept. 1, 1921
Arbitration ended	Nov. 28, 1922
Sessions held on	158 days
Counsel argued on	38 days
Evidence taken, more than	5,000,000 words
Exhibits filed	749
Expert witnesses heard	49
Award given	Jan. 31, 1923
Cost of arbitration may reach	$3,000,000
Toronto Railway stock when arbitration began	70¼
Toronto Railway stock after decision was announced	94¼

The first question to be decided by the board was that of the time as of which the valuation was to be made, because of the decline which has taken place in prices of commodities and in rates and wages since 1920. The decision points out that the clause in the contract makes no explicit reference to this question, although it might be inferred from its language that its valuation would be as of about the date at which the railway was taken over by the city. Section 4 of the authorizing statute, however, provides "that the award of the arbitrators shall be made, if possible, not later than the time named by the city for taking over the property," and that "the arbitrators shall consider only the value to the city at the time of the arbitration." From this the arbitrators decided in favor of a valuation as that of the time of the arbitration. Counsel for the company placed in evidence figures showing what it would have cost to reproduce the railway property over a period of three years prior to Sept. 1, 1921. This evidence was offered on the assumption that if the city had been obliged to construct a railway system, it would have had to begin three years before to be in as good a position as it was on Sept. 1. 1921, when it took over the railway without interruption of operation. As the cost of construction was higher on the average of this peak year period, the adoption of this theory would have materially added to the valuation of the road. The board said, however:

> We are unable to conclude that this would be a sound principle of valuation, nor do we know of any judicial decision of a purchase case which sustains it. It seems to us that so far as the principle of reproduction cost, less depreciation, is availed of, it must be reproduction cost as of the "time of the arbitration." We have therefore rejected this contention of the railway company.

PRICES WITHOUT ANY WAR

Counsel for the city also introduced testimony of a theoretical character based on the comparative statistics as to prices of materials and rates of wages prevailing before the war, and designed, generally speaking, to

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show what it would have cost to reproduce the system had there been no war and had the trend of prices and wages in progress before the war continued down to the time that the property was taken over. It was contended that under the terms of the agreement value should be determined upon this "trend" basis, rather than by reference to the cost of reproduction, less depreciation, as of the time of arbitration, because of the rise, which, owing to the war and post-war conditions, has taken place in prices of materials and in wages as compared with those of the pre-war period. The board, however, rejected this contention, saying:

> Value means value in lawful money of Canada at the time at which the valuation is made, not in lawful money of Canada as of an imaginary period. We are unable to find anything in the agreement or in judicial decision sustaining this view. In our opinion it would be impossible to determine the "actual value at the time of the arbitration" upon such a hypothetical basis, which has no reality in fact, and consequently seems opposed to the meaning contained in the word "actual" in the expression "actual value."

The board, however, in certain figures which it gave in its report, shows figures based in this way, which it calls the "trend basis."

As previously stated, one of the clauses in the original agreement required the arbitrators to award "only the value of the said several particulars to the city at the time of the arbitration, having regard to the requirements of a railway of the best kind and system then in operation and applicable to the said city."

There was considerable discussion during the hearings as to the meaning to be attached to the expression "best kind and system." The commission says, however, that it was established in evidence that the system under which the company was operating up to Sept. 1, 1921, viz., the electric overhead trolley system, is the best system in use for the operation of surface street railways and that it is applicable to the city. The arbitrators therefore regarded in their valuation the requirements of an electric overhead trolley railway of the best kind now in operation applicable to the city.

WHAT IS ACTUAL VALUE?

In discussing this question the arbitrators quoted extensively from various valuation decisions in Great Britain, particularly that concerning the Edinburgh Street Railway, London Street Tramways and Oldham Electric Tramways and also from the case of the Melbourne Tramway & Omnibus Company, Ltd., and concluded in favor of the method of cost of reproduction, less depreciation. On this the decision says, in part:

> As to all the plant *in situ*, such as track with substructures, overhead and underground distribution systems, machinery and equipment fixed in place for use in the operation of the railway, it seems clear from the foregoing decisions and judicial utterances that an approved method of determining their value is cost of reproduction at the time as of which the valuation is made, less a proper allowance for depreciation.
>
> Counsel for the railway company contended that the word "depreciation," as used in these decisions, means only physical wear, and that obsolescence, unless so complete as to require or justify immediate removal of the item of plant under consideration, is not to be considered. We do not concur in this view. We understand the word "depreciation" occurring in the decision cited to include obsolescence and deterioration from whatever cause, and not as confined to physical wear and tear and to what might be called "obsoleteness" as distinguished from "obsolescence" at the time of valuation. The fact and degree of obsolescence must be determined from the evidence upon the point having regard to good practice in railway administration and to the qualification of the above recited subsection 4 of section 4 of the statute.

With respect to immovable plant *in situ*, this method of valuation seems the most practicable and convenient. In applying it, however, care must be taken to make full deduction for depreciation as defined. Take the case of a section of track which has become so worn that it should, having regard to good practice, be taken up and replaced by new construction. The cost of reproduction of the section in question might be quite large, but there would have to be deducted an amount for depreciation which would leave only scrap value remaining. In cases of parts or articles connected with plant *in situ*, which although useful are not now being manufactured, value may be estimated by references to prices of parts and articles which can be bought today, taking into account of course comparative utility depreciation and all other relevant considerations.

VALUATION OF ROLLING STOCK

The same method (reproduction cost less depreciation) may, we think, be useful also in valuing the rolling stock of the railway company, as was done by the arbitrator in the Melbourne tramway case referred to above. In the case before the board, where so many of the cars taken over are of older type, it would, however, be most difficult to make the valuation solely by reference to cost of reproduction new, less depreciation. We have had placed before us, however, a great deal of evidence as to the character of this rolling stock, its original cost of construction, reproduction cost, physical deterioration, degrees of obsolescence, and as to alleged defects and advantages from the operating standpoint. All this evidence has been given its due weight in reaching conclusions as to the value of the rolling stock.

The principle of reproduction cost, less depreciation, is also of service in valuing buildings, such as carhouses, car construction, repair shops, substations and the plant and machinery which they contain. Care must be taken here also to make full deduction for depreciation (including obsolescence) and to take into account the evidence adduced bearing upon the question of the suitability of such buildings, plant and machinery for the purpose for which they are being used, and, generally, all factors bearing upon the matter of their usefulness and fair value, subject to the qualification of the agreement and statute.

With regard to tools, stores and small chattels (fixed or unfixed) generally it is not necessary to go to the trouble of considering what it would cost to reproduce them new and then deduct an amount for depreciation. We have had evidence as to the market value of such chattels or of others which would serve as well or better, and from such market value and comparison and other evidence relating to use, condition and extent of depreciation, a conclusion as to value may be reached.

HOW LAND WAS VALUED

As to land (other than land acquired from and now retaken by the city) it seems to us that it should be valued at its fair value as of the time of the arbitration. In estimating its fair value we are, we think, entitled to consider, in addition to other relevant factors of value of individual parcels, their suitability (having regard to size and location) for street railway purposes. As to the land (including buildings) acquired from the city by the purchasers and particularly referred to in clause 7 of the conditions, the question is, what is its fair value without reference to its value for the purpose of operating a street railway.

With regard to the former class of land, counsel for the company adduced evidence not only as to its present value for commercial purposes, but also as to its value for street railway purposes. To establish the combined value they brought forward testimony as to what it would cost to obtain property as suitable if the land in question had not been acquired and was not available for the city's use in the operation of the system. This testimony showed that in some instances a price two or three times the commercial market value of the land in question (considered without special reference to its suitability for railway purposes) would have to be paid in obtaining parcels of equal size and suitability. It does not appear to us that this is the true method of valuing this land. The land has been acquired by the company and the city is entitled to take it over as it is. The real question is, what is its fair value having regard to all proper factors, including the factor of suitability for railway purposes.

With respect to overhead charge, the arbitrators point out that the agreement and statute provide for the payment only on "actual and tangible property." After quoting various British authorities, they decided to include an allowance, even under this limitation, for engi-

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neering cost, for which they allow $375,000. They also thought it proper to make reasonable allowance for interest during construction, and for this amount allowed $525,000. The arbitrators, however, allowed nothing for the preliminary expenses of organizing the company or for the cost of raising capital or other charges connected with the issue of securities. They also excluded such items as "contingencies and omissions," "administration, organization and legal expenses" and "cost of placing the physical property in operation," saying:

> While items of this character are frequently taken into account for rate-making purposes, they must be regarded as so-called "intangibles" and are not capable of being included within the meaning of the words "actual and tangible property" in the agreement and statute.

The board also decided that the city need not pay for the cost to the company of the construction of a subway under the tracks of the Canadian Pacific Railway and a bridge over the steam railroad, saying:

> These payments were made by the company in pursuance of orders of the Board of Railway Commissioners for Canada, the object being the elimination of dangerous level crossings and consequent protection and convenience of the public. It does not appear to us that these payments constitute "actual and tangible property" within the meaning of the statute, and we are unable to agree with the argument put forward by the counsel for the company that these payments became, so to speak, attached to or inherent in the cost of construction of the tracks of the company carried through the subway and over the bridge respectively.

The arbitrators were in doubt as to whether they had jurisdiction to decide whether they should allow interest. As, however, the city has had possession of the railway since Aug. 31, 1921, and the company has not received payment, they allowed 5 per cent.

They decided that the power house property should be taken over, but valued the steam power plant upon a "scrap basis." The board also decided that three storage battery properties were "necessary to be used in connection with the working of the railway within the meaning of the agreement" and allowed $338,500 for them. On a three-year average basis these figures would have been $352,200, and on a trend basis $197,100. The board also included as property to be taken over by the city a storage yard and carpenter shop, which, with buildings, tracks and structure, equipment and furniture, were valued at $65,000.

On the other hand the board decided that certain property could be rejected by the city, including the main office building, a property at Scarboro Beach, and certain rolling stock, patterns and materials.

Combining these valuations with the valuation of the undisputed property, the board found a total valuation for both the undisputed and the disputed of $11,188,500. On a three-year average basis the figure would have been $11,650,400, and on a trend basis $7,577,100.

Minority Report

Sir Adam Beck, the minority member, filed a brief, dissenting report, saying that he was unable to concur in the conclusion as to the method which should be adopted in ascertaining the value of the railway plant and equipment, also from the statement of the majority as to certain of the property which the railway claimed should be valued as property required for the operation of the railway. In regard to depreciation he said:

> With regard to the matter of depreciation I would allow all that the city has contended for by reason of obsolescence. Much of the track is antiquated and required to be replaced when the railway was taken over. Much of the rolling stock is out-of-date and costly to operate as compared with modern cars. I agree entirely with the contention of the city that the question of economy in operation is of vital importance in estimating obsolescence. The statute expressly provides that the arbitrators shall award only the value to the city having regard to the requirements of a railway of the best kind and system in operation and applicable to the city, and in my opinion, the basis of valuation as fixed by the agreement between the city and the railway company does not admit of any allowance being made for cars and equipment which are useless for the purpose of such a railway and should be valued only at what they can be sold for.

Among the prominent engineers engaged in the case for the company were Hagenah & Ericson of Chicago, A. L. Drum of Chicago and M. E. Cooley of Ann Arbor, Mich.

Jackson & Moreland of Boston were in charge of the case for the city, assisted by Prof. A. S. Richey of Worcester, Mass., who valued the rolling stock.

Numerous other prominent engineers were called in to deal with special features of the property.

Successful Interurban Radio Reception

JAN. 25, 1923, being the tenth anniversary of the opening for operation of the Excelsior Springs Division of the Kansas City, Clay County & St. Joseph Railway Company, a dinner in honor of this event was served at the Elms Hotel, Excelsior Springs, Mo. Seventy-six guests were present, including prominent bankers, lawyers and citizens from Kansas City, Liberty and Excelsior Springs, as well as directors and officers of the company.

Radio reception being one of the features of the event, a special set was installed on the special car used for the occasion. This car left Kansas City at 5:40 p.m. and arrived at Excelsior Springs at 7 p.m. During this time the 6 to 7 o'clock program of the Kansas City *Star* was successfully received, Western Electric loud speakers being located at each end of the 60-ft. car. Such reception was effective when the car was at rest as well as when traveling at 50 m.p.h.

On the return trip to Kansas City, the 11:45 p.m. to 1 a.m. Nighthawk program of the Kansas City *Star* was received satisfactorily and without interruption over the entire right of way, even through Kansas City from the city limits to the station at Seventh Street and Grand Avenue. Even when the special car was returned to the shops and run in over the inspection pits in a steel frame building the reception was unimpaired.

Following the suggestions and instructions of Robert P. Woods, vice-president and general manager, L. U. Bruner, supervisor of power and signals, designed and constructed a special receiving set for use on this trip. After exhaustive experiments a loop aerial on the roof of the car was adopted. A set consisting of two stages of radio and two stages of audio amplification was used with WD11 tubes. The aerial consisted of four turns of seven-strand phosphor-bronze wire on a frame 6 ft. square and placed horizontally on the car roof.

That satisfactory reception was secured in a steel car, especially while traveling at a high rate of speed, is all the more remarkable since the trolley wire, carrying 1,365 volts d.c., was but 5 ft. directly over the aerial. Also, the 33,000, 2,200 and 110-volt, 25-cycle, a.c. power lines were all parallel to the line of travel and all on the same poles as the mast arms supporting the trolley.

The *Star* broadcasted to its listeners-in over the continent the information that the program was being received on the moving electric car of the Kansas City, Clay County & St. Joseph Railway Company.

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The Readers' Forum

Supporting Trolley Wire at Short Intervals

BROOKLYN, N. Y., Feb. 5, 1923.

To the Editors:

A plan recently put into operation in one of the cities of the Middle West consists of running ½-in. galvanized-iron guy wires between adjacent poles at the side of the street, so that these form nearly a continuous wire on each side running parallel to the curb line. At intervals between the poles, cross-spans are run connecting together these two parallel wires. This construction is used in an endeavor to reduce the danger from breaks of the trolley wire.

From two to eight of these additional cross-spans are installed between adjacent poles and where they cross the trolley wires they are equipped with hangers and ears and the trolley wires are supported from them. The result is that supports are provided at intervals of from 35 ft. down to 12 ft., instead of at the usual pole spacing of approximately 100 ft.

Some of the advantages claimed for the new construction are that the trolley wires are kept more nearly horizontal and that therefore there is less wear on them and consequently less liability of their breaking, and that if they do break there will not be the danger of accident due to persons or property being struck by the comparatively short pieces hanging down that there would be if a whole 100 ft. section should drop.

While the writer has not tried out this new method of construction, it would seem to be based upon wrong premises. While the increased number of ears will hold the trolley wire more nearly horizontal, yet their weight, together with the weight of the hangers and spans, will increase the number of "hard spots" in the wire, and these "hard spots" are what give the greatest trouble, because under them the wire wears faster than any other place and is therefore most likely to break. Another great cause of breakage is when the pole leaves the wire and, after striking the span wire, is caught between it and the trolley wire or some casting. In this new arrangement both the number of ears and the span wires have been increased, so that it would seem that the danger of breaks in the wire has been increased rather than decreased.

It is seldom that a trolley wire will break in the middle of a section. Most of the breaks occur either at or near ears or other castings. Therefore in only those cases where the spans are very close together, 13 ft. or less, will there be any protection to persons or horses, and even that short length would not entirely protect vehicles or persons riding under them.

Furthermore, when a long section of trolley wire falls to the ground there is at least a possibility that some part of it will touch one of the running rails and cause a heavy enough ground to open the circuit breaker in the power or substation feeding that line and thus kill the wire. If that occurs it is difficult for the station to pick it up again and stay in on the line until after the ground is removed, and it is likely that that would be done only by some one who had some knowledge of the danger of a live wire lying in the street and who would therefore either tie it up where it would not be a menace or would watch it until it could be properly cleared and repaired.

The additional wires along and across the street detract from its appearance, their installation adds to the first cost of the line, and there are many more ears and spans to care for, thereby increasing the cost of maintaining the line. It may be that the actual installation will prove to be both a life saver and a money saver, but its success would seem to be doubtful.

G. H. MCKELWAY.

Information on Steel Tie Construction Desired

UNITED TRACTION COMPANY

ALBANY, N. Y., Jan. 13, 1923.

To the Editors:

We should like to obtain from roadmasters of different electric railways information as to their methods of installing steel ties, and also their opinions of these ties.

This company has during the past year installed steel ties with 95-lb. T-rail under my supervision. As this was the first steel tie construction job that I have done, I should appreciate very much hearing from others with more experience in this line.

THOMAS MURRAY, Roadmaster.

"Thought-Work-Character" Essential to Maintain Leadership

NICHOLS-LINTERN COMPANY

CLEVELAND, OHIO, Feb. 1, 1923.

To the Editors:

In your issue of an. 27 the editorial on "Work-Thought-Character" is a gem that should be constantly before the largest possible group of our population. It contains the essence of the qualities necessary if our civilization is to be continued, and must be recognized by a sufficient percentage of our population if this country is to continue its leadership.

After all, everything depends on the individual, and propaganda that advises, instructs and spurs the individual to practice Character, Thought and Work should have the widest publication.

J. M. LINTERN,
President.

Committee Formed to Foster Work of Arbitration

CHARLES M. SCHWAB, it is just announced, will head a committee of New York business men to enlist trade support for the work of the Arbitration Society of America. The purpose of this organization is to develop activities for relieving the congestion of the calendars of the courts through a clearer understanding and a wider use of arbitration in commercial disputes. This is encouraged by statute in New York State, and it is hoped by the society that there will be similar legislation in other states.

Under this New York statute, an agreement to arbitrate cannot be revoked, and a decision rendered by an arbitrator cannot be reviewed in a court of law in the absence of corruption, malfeasance or misconduct. In the opinion of many eminent judges, lawyers and business men, the statute provides the most effective means for the speedy and inexpensive settlement of practically any kind of dispute that may be made the basis of a civil action in the court. Several trade associations have indorsed the movement.

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Association News & Discussions

Co-operation May Be Stimulated*

Compulsory and Voluntary Co-operation Are Defined—The Problem of the Railway Manager Is to Stimulate the Latter

BY GEORGE E. PELISSIER
Assistant General Manager Holyoke Street Railway

THE usual definition of co-operation is the "act of working together to one end or to promote the same object." As applied to industrial relations, this definition is just as applicable to slavery as it is to a voluntary partnership, so it is necessary to differentiate between voluntary co-operation and compulsory co-operation.

I mention this because there seems to be such a diversity of opinion as to what constitutes co-operation, not only among employees but among employers. This opinion varies all the way from the idea of the communist that co-operation means an equal division of authority and of the proceeds of collective effort, without regard to what proportion he has contributed, to the idea of some employers that co-operation means the doing by all those associated with him of what he wishes them to do, without question, without consideration of its effect upon themselves or perhaps without any other reason than he desires them to do it.

What therefore sometimes is called lack of co-operation may really be unwillingness to submit to compulsory co-operation, and what may sometimes be called co-operation is really only submissive obedience without that spiritual enthusiasm which is the very essence of co-operation. In many instances misunderstandings can be attributed to the lack of a clear conception of the difference between voluntary and compulsory co-operation.

In any analysis of the problem one of the first questions to arise is the necessity for co-operation.

Many believe, or profess to believe, that they are beholden to no one for what they need, but under the conditions of modern civilization the average individual is more dependent for his existence on the co-operation of his fellow men than the savage in the wilderness. How many of us could make the clothes we wear or alone produce the food we eat. Of what value would be the knowledge of a scientist if no one would use it, or the skill of a physician if no one would avail themselves of it. Of what use is a captain without a ship or an executive without workers?

Granted then that co-operation is not only desirable but absolutely essential under present conditions, the second question that arises is: which is preferable, voluntary co-operation or compulsory co-operation?

It cannot be denied that great things, at least in a material way, have been accomplished by compulsory co-operation. One which is fresh in the minds of us all is the building up of the German Empire and the mighty effort put forth by the German nation during the World War. On the other hand, the same conflict gave us a good example of voluntary co-operation, not only of the individuals of one nation, where the spiritual enthusiasm was exemplified in the phrase "They shall not pass," but in that of a number of nations, all imbued with the same resolve that a certain task had to be done no matter what the cost or the difficulty.

Given a stolid, persevering and unimaginative people, particularly if they are of a low order of intelligence, it is probable that with capable direction more can be accomplished not only in a material but in a spiritual way under compulsory co-operation than under voluntary co-operation, because their actions are governed by their material rather than their spiritual desires. But with an alert, energetic and imaginative people more can be accomplished through voluntary co-operation, nor is there any question that such people are capable of rising to greater heights of accomplishment than those first mentioned.

In a country like ours, in which every individual is taught to believe from childhood that he is at least the equal if not the superior of every other individual, it is footless to discuss the desirability of introducing compulsory co-operation, although it cannot be denied that there are many among us who have not yet arrived at that stage of development where voluntary co-operation may be expected.

To obtain the voluntary co-operation of your fellow men you must first be convinced that all men are subject in a more or less degree to the same emotions, desires and aspirations and as such are entitled to consideration, sympathy and a fair proportion of the proceeds of their labor. This makes it possible to obtain that voluntary co-operation which arises from the latent spiritual enthusiasm possessed by every man and which only awaits the opportunity and incentive to display itself.

In street railway work, if you please, there is a great difference between the attitude and accomplishment of a switch greaser who feels that he is only greasing switches for a living and the one who feels that he is a vital part of an organization which is furnishing transportation. How many times have you heard some executive decrying the lack of respect for authority, the lack of enthusiasm and of loyalty on the part of the men to the organization to which they belong. Yet he himself thinks nothing of violating some law if it does not happen to please him, such as the prohibition law, for instance, and will not hesitate to tell you that the business he is connected with is going to smash. Unless the leader is enthusiastic, optimistic and courageous, particularly in times of stress, is it reasonable to expect that the other employees will be?

KEEP IN TOUCH WITH EMPLOYEES

The argument is sometimes advanced that a busy executive does not have the time to come in contact with the rank and file of the employees, but I believe he should take the time. It is of a great deal more importance to do this than it is to affix signatures to a great many reports and documents where the signature of a subordinate would do just as well and where the signature cannot mean anything more than subscribing to the accuracy or error of the subordinates whose signatures precede his or spend all his time analyzing figures.

This is particularly true in an industry like ours where from one-half to two-thirds of the gross revenue is paid out directly to labor. In many instances where there has been lack of co-operation I believe it can be traced to the actions of subordinates who perhaps without the knowledge of the executives were abusing their authority or who were not fitted to exercise the authority delegated to them.

How many times has it happend that men have advanced good ideas or suggestions only to be ignored or perhaps told to mind their own business and later see those same ideas used and exploited as original by the very ones who had refused to accept them, much less to say a word of commendation for them.

Another common failing is never to say a word of appreciation for the 99 per cent that is done well and to exaggerate out of all proportion the 1 per cent that is done wrong. How much better it is to express some recognition of the things that are done well and then to point out the thing which might be done better and the way to do it better.

It is my belief that the results obtain-

*Abstract of paper presented at the meeting of the New England Street Railway Club, Boston, Feb. 8, 1923.

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able from any organization dominated by one or two individuals, no matter how capable they may be, are not comparable with those obtainable from an organization composed of men each selected and fitted for the position he holds and willing to subordinate their individual ambition for team work so that the best results may be obtained from the team as a whole rather than from any particular individual.

When the conditions of industry were such that nearly every man could see the finished product of his labor it was not difficult to arouse that pride of accomplishment to which I have referred, but today, when men are merely parts of a creative machine, in which the individual work of each one almost loses its identity, it becomes necessary to foster and develop pride in the final product of the entire organization.

The fact that men are loyal to their own organization is convincing proof to me that they are just as capable of intense loyalty as ever and that it is a reflection either on the industry or those controlling it if this loyalty has been lost.

To me loyalty to a labor organization is no more inconsistent with loyalty to a business organization than loyalty to one's wife is inconsistent with loyalty to one's mother. I see no good reason why a labor organization should not be a constructive factor in obtaining loyalty and co-operation. I believe it will be as soon as it is fully recognized that labor has just as much right to act collectively as has capital provided that each is willing to assume the obligations which go with those rights and which are all summed up in the golden rule, "Whatsoever ye would that men should do to you do ye even so to them."

Bonus vs. Recognition

I had contemplated stopping here but changed my mind after reading an article which appeared in the New York *Times* last Sunday setting forth the views of George Eastman of the Eastman Kodak Company bearing on this subject as given in an interview for that paper. As the views expressed are almost diametically opposed to my own it may be of interest just to refer to them. Abstracted freely, the article says: "You ask what is the solution to the problem of gaining the co-operation of employees. Every organization, every man has his own problems peculiar to his own industry, typical of his own work. You can talk about co-operation and good feeling and friendliness from morn to midnight, but the thing the worker appreciates is the same thing the man at the helm appreciates—dollars and cents. In the growth of the Eastman Kodak Company more were responsible than just the heads. It was impossible for me to go to every man and shake him by the hand and tell him that I am grateful and appreciative. First of all, I didn't want to do it; secondly, the men don't want that sort of thing. Their service to me meant dollars and cents and a sound organization. I could appreciate that. The thing to do then, was to give them something that they could appreciate." Mr. Eastman then outlines his bonus plan. He also says: "As far as possible, all executive jobs in our organization are given to men who grew up in it." Some questions he does not answer are:

"What are the fundamental differences in industry that make the methods which are successful in obtaining co-operation in one industry a failure in another if the principles involved in getting co-operation are correct?

What happens when the condition of business is such that it is impossible to give something that competitors do not give in the way of a bonus?

What happens if on account of business conditions the employees receive a bonus this year, and next year when they work harder they receive none?

Is it always right and fair to promote a man because he himself feels he has the qualifications for the job higher up?

If you don't know your men how is it possible to obtain a fair estimate of their qualifications?

Is there any such thing as justice without knowledge?

Recognition of Good Work

It is our belief that the best product of any organization is men, and that the really great things in the history of the world have not been done for money, that the greatest inducement to accomplishment by men is not money but the recognition and respect of their fellow men.

Some may say that this is idealism and is impractical in business, and that it is visionary, but it is my opinion that there is too little idealism in business, that there is a difference between having vision and being visionary.

To give a practical example of the idea which I have tried to convey I might quote recent newspaper and other expressions of commendation on work done by our men in keeping the road open this winter in spite of the severe storms. I am sure that I am expressing the true sentiment of our men when I say that if they had their choice of a paltry bonus or this public recognition of duty well performed they would not hesitate a minute in choosing the latter, and that money alone would not have induced some of them to perform the tasks which they did.

In closing his paper, Mr. Pellissier gave the following word-picture of the type of electric railway executive and officer who does not obtain co-operation:

1. The man who whispers to a subordinate when the latter does something original or well, "You did that pretty well." The next day the former says, "That was a pretty good job *we* did yesterday." A day or two later he tells *his* superior, "I did a job the other day that I am proud of. Of course, I didn't do the actual work, but I furnished the ideas."

2. The fellow who makes up his mind first how a thing ought to be done, without a knowledge of the facts, and then tries to make the facts fit his conclusions.

3. The "reasonable" fellow who can always find a reason for doing what he wants to.

4. The fellow who thinks that the other fellow's job might always be done better, but who for some reason never does his own job right.

5. The fellow who never can see the apple but who always sees the speck.

6. The fellow who perhaps has made a success in some line and because of that fact believes that he is an authority on all subjects.

7. The fellow who can criticise destructively, but who never advances a constructive suggestion.

8. The fellow who will not say how he wants things done but expects men to use their own judgment and then condemns them if they make mistakes.

9. The fellow who tells his men, "I don't want you to do anything until you come to me. I'm the boss, etc."

A few such joy-killers in an organization and the company is "done" as far as getting voluntary co-operation is concerned.

Discussion

The importance of friendliness in attitude toward employees, of eliminating "grouchy" employees from contact with the public, and of the careful training of subordinate officials was emphasized in the discussion. The great value of explanation in destroying false ideas held by employees or the public was brought out. Greater efforts to place operating data before groups of employees were urged as essential in view of the failure of newspaper advertisements in some cases to carry the company message to the men. Those who participated in the discussion were: A. E. Potter, H. B. Potter, Ralph D. Hood, H. F. Fritch, R. B. Stearns, Alonzo R. Williams and Harry Hanson.

Executive Committee National Safety Council

A MEETING of the executive committee of the Electric Railway Section of the National Safety Council will be held in Washington, D. C., on Feb. 15. The members of this committee are: John H. Truett, chairman; G. T. Hellmuth, vice-chairman; Melvin W. Bridges, secretary; A. J. Van Brunt, chairman bulletin committee; Guy R. Radley, chairman membership committee; H. M. Keyser, chairman program committee. This meeting is called at this time as the midyear meeting of the American Electric Railway Association is to be held in Washington on Feb. 16, and a great many of the officers and members of the electric railway section will probably be present at this meeting.

The latest bulletin of the section says that the following companies have been added to the membership list of the

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section: Chicago Surface Lines, Menominee & Marinette Light and Traction Company, Buffalo & Lake Erie Traction Company.

Indiana Claim Agents' Association

FOR some two years past the electric railway claim agents of Indiana have had an association which meets twice a year, once in the summer and once in the winter. There are only two officers, a chairman and vice-chairman, and the meetings are most informal. The claim agent in the city where the meeting is held is secretary of that meeting and host to the association, and he automatically becomes chairman of the next meeting, while the claim agent in the city in which that meeting is held automatically becomes secretary for that meeting. A meeting was held at South Bend on Jan. 11 and about ten claim agents from other cities were present. The Northern Indiana Railway, as host, provided an excellent dinner for the association members. A number of its attorneys and other representatives of the claim department attended and R. R. Smith, vice-president and general manager of the company, made the principal dinner address.

The only official feature of the meeting was a short paper by William Tichenor, Terre Haute, Indianapolis & Eastern Traction Company, on results from the meetings of the American Electric Railway Claims Association. The speaker said that he had been attending these meetings quite regularly since 1906 and mentioned some of the changes in ideas which had occurred since that time. One was the advisability of quick settlement. This was strongly urged at one of the early meetings. Mr. Tichenor said:

> I know of only one claim agent who now insists upon getting to an accident with a pocketful of money for fear that the claimant will get away from him and into the hands of what are commonly called ambulance chasers. And I know of two systems of electric railways, one large and the other small, which insist upon the claimant pursuing them to press for a settlement rather than that the claimant should be sought. The claim agents of both companies sit in their offices and await the coming of the claimant, allowing a suit to be filed, if such is the choice of the claimant, rather than go hunting for an opportunity to spend some of the company's hard-earned money.

The speaker also said that although the advantages of the Hooper-Holmes Index Bureau had been set forth at a great many meetings, very few companies used it, and a very small percentage of the whole number had done all the reporting. This was unfortunate. In conclusion, he spoke of the great advantages of attendance at conventions.

Program for Illinois Association

THE Illinois Electric Railway Association will meet in joint session with the Illinois Gas and Illinois Electric Associations in Chicago at the Hotel Sherman on March 14 and 15. Secretary R. V. Prather has announced a tentative outline of the railway section program. The two morning sessions will be joint meetings with separate sessions of the several associations each afternoon. The joint program is to be announced later.

The program for the railway section will include a paper by W. H. Sawyer, president East St. Louis & Suburban Railway, on "The Future of the Electric Railway Business." Walter Jackson will read a paper on "The Weekly Pass System as Applied to the Chicago Elevated Railroads." C. D. Goodsell, Chicago, North Shore & Milwaukee Railroad, will read a paper on "Citizenship," presumably dealing with the spendid work being done on the North Shore Line in Americanizing employees in the maintenance of way department.

Summer Meeting C.E.R.A.

THE summer meeting of the Central Electric Railway Association will probably be held at Cedar Point, Ohio, on June 27, 28 and 29. The usual boat trip has been abandoned for this year. Arrangements for the Cedar Point meeting will be in the hands of the hotel and arrangements committee, the membership of which is announced as follows: S. D. Hutchins, Westinghouse Traction Brake Company, Columbus, Ohio, chairman; Harry L. Brown, John Benham, James H. Drew, J. A. Donahey, C. Dorticos, L. P. Morris and E. R. Kelsay.

Traffic Association Met at Fort Wayne

DISCUSSING possibilities of further increasing through electric service between points in Indiana, Ohio, Michigan and Kentucky, delegates of the Central Electric Railway Traffic Association from about twenty-five cities met at the Anthony Hotel in Fort Wayne, Ind., on Jan. 20. It is pointed out that it is now possible through cooperation of the electric lines in the association to accept through shipments of freight from Indianapolis to Detroit and through passengers from Indianapolis to Cleveland. The next meeting of the association will be held at Dayton, Ohio, in about two months.

Transportation the Topic at U. S. Chamber of Commerce Meeting

TRANSPORTATION has been selected as the principal topic of the next annual meeting of the Chamber of Commerce of the United States, to be held in New York, May 7-10. The subjects to be considered include: Railroad rate structure, the public interests and the right to strike, transportation problems in England, co-operation between waterway and railroad transportation, co-ordination between motor trucks and railroad transportation, the farmers' interest in transportation, financial support for the railroads, establishment of railroad credit, and the government and the railroad.

On the evening of May 8 a general session will be devoted to European conditions from the American viewpoint. On the afternoons of May 8 and 9 there will be group meetings on civic development, domestic distribution, fabricated production and finance, foreign commerce, insurance, natural resources production, and transportation and communication.

American Association News

Reduced Rates to Midyear Meeting

THE committee on transportation for the midyear conference at Washington on Feb. 16, of which C. H. Beck, Westinghouse Traction Brake Company, New York, is chairman, has completed arrangements whereby delegates can travel at a rate of fare and one-half for the round trip, provided a minimum of 250 certificates are presented. In order to get the reduced rate travelers must request a "certificate" upon buying the usual one-way ticket to Washington. Tickets must be purchased on Feb. 13 to 16 inclusive and not on other dates. Immediately upon arrival at Washington these certificates should be presented at the registration desk, where they will be indorsed by Secretary Welsh and later validated by a special agent of the railroads, if 250 certificates are presented. Delegates are urged to secure a certificate and turn it in at Washington even though they plan to return over a different route than that taken in going to Washington, as the certificate will help in obtaining the minimum requirement even though the reduced fare cannot be had by the person returning over a different route.

Program for Ladies at Midyear

PROVISION has been made by the dinner committee for the entertainment of the ladies who will attend the midyear conference as follows:

A tea and reception will be held on Thursday afternoon at either the New Willard or Washington Hotel. Thursday evening there will be a theater party. Friday morning the ladies will be taken on a sight-seeing tour of Washington, and at noon there will be a luncheon at the City Club. Friday afternoon they will be taken on a trip to Mount Vernon and Alexandria by special car over the Washington-Virginia Railway. For those who do not care to go to Washington's homestead there will be tea and cards at either the New Willard or Washington, or a further sight-seeing tour around the District. Friday evening the ladies will be served dinner in the small ball room at the New Willard, and thereafter those who care to hear the speeches will go into the main banquet hall, or tickets will be secured at the leading theaters for those who prefer this form of amusement.

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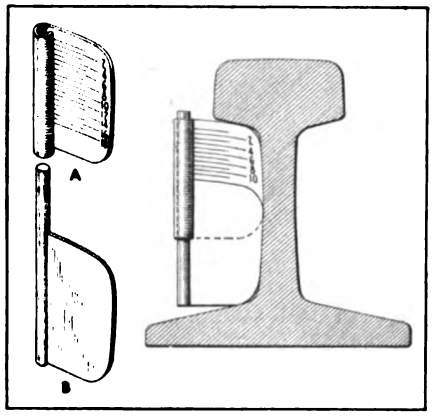
Maintenance of Equipment

Gage for Determining Space Available for Angle Bars

THE lines of the Municipal Railway of St. Petersburg, Fla., have a large variety of makes of rail, varying from 50 lb. to 80 lb. in nearly all sizes and shapes. One line in particular that was built of relaying rails that were never properly graded before laying has all varieties. Very often it is desirable to know the approximate size of the angle bars that are needed at various points. In order to determine this readily, a gage has been devised by J. S. Wilder, engineer maintenance of way department, as shown in the accompanying illustration.



Gage for Rail Angle Bars

This is made of two copper strips. One edge of the lower one, shown at *B*, is bent around a stiff steel wire in a vise. A corresponding edge at *A* is also bent, but to a slightly larger diameter than that of *B*, so that the bent portion of *A* can be slipped over that of *B*. A reasonably close fit should be secured between the round parts. It will thus be seen that the two parts can slide over each other and form a gage to indicate the space available for an angle bar. The part marked *A* has a scale of gage marks on it. The line marked at 8 was first located, that being the size of an angle bar for a 60-lb. A.S.C.E. rail. Divisions were drawn each side of the 8 mark every sixteenth inch. By placing this gage in position and noting the readings on the gage, the proper size bar can be readily determined. It should be noted that the rounded corners which fit against the rail should have a larger radius than that of the rail section to overcome any variations in the shape of the various rails. If several gages are made exactly alike, the track foreman can send in for an angle bar of a certain size and boring as required. He also can indicate when one end of the bar should be ground off to some other size.

Chattanooga Signal Failures Show Further Decrease

A COMPARISON of signal failures for the Chattanooga Street Railway for the years 1919, 1920 and 1921 was given in the ELECTRIC RAILWAY JOURNAL for March 18, 1922. A report from this company giving similar data for the year 1922 has just been issued, and a table herewith gives a comparison for the four years.

The company has forty-two Nachod signals in operation, most of which were installed fourteen years ago. The continuous reduction in the number of signal troubles which have occurred is shown in the accompanying table and indicate the care with which maintenance is carried out.

A comparison with the year 1921 shows that the number of cases of trouble of each kind were either the same or fewer during 1922, except for the items "Lamps Out" and "Setting Contactor." The trolley contactor failures are nearly all due to flying trolleys, and as such are not under the jurisdiction of the signal department. The burning out of lamps is the most frequent single trouble, constituting 22 per cent of these. In the future new lamps will be inserted periodically in the signals, whether they burn out or not, after the average life of a lamp in the signal has been determined. It is expected that this regular replacement of the lamps will greatly reduce the number of lamp outages.

There were only eleven failures due to relay trouble, and while some of these may have been due to the relay itself, others were brought into the relay through line failures, as grounds, crosses, etc., whereby the relay was damaged. Since there are forty-two relays in service, this is equivalent to one case of relay trouble in nearly four years.

In 1922 there were eight-six cases of trouble arising from a total number of signal operations for the year of 2,082,404, which is 24,214 signal operations to one signal failure and 30 per cent better than 1921. The passage under a trolley contactor is counted one signal operation. Stated in another way, there were only two failures per block per year from all causes. It will be noted that the signals also made more total operations during 1922. There was one period extending over twenty-three days when there were no failures

As a part of the year's maintenance work, the signal department rewired seven signal poles by approved methods, using conduit, new fuse boxes and cable supports for distributing the leads; thirty overhead contactors were taken down and replaced with others previously overhauled and painted; seven relays were overhauled, rewired and made as new; new oil was placed in thirty-six signals, and three Cheatham switches were installed.

COMPARISON OF SIGNAL TROUBLES

Trouble found	1919	1920	1921	1922
Line wires	8	13	5	3
Fuses blown	29	16	9	9
Lamps out	15	34	17	19
Relay trouble	24	22	13	11
Setting contactor	9	4	4	6
Restoring contactor	19	7	5	5
Bad grounds	9	7	6	3
Pole wiring	10	1	13	13
No trouble found	13	20	14	12
Miscellaneous	20	19	8	3
Totals	156	143	94	86
	1919	1920	1921	1922
Total operations of all signals for year	1,745,950	1,709,820	1,759,300	2,082,404
Number of operations per failure	11,336	11,954	18,714	24,214
Average yearly operations of each block of signals	96,986	85,490	97,964	99,162
Average daily operations of each block of signals	264	276	240	272
Number of blocks in service	18	20	20	21

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Kansas City Railway Tries Ratchet Hand Brake

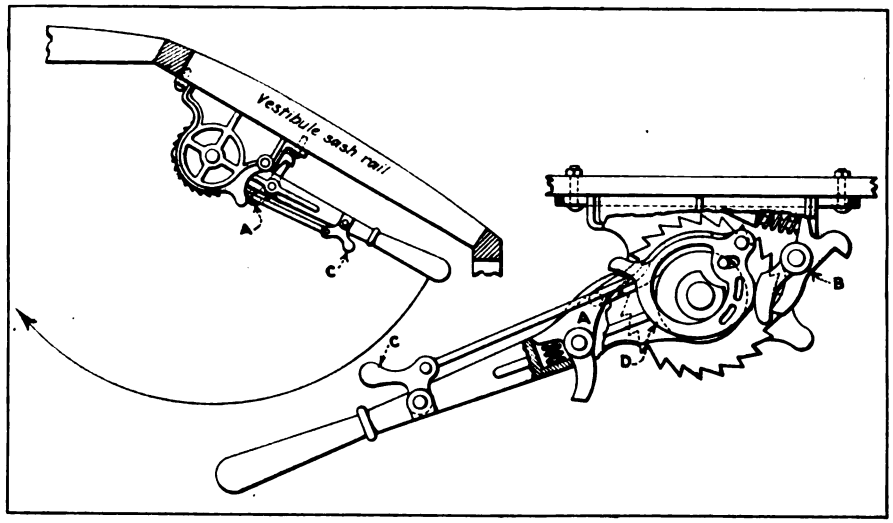
THE accompanying illustrations show a new type of hand brake mechanism which has been in service on a car of the Kansas City Railway for the past seven months. Its use is now being extended to other cars of the system. The new mechanism consists only of an operating head and the same hand brake staff and brake rigging is used as previously. The new operating mechanism is applied by cutting off the top of the old brake staff and providing this with a square end to set in a socket of the new mechanism.

In the running position with brakes fully released the operating handle occupies a position to the right and against the front vestibule of the car. To apply the brake the operating lever is pulled forward to the left, which at the same time moves a ratchet wheel which forms a part of the mechanism. As the ratchet wheel is fastened to the brake staff this movement winds up the brake chain at the bottom end in the usual manner. By referring to the accompanying illustration it is seen that the ratchet is made to revolve when the operating lever is pulled to the left through a pawl, *A*, and is retained in position by a second pawl, *B*, so as to prevent any back motion. In case one forward sweep of the lever is not sufficient to apply the brake, the lever can be pushed back and again pulled forward until the required braking effort is obtained. If it is desired to release the brakes entirely, the operating lever is pushed to the right so as to occupy a position against the front vestibule. The release is accomplished through the end of pawl *A*, engaging in the notched portion of the pawl *B*, which tilts the latter pawl back and disengages it from the ratchet wheel, which allows the wheel and shaft to rotate and fully release the brake. The pressure on the end of the operating lever necessary to move the pawls for release is about 25 lb. When in the release position the locking pawl is held clear of the ratchet wheel for a distance of approximately ¼ in. This prevents stripping of the teeth on the ratchet wheel.

With the brakes applied and the handle in the forward position, if it is desired to ease off the pressure without fully releasing the brakes, this is accomplished through the action of the thumb latch marked *C*. The thumb latch is connected through a link to a cam which is socketed about a boss on the operating lever. This cam, marked *D* in the illustration, has a slot in which a pin on the operating lever slides. This permits the cam to be moved forward and backward by the action of the thumb latch. The movement of the cam *D* acts on the pawl *B* so as to disengage this, and the ratchet being then held by the pawl *A* can be moved backward to any extent desired. The releasing of the thumb latch causes the locking pawl *B* to again drop into position and retain the ratchet in the desired position.

The operation of unlocking the ratchet wheel is accomplished with very little effort, since the pulling of the lever forward removes the pressure from the locking pawl *B*, so that all the strain from the brake is carried on the lever and the pressing down of the thumb latch *C* rotates the cam and forces the locking pawl to a disengaged position. When the brakes are released to the desired degree, the removing of the thumb pressure from the latch allows the cam to return to its released position through the pressure of a spiral spring. The brake can thus be eased off as the car comes to a stop in the same manner that is accomplished by the use of straight air brakes. There is no danger of the lever flying back while it has the braking pressure, as should the operator let go of the lever while it has the strain of the brake, the thumb latch would be released and the locking pawl would immediately engage the ratchet wheel, so as to prevent further movement or release of the brake.

A friction retarding wheel also constitutes a part of the mechanism. This fits around the brake shaft and revolves as a unit with the shaft. This retarding wheel prevents the brake shaft and chain from spinning off in making a full release. The action of the operating lever in its movement to the right causes the lever jaw to be forced against this friction wheel so as to prevent too rapid unwinding of the chain. The hand brake mechanism was worked out and has been patented by Charles C. Crewson, who is connected with the railway company.



Hand Brake Operating Mechanism

All Cars Equipped with Sleet Cutters

IN ORDER to provide for quick installation of sleet cutters in case of necessity, the Holyoke (Mass.) Street Railway has installed a spring type sleet cutter in the front vestibule of each closed car. These are fastened with a wing nut so that they may be removed without the use of tools.

These sleet cutters are of a type which may be put on the trolley wheel or removed without tools, and every motorman is instructed in regard to their installation and removal. In case of a sleet storm the motormen have orders to apply the sleet cutters as soon as there is any arcing on the trolley wire and to remove them as soon as the ice on the wire stops causing trouble. If the sleet cutters

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when removed are in good condition they are put back in the vestibule in their original location. If not, they are turned in to the carhouse foreman, who replaces them with new ones. The foreman also sees that every car is equipped at all times with one of the sleet cutters until the season of ice storms is over, when they are removed and put in the storeroom until the following winter.

New Equipment Available

Machine for Cutting Gaskets

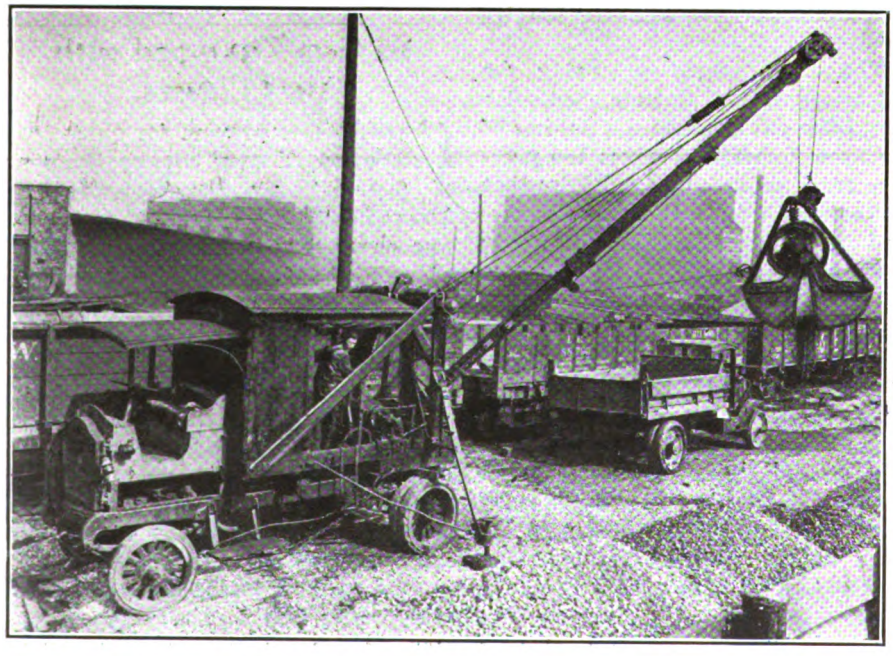
ELECTRIC railways use a considerable number of gaskets, but frequently the quantity used of any particular type does not warrant the expense of having a die made. To meet the requirements for a machine which can cut one or a quantity of gaskets at one time, depending on the thickness, and eliminate a large investment in idle dies the International Register Company, Chicago, Ill., is marketing a machine called the "International Cutawl." The mechanism provides for the operating of a small chisel making 2,000 strokes per minute by a small Universal motor. At the top of each stroke the chisel leaves the work and the stroke may be adjusted for any thickness of material up to ½ in. The high speed assures a smooth edge on all materials and the machine can be used for cutting stencils, felt rings, cardboard and thin wood patterns. It cuts all gasket materials, even copper and the wire insert asbestos kind.

The weight of the machine is 19 lb. and the cutting range is 24 x 48 in. at one setting of the clamp. The height of the machine from the table is 16 in. The machine is equipped with a 1/20-hp. Universal motor, which can be used on either alternating or direct current.

A Crane for Mounting on Trucks

TO MEET the demand for a type of crane which can be mounted on a truck and used for handling material in yards and at new construction where the usual type of car crane is not adaptable, a new type is being marketed by the Byers Machine Company, Ravenna, Ohio.

The crane has a special base to accommodate mounting on a truck. Unmounted the crane weighs 6 tons. Any 5-ton or larger truck having a minimum chassis length of 8 ft. 10 in. from rear of driver's seat to the center of the rear axle can be used for the mounting. The crane is provided with a power drum for raising and lowering the boom, which is made of steel, and is furnished with a Hercules four-cylinder 4-in. x 5-in. engine for power purposes. Any ½ cu.yd. bucket weighing not more than 2,000 lb. can be used. The extreme height of the top of the truck chassis to the top of the crane is 8 ft. 10 in. The equipment furnished by the manufacturer includes an all-steel cab, curtains, set of tools, and necessary lubricating devices.



Handling Crushed Stone in a Railway Yard

Switch-Thawing Outfit

THE Aeroil Burner Company, Inc., Union Hill, N. J. announces several additions to its line of thawing outfits. A new type has the burner directly attached to the upright tank so that the hose connection is unnecessary. A windshield or hood has also been developed to prevent the extinguishing of the flame during severe weather. The direct connected torch has a 3-gal. steel pressure tank with rigid handle. The tank is made of welded steel tinned inside and outside and is tested at twice the working pressure of the torch. The upright construction permits the use of a large pump having a rigid handle and a stroke of 10 in.

Thawing Outfit

Two sizes are also furnished with hose connection. One has a 3-gal. tank with a torch flame 2½ in. in diameter and 30 in. long, and another has a 5-gal. tank with a 3½ in. flame, 30 in. long. Electric railways find these torches useful for thawing out frozen conditions about tracks and rolling stock.

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The News of the Industry

Vote on Paving

Plan to Relieve San Diego Railway of Paving Charge to Go to Vote at Primary in March

Citizens of San Diego are again to be given an opportunity to vote on the question of whether the San Diego (Calif.) Electric Railway is to be relieved of the obligation to pave between tracks on new work that may be put in. The opportunity will be presented in the form of a charter amendment to be voted on at the regular city primary election on March 20. The proposed charter amendment is more lengthy and detailed than the one, aiming at the same purpose, which was defeated by a very narrow margin at a special election Oct. 10 last. The new proposed charter amendment originating with members of the City Council was drawn by the city attorney and was ordered placed on the ballot at the meeting of the City Council on Jan. 29.

The proposed section of the charter in part reads:

> The owner of the franchise or privilege shall at all times keep that portion of the street occupied by his or its tracks in good condition, constantly in repair, flush with the street and with good crossings; and in the event that the street on which said franchise or privilege is granted shall be paved, either by the city or under proceedings authorized by the general laws of the state, the said owner of said franchise shall be required to pay for only that portion of any construction in excess of that covered by the specifications for improvement of the rest of the street, and which shall be necessary to provide a safe and suitable foundation for the operation of car lines on a paved street. It is the intent and purpose of this section to relieve the owner of a franchise or privilege to operate street cars on the streets of the city of San Diego of the cost of new surface pavement between the tracks of said owner and for two feet on either side thereof on streets to be hereafter paved, and to require the owner of said franchise or privilege to lay a suitable foundation for the operation of car lines over a paved street.
>
> In the event that a street on which a franchise under this section shall have been granted shall be paved or improved under any of the general laws in force at the time said improvement is started, the property owners shall be required to bear the entire cost of the improvement of the street, including the cost of improving that portion of the street occupied by the owner of said franchise, save and except that portion required to be borne by the owner of the franchise as hereinbefore provided.

$650,000 for New Grades if Railway and City Will Help Pay Cost

The Illinois Central Railroad has announced that it will expend $650,000 for a new grade through the city of Champaign, Ill., and for the erection of a modern three-story station for Champaign, if the city of Champaign and the Urbana & Champaign Railway, Gas & Electric Company will each pay one-third of the cost. The station will cost $300,000. It will be directly served by cars of the street railway and also of the Illinois Traction System, the parent company of the electric railway.

The raising of the steam railway tracks and the construction of a subway at University Avenue would eliminate a dangerous grade crossing which all street cars of the Urbana & Champaign Railway, Gas & Electric Company and all freight and passenger cars of the Illinois Traction System must pass. As street car service between Champaign and Urbana and also to the campus of the University, midway between Champaign and Urbana, is very heavy, the building of a subway would be a long step forward in the safety program so generally in vogue now. The interurban cars and freight trains would also be benefited by the subway under the Illinois Central Railroad. This grade crossing is the cause of great congestion at the present time, delaying street cars throughout the day.

Wants Commission Abolished

Mayor Schwab of Buffalo Sees Neglect of Railway Situation—Commission Blames City and Makes Recommendations to Railway —Use of Additional Buses Suggested

FOLLOWING closely upon the recent report of the Public Service Commission fixing on the Mayor, City Council and city authorities a good part of the blame of the poor transit service in Buffalo, Mayor Schwab has written a letter to Governor Smith urging him to ask for the resignations of William A. Prendergast and Colonel William R. Pooley from the Public Service Commission or to abolish the commission for not relieving the railway situation where a strike of employees has been in force since July, 1922.

The recommendations of the commission followed an investigation by that body of a complaint over Buffalo's car service made on Jan. 5 to Governor Alfred E. Smith.

In the Mayor's opinion the report and the apparent neglect in solving the railway situation are sufficient grounds for abolishing the commission or at least demanding the removal of Messrs. Prendergast and Pooley. The report was written by Chairman Prendergast after a three-day hearing in Buffalo by the chairman and Commissioner Pooley. Twenty-two witnesses were examined, 652 pages of testimony were recorded and thirty exhibits were introduced.

Mayor Schwab in his letter of Jan. 5 made nine complaints against the railway charging insufficiency of cars, employment of inexperienced men, nonestablishment of regular schedules, disobedience of health department rules, shortening routes, thereby causing inconvenience to passengers; failure to provide "owl" service, failure to render service to the so-called Bailey-Kensington district, failure to anticipate snowstorm on Dec. 28, and failure on the part of the company to make any extensions for years.

Answering the charge of the city that normal service had not been restored in Buffalo since the outbreak of the strike on July 1, 1922, the commission says the company now has a force of 2,051 trainmen compared with 1,711 on the day the strike was declared, and that 1,400 of the new force are local men. The commission says, however, that the labor turnover in the last six months has been 106 per cent.

It was the contention of the commission that the company was at present operating 95 per cent of last year's service as measured in quantity of car-miles, that there was being carried at present about 85 per cent of the number of passengers carried last year, so that the quantity of service in car-miles exceeded that of last year. Rather was it incumbent upon the city authorities who control the streets to reduce the congestion and in that way enable traffic to flow with greater convenience to the public.

On the charge that no extensions of the lines had been made in recent years the commission brought out the fact that the company had no franchise permitting it to make any extensions. Further, the commission ruled that it might well be that there were certain sections which should be served by extensions, but the complaint of the Mayor came at the very time when the Mayor and his associates in the Council were threatening the life of the railway company by the indiscriminate competition of buses.

The nine recommendations to the city authorities urged "that the Mayor and the Council of the city are under a public obligation to co-operate with the railway company in securing satisfactory street car service." The Mayor is asked to direct the police department "to prevent undue and malicious interference with the operation of street cars by drivers of automobiles and other vehicles and that the energies of the police department be more intensively used to prevent a recurrence of outrages against employees and property of the railway company, proof of which was furnished in this proceeding."

The city is also urged to revise its parking ordinances to improve present street car and automobile congestion in the business section and increase the

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number of one-way north and south streets. Enforcement to practicable limits is urged of ordinances relating to slow moving or standing automobiles, held to be one of the contributing causes to Buffalo's unsatisfactory street car service. Co-operation between the company and the city to bring about more efficient snow removal is also recommended.

The street car company is directed to add forty-five cars to its present service; equip all cars with route and number signs; to retire certain snow-fighting equipment; to reroute various lines to better service; to construct connecting track on west side of LaFayette Square to improve service on east side lines; to improve service on Kensington Avenue, east line, by adding additional buses during the rush hours; to build shelters at Kensington and Federal Avenues; to secure city consent to operate buses in Bailey Avenue until the company's financial condition will permit track reconstruction; to consider eliminating car stops when less than 500 ft. apart; to permit city passengers to board inbound interurban cars when they stop to discharge passengers.

Parking Regulations Hamper Car Operation

Former Judge H. G. Wasson, as special master, has submitted a report to the receivers of the Pittsburgh (Pa.) Railways showing the effect of the city's parking regulations on car operation. The report contains the results of an analysis of street conditions during the rush hours and shows that about 25 per cent of the passenger-carrying capacity is hampered by the parking of automobiles at points of particular congestion.

The report points out how the Council might modify the parking regulations to prevent the inconvenience of thousands of car riders and at the same time help thousands of automobiles moving during the rush hours in congested districts to reach their destinations with less delay. Mr. Wasson believes that what is best for the greatest number ought to be the rule in determining regulation of street traffic.

Power of Commission Attacked

The city of Pomona, Calif., in a brief filed with the California State Railroad Commission on Jan. 13 attacked the right of the commission to abrogate a contract made by a municipality with a public utility.

For some time the Pacific Electric Railway has endeavored to obtain permission to abandon its local lines in the city of Pomona because they are not paying. The City Council of Pomona refused permission to the company and the railway appealed to the commission, which ordered the city to submit its side of the case. The railway company's franchises for its city lines in Pomona were granted in 1910 for a period of fifty years.

Governor Smith Speaks Again on Home Rule

New York Executive Says State Regulation Has Failed—Half a Dozen State Appointees Cannot Be Permitted to Determine How the Affairs of a City of 6,000,000 People Are to Be Run

GOVERNOR SMITH of New York addressed the Board of Trade and Transportation, New York City, on Feb. 3 and reiterated points taken up in his gubernatorial address favoring the abolition of the New York Transit Commission and the regulation of the utilities by the municipality. The Governor's stand on this matter, as set out in his inaugural address, was given at some length in the ELECTRIC RAILWAY JOURNAL for Jan. 6 and commented on in an editorial in the same issue.

In this more recent address the Governor reviewed the history of utility regulation in New York and pointed out as one indication that state regulation had failed the fact that there have been some fifty-six different commissioners appointed. He said that no one had ever been able to explain to him upon what theory regulation should be a state function.

He made the point particularly that there is a good business reason why New York City should have the power to construct its own subways without interference from the State. The present arrangement gives a division of responsibility. The major power in such matters rests by constitutional law with the city. Only minor power rests with the State. Good business sense suggests that these be put together so that somebody can be held responsible and so that there will be some one whose sole job it is to enlarge the transit system of the city. He said it would take three years to take the power away from the city and lodge it entirely in the State, and he was not sure whether this could be done at all. The State Constitution provides that the city is the final authority in permitting any use of its streets. That provision was put into the Constitution to safeguard the interests of municipalities from legislative interference with what the people themselves believed to be the power and the property of the municipality.

The Governor said that if that is true, then the next thing to do is to lift the minor power away from the State and put it over where the major power is, so that the people in the city will be able to know to whom to look to get subways. The present divided responsibility makes the people look to the State to accomplish the desired end when the State has only the minor power.

The Governor said that the theory upon which the State attempts to regulate public utilities is the exercise of what is called the police power. The State does not exercise this power itself, but confers it upon a commission. The theory behind that is that these utilities use the public highways, and, in the last analysis, the title to the public highways rests with the State. He said he had no quarrel with that doctrine as a doctrine. His quarrel is that it has not been successful, largely because of the agency. Now, he asks, what harm can come by transferring that agency to the elected representatives of a municipality, and let the question of proper regulation become an issue. "Let us have a chance to vote for men who are going to exercise that power," was his remark. "If there are any ills that democracy is suffering from today, they can only be cured by more democracy. It is all right to argue some constitutional principle, and talk about some divine right or constitutional right. But you have got to reckon in this city with 6,000,000 people. You cannot let a half dozen men determine how the affairs of these people are going to be run."

The Governor then made the point that the people do not know the public service commissioners, that they come suddenly into office over night and have authority in the fixing of great policies that have to do with the comfort and convenience of millions of people. These are matters that the Governor says must be determined by the people themselves, through their expression at the polls in electing municipal officers.

Double-Truck One-Man Cars in Operation

The Cincinnati (Ohio) Traction Company put into operation five one-man cars on Feb. 1. The cars, which were built at the plant of the Cincinnati Car Company, are unique in many details. The control equipment is a Westinghouse multiple-unit type, designed to permit the operation of the cars in trains, with the motorman controlling all cars simultaneously. There are nine cross seats on each side of the car and seats running lengthwise both in front and in the rear, giving the car a total seating capacity of forty-six. The front door, through which passengers must enter the car, is operated by air pressure and interlocked so that it is impossible to start the car until the door is closed and impossible to open the door until the car is stopped.

Eight of the new type cars will shortly be started on one of the suburban lines, which later will be equipped with twenty-two of these cars. It is the intention of the traction company to have fifty "one-man cars" in operation March 1.

The Cincinnati Car Company is building seventy-five of these new type cars for the traction company. The order was placed last fall.

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Warrants Being Cashed

Temporary Relief Provided—Ordinance Appropriates $41,000 from the Depreciation Reserve Fund

Warrants issued for January pay of employees of the Seattle Municipal Railway and for railway supplies are being cashed by Seattle banks, following adoption of a City Council committee resolution which met the bank's requirements regarding the provision of funds to retire the $231,533 in warrants. The resolution was framed by the Seattle Clearing House Association and was passed by the unanimous vote of the Council. It provides that, beginning Jan. 30, no legislation shall be adopted that will result in appropriations from the city railway fund, except for the purpose of paying outstanding city railway fund warrants. It also provided that "daily receipts of the railway be placed in the fund and remain until the warrants are paid in the order of their issuance." In addition, an ordinance has been introduced appropriating $41,000 from the depreciation reserve fund, to be placed to the credit of the fund against which the warrants are issued.

The decision of the Seattle Clearing House Association was outlined after several days' sessions, during which the association refused to cash the Municipal Railway warrants and employees were unable to obtain their wages.

The association based its refusal to cash warrants on the inability of the street car system to meet expenses on the 5-cent fare basis scheduled for March 1. Its statement said:

> At the reduced fare of 5 cents, with the 1¼ cents additional for transfers, allowing for a 15 per cent increase in the number of fares, with no additional increase in expenses, the estimated receipts will be $14,000 a day, or $3,000 less per day than is sufficient to meet the needs of the system.

Cashing of the January warrants is looked upon by Mayor E. J. Brown and the city bankers as merely temporary relief, as another issue of warrants to the amount of $123,000 becomes necessary on Feb. 10. Mayor Brown believes this issue will bring the city a step nearer the inevitable "showdown" which he says must come on the "impossibility" of the purchase contract between the city and Stone & Webster. Mayor Brown said he was in favor, after March 1, of using the earnings necessary for operating expenses before taking care of the bond redemption and interest. Funds of the street railway department should be kept separate from all other funds of the municipality, he said, and the ordinance requiring an appropriation from utility funds each month for bond redemption and interest should be amended to exclude the street railway department.

That Mayor E. J. Brown is deliberately inviting a law suit from Stone & Webster for specific performance or default on the contract for the purchase of the Seattle street railway lines is the opinion of Councilman E. L. Blaine, chairman of the Council finance committee.

With the 8½ cent fare, the Seattle Municipal Railways would be on a cash basis again early in March, according to Allen B. Hiatt, chief accountant in the railway office. As it now stands, as soon as the Jan. 25 issue of warrants for salaries and supplies is redeemed a new issue of approximately $123,000 will be out on Feb. 10, followed by another larger issue on Feb. 25 of about $225,000. Considering the 5-cent fare after March 1, Comptroller H. W. Carroll's statement to the clearing house recently shows a possible warrant indebtedness on Dec. 25 next of $1,138,000.

A net profit of $690,153 was made by the railway in 1922, according to the annual report of D. W. Henderson, superintendent. The income profit and loss account follows:

Gross operating revenue		$6,216,569
Less operating expense (depreciation of $685,114 included)		4,631,538
Operating income		$1,585,061
Add miscellaneous non-operating revenue		11,533
Total		$1,596,594
Less net loss on property retirements, etc.		75,510
Total		$1,531,084
Less interest		834,157
Total		$ 686,926
Add donation (buses)		3,226
Net profit		$ 690,153
Total charge to expense for depreciation		$ 688,114
Less amount transferred to depreciation reserve fund out of railway earnings		260,000
Amount included in railway operating expense, but allowed to remain in operating fund to be used for redemption of bonds, purchase of stores, betterments, etc.		425,114
Add net profit for year shown above		690,153
Earnings in 1922 which might be used for bond redemption and betterment or extension of system		$1,118,267

Through Service Again Sought

As the result of a conference at which were present Maurice E. Connolly, Borough President of Queens, Gen. Lincoln C. Andrews, receiver of the New York & Queens County Railroad, and S. W. Huff, receiver of the Steinway lines, it was agreed to establish a through service from College Point and Flushing to Long Island City and New York, if the Commissioner of Plant and Structures would replace the car tracks at the Fifty-ninth Street, Manhattan entrance of the Queensborough Bridge. These tracks were torn up several months ago. Passengers now must change cars and pay an additional fare at Woodside, due to the splitting of the Steinway lines from the New York & Queens County Railroad. It is believed that Borough President Connolly will ask Commissioner Whalen for restoration of the tracks.

Conference of Union Employees Called.—A New York State conference of union electric railway employees will take place on Feb. 12 at Utica, with the purpose in view of organizing a representative body for 1923. It is said that one-man cars will be discussed.

Will Submit Bond Issue

Detroit Voters Will Be Called Upon Again to Approve Money Provision for Railway Improvements

A bond issue of $5,000,000 will be submitted to the voters of Detroit at the March primaries to provide money to be used for street railway improvements and extensions. Favorable action was taken on the proposal by the City Council after the Street Railway Commission had agreed to ask again for the bond issue which failed to pass at the last November election. When the proposal was submitted before, it was believed by the street railway officials and former Mayor Couzens that its failure to pass was due to the fact that it had not been thoroughly understood by the voters.

While something more than $1,000,000 of the $15,000,000 bond issue voted for the municipal street railway system in 1920 is still unused, this will probably be supplied in payment for the Peter Witt cars, 200 of which have already been ordered and 106 have already been received. If the bond issue is passed, it is planned to complete payment on the 200 cars ordered, purchase additional cars and proceed to carry out an extension program contemplated for the city. Several trailers are now being built in the city-owned shops in Highland Park acquired from the Detroit United Railway.

According to Ross Schram, assistant general manager of the Department of Street Railways, the street railway department is paying for equipment more quickly than is customary with private corporations, as five years are often required to make complete payments.

Although the 2 per cent bonding limit for the city of Detroit based upon the 1922 valuation has been practically reached, an increase in assessed valuation amounting to $100,000,000 in this year's assessment is expected to provide for further bond issues. As it has been felt that the city's bonded indebtedness should not be limited to 2 per cent of its assessed valuation, preliminary steps have been suggested to have the limits raised to 4 per cent. In stating that the Department of Street Railways must expand in the near future to meet the needs of a fast growing city, Mr. Schram explained that such expansion can only be financed as any public utility corporation would do in a similar situation through the sale of securities.

A report has been turned over to the street railway department by W. E. Ruff of the Department of Public Works recommending the construction of a loop line to circle the heart of the city and tap the main lines outside of Detroit's congested district. A survey of the proposed line has been made, indicating that it would require the construction of 1¼ miles of double track.

The proposed line would run north from the intersection of Jefferson Avenue and Third Street, to Elizabeth Street, then east and south, connecting with Jefferson again at St. Antoine Street. The loop, the estimated cost of

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which is placed at $500,000 would if constructed, provide an opportunity for passengers to transfer to the trunk lines without entering the congested area at the heart of the city.

The possibility of a new street car line to be financed by Henry Ford, and connecting the present Department of Street Railways line with the Ford blast furnaces at River Rouge, has been discussed by the street railway commission and Ford Motor Company officials. Expansion of the Ford interests in River Rouge and Springwells and Dearborn are considered as making a construction of such a line necessary in the near future. The possibility of the villages of River Rouge and Springwells taking part in the financing of the project has been brought up.

Cars would be operated over the line by the Department of Street Railways and the lines would eventually pass into the possession of the department, according to the proposed agreement. This agreement whereby the city would acquire ownership of the line when it was ready for such step would be arranged whether the line was financed by Mr. Ford alone or with the co-operation of the villages.

According to Mr. Schram, the city has hesitated to consider extensions outside the city limits to River Rouge, financed by the city, because of the number of sections desiring extensions within the city. The Ford industries contemplated are expected to result in a new residence and business section containing in the neighborhood of 150,000 people.

Damage Claim Plan Approved in Pittsburgh

The City Council of Pittsburgh, Pa., has unanimously given its consent to the settlement of individual injury claims against the Pittsburgh Railways. Under the plan each claimant will be given the choice of either the ten-year installment or the cash-discount plan of payment. Those who accept the cash-discount idea will be paid "at the then value" of the claims. The present value has been estimated at about 76.6 per cent on the dollar of judgments for damage claims.

The reorganization plan of this property has been hanging fire now for some time due in large measure to the inability of the company and the claimants to come to an agreement on the point of payments. The Council some time ago called on H. Fred Mercer, attorney for a number of persons holding judgments against the company, to state his case. He had stood firm for a guarantee from the Philadelphia Company that the money would be paid. A. W. Robertson, vice-president of the Philadelphia Company, later informed the Council that his company would not object to the plan since it did not affect the ten-year installment plan, but merely speeded up payments. The Council concurred in this agreement. Immediately after this another delay was caused by an announcement to the Council by C. K. Robinson, special assistant city solicitor, that 15 per cent of the damage claimants had not agreed to any plan of payment. The resolution as now agreed upon has received official acceptance by the Philadelphia Company.

Invitations Issued to Participate in Coffin Award

Frank W. Smith, as president of the National Electric Light Association and Chairman of the Charles A. Coffin prize committee of the N. E. L. A., has issued a letter to all central stations in the country inviting them to participate in the awards to be made under the terms of the Coffin Foundation as established by the General Electric Company and announcing further details of these awards.

All statements must be in the hands of the committee by March 15, 1923. They are to be addressed to the Charles A. Coffin Prize Committee of the National Electric Light Association at 130 East Fifteenth Street, New York City. The details of the Charles A. Coffin Foundation were given in the ELECTRIC RAILWAY JOURNAL, issue of Dec. 9, 1922.

Strikers Sentenced for Disorders

Five striking platform employees of the International Railway, Buffalo, N. Y., have been sentenced to from two to four months each in the Erie County Penitentiary by County Judge Noonan. The men were convicted of stoning cars during the early days of the strike. Another striker was convicted of the charge of assault and was sentenced to one year in the penitentiary. He was accused of firing a shot at an employee of the company.

Frank W. Reilly, a striking platform employee of the International, who was indicted with twelve others on charges growing out of the dynamiting of the Buffalo-Niagara Falls high-speed train last August, has surrendered to the federal authorities. Reilly is the only one indicted who failed to give himself up immediately. He was released on $15,000 bail.

News Notes

Must Answer Complaint Charges.—According to an order of the Public Service Commission the Schenectady (N. Y.) Railway will be required to appear before that body and answer complaints as to service conditions on the Albany-Schenectady divisions of its lines.

Subway in Prospect.—It is said that an agreement has been reached between the city and the Memphis (Tenn.) Street Railway whereby the work on constructing the subway on Linden Avenue will soon be undertaken. Electric railway cars on this avenue will be rerouted.

Date for Hearing on Bills Set.—The date for a joint legislative hearing on the State fund bill of the Lockwood housing committee has been set for Feb. 13. Other bills to be heard on that day will be the one regulating the disposition of stock investments of insurance companies and the bill creating a trade and commerce commission and the measure regulating the activities of trade unions.

Recount Defeats Municipal Ownership.—A recount was taken recently on the vote cast on Jan. 1 by the public of Ottawa, Can., on the purchase by the city of Ottawa of the Ottawa Electric Railway. The recount showed a defeat for the purchase plan by forty-nine votes. On Jan. 1 both the proposed service-at-cost contract and the municipal ownership questions were turned down by the people.

Courtesy Counts.—G. J. Kuhrts, general manager of the Los Angeles (Calif.) Railway, has emphasized in an official bulletin that courtesy will become one of the outstanding factors in determining a man's efficiency record and the amount of bonus he will receive in 1923. It is the company's aim to give Los Angeles the most courteous car service of any city in the United States.

Interest in Big Extension.—Much interest is centered just now in the proposed extension of the lines of the Chattanooga (Tenn.) Traction Company from a point near the Signal Mountain to Crossville to connect with the Tennessee Central. It is said that if the line is constructed it will probably be electrified. In the approximate length of 90 miles the proposed line would make it possible to develop an area of 350,000 acres, containing a billion tons of coal.

Blame for Accident Shared. — An agreement has been reached between the Louisville & Nashville Railroad and the Louisville (Ky.) Railway whereby each will assume an equal responsibility for the wreck on Jan. 19. The accident occurred at Twelfth and Magnolia Streets when a Louisville & Nashville switch engine crashed into a street car. Eight passengers were injured besides the motorman, who is perhaps fatally injured. The details of the accident were given in the ELECTRIC RAILWAY JOURNAL, issue of Jan. 27.

Tulley Talks in Print. — "Tulley Talks" is the name of a new publication being circulated among employees and to the public by the International Railway, Buffalo. The publication is named after Herbert G. Tulley, president of the International. The first issue recalls the suffering experienced by Buffalo because of union domination. There is a brief outline of Mitten policies and an explanation of the Mitten plan of operation and co-operation which has been put into effect in Buffalo. Editorials from various publications of national circulation commending the Mitten plan also are included in the first issue.

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Financial and Corporate

American Public Utilities Company to Reorganize

A plan for the reorganization of the American Public Utilities Company, Grand Rapids, Mich., has just been sent to the stockholders. The plan provides for the elimination of the 6 per cent preferred stock through its exchange into new prior preferred 7 per cent and 6 per cent participating preferred on the basis of three-tenths share of the prior preferred and eight-tenths share of the participating preferred for each share of the present 6 per cent preferred, with its right to accumulated dividends, and the dividend scrip or accrued dividend notes. Where the present holders of the 6 per cent preferred are not owners of scrip or dividend notes they will be required to pay the sum of $7.50 in addition to surrendering their stock for exchange.

The management announces the payment of dividends beginning April, 1923, on the new issues provided the plan is consummated. No change is contemplated in the common stock of which $2,995,000 is outstanding and no additional bonds are to be issued under the plan.

The American Public Utilities Company controls through stock ownership certain of the properties operated under the management of Kelsey, Brewer & Company. Among them is the Wisconsin-Minnesota Light & Power Company, which operates street railway systems in Eau Claire and Chippewa Falls and the interurban line connecting Eau Claire, Chippewa Falls and Altoona.

Charlottesville Still on Winning Side

For the year ended Dec. 31, 1922, the Charlottesville & Albemarle Railway, Charlottesville, Va., reports a net surplus of $58,104, against $42,098 in 1921, $24,021 in 1920 and $32,908 in 1919. These figures include the light and power departments as well as the railway department. The gross earnings from railway operation increased from $50,957 in 1919 to $76,336 in 1922. Railway operating expenses for 1922 amounted to $47,683.

In his report to the stockholders John L. Livers, president, submits the fact that the year 1922 completed a period of ten years from the date of the purchase by the present owners of the property and tells what has been the progress made in that time. There has been an increase of 105 per cent in the number of passengers carried, the number in 1912 being 758,363 and in 1922 1,557,063.

Mr. Livers said he believed that the outlook for 1923 was especially encouraging and that the growth of the city would be felt in the receipts from the electric and railway departments.

Minneapolis Case Decided

Miscellaneous Expenditures Not Subject to Scrutiny When Not Included in Valuation Set Up

Permanent rate determination proceedings for the Minneapolis Street Railway will begin about March 1 before the Minnesota Railroad & Warehouse Commission. Following a decision on Feb. 2 by the Supreme Court of the State as to whether the railway and allied companies must produce certain records, the railway attorney announced he was ready to proceed. The city attorney said he wanted two weeks to go over the stock records and two weeks after that to get ready.

The Supreme Court decision is both for and against the company. The arguments had been heard by the court on an appeal from an order in mandamus action brought by the city to get certain records from the company. Judge F. M. Nye had ruled that the company must divulge the whereabouts of a fund of $227,000 and the names and addresses of stockholders.

The Supreme Court decision held the $227,000 had nothing to do with the valuation proceedings to determine a permanent rate of fare now under way. On the other hand, it affirmed the lower court's order regarding the information about stockholders. The court held as follows:

> Where the railway balance sheets and income account showing its net earnings are made part of the application to the Railroad & Warehouse Commission all items entering into the account may be considered, and the nature of all expenditures which go to reduce the net earnings are subject to investigation. But when the company stipulated that certain expenditures are not to be considered as affecting the value of its property or as having any bearing on the rate of fare it may charge, an investigation of such expenditures is no longer material and may not be required.
>
> The court properly directed a corporation holding the stock of the street railway company and the officers and directors of the holding company to permit the city to inspect such books of the holding company.

Horace Lowry, president of the Twin City Rapid Transit Company, said of the Supreme Court decision:

> In going over the decision it appears that the city is upheld in all of its claims to access to all the books of all the companies comprising the Twin City lines, and that the decision gives the city access to the stock books of the Twin City Rapid Transit Company.
>
> We do not now feel, nor have we ever felt, that the city should have access to the books of the Twin City Rapid Transit Company, as the company is only a stockholder of the subsidiary companies and does not operate them, but we, of course, must and will abide by the decision.
>
> The question of miscellaneous expenditures for which we have never claimed any credit in the valuation proceedings are, of course, ruled out as they could be of no real use to the city in the presentation of its case to establish the value of the properties or the proper rate to be charged.

Four per Cent Depreciation Charge Allowed

The Michigan Public Utilities Commission recently made an order granting the Muskegon Traction & Lighting Company permission to charge 4 per cent on its books for depreciation. The decision was made by the state commission after several months of investigation and it is said that this policy will be followed in the future. The ruling applies from 1920, when the troubles of the Muskegon company were placed before the Public Utilities Commission.

The decision gives the Muskegon Traction & Lighting Company a charge of $34,261 for depreciation during 1922, and about the same amount in the two preceding years.

The report of the Muskegon company covering a period from August, 1920, to Jan. 1, 1923, shows a deficit of $54,-301 after depreciation had been figured, while the cumulative earnings of the company during that period without figuring depreciation was $3,450.

However, during 1922 the earnings of the company reached $35,674, when depreciation was figured, while the year previous the company showed a deficit of $25,787. This is interesting due to the fact that competing jitney lines were eliminated by a vote of the people in January, 1922.

The company now reports that business is increasing rapidly with the return of normal conditions and the elimination of the competing jitneys. However, the company in its annual report points out that an 8 per cent return on the property for the period would call for earnings of $194,316, while there was a deficit of $54,301, making the total deficit figuring on an 8 per cent return $248,617. An 8 per cent return would have called for earnings of $79,229 in 1922, while the earnings as shown by the books were $35,674.

The Muskegon City Commission is maintaining its policy of preventing jitneys from competing with the railway.

Riding Increases in Ashtabula

The municipally owned street car line in Ashtabula, Ohio, continues to increase its business over a corresponding period last year. The system was owned by the Ashtabula Rapid Transit Company formerly.

In the first twenty-eight days of December, 1922, the receipts from car riders was $8,175. The number of passengers carried was 103,784.

During the first twenty-eight days of January, 1923, the receipts were $8,214. The number of passengers carried was 104,668.

The increase in the first twenty-eight days of December, 1922, over the same period the year previous was 27 per cent.

The percentage of increase of the first twenty-eight days in January, 1923, over the same period a year ago was 37 per cent.

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Changes Proposed in Financial Structure

Chicago, North Shore & Milwaukee Railroad Handicapped by Closed Mortgage Plans for the Future

Changes in the financial plan of the Chicago, North Shore & Milwaukee Railroad so as to give greater elasticity of finance and permit capital expenditures such as will enable the company to accept the continuous new business offered it are proposed by the board of directors in a notice sent to holders of the participation shares. The plan recommended will be voted upon at the annual meeting of shareholders on Feb. 27. .

The tentative plan for reorganization, in substance, provides for:

1. Creation of an open first and refunding mortgage under which bonds may be issued for retiring first mortgage bonds and other obligations issued for capital expenditures now outstanding and for capital expenditures in the future.
2. Issuance of $10,000,000 prior lien 7 per cent stock, of which not less than $1,500,000 would be immediately sold to provide working capital and reimburse the treasury for capital expenditures made, the balance to be sold as required for capital expenditures and to retire equipment notes and secured notes in accordance with the sinking fund provisions governing these issues.
3. Issuance of 50,000 shares of 6 per cent non-cumulative preferred stock, of $100 per share par value, and 50,000 shares of common stock, $100 par value.

This $10,000,000 of 6 per cent preferred and common stock is to be given to the participation shareholders in exchange for their 170,000 no-par participation shares in the ratio of 50 per cent thereof to the holders of first preferred participation shares, 40 per cent to holders of second preferred participation shares and 10 per cent to holders of common participation shares. This division is provided for in the participation trust agreement.

It is the intention to give recognition to the dividends in favor of the first and second preferred participation shares which have been set up on the books of the trustees and have not been paid. These dividends on Dec. 31, 1922, amounted to approximately $2,700,000. In recognizing these dividends it is proposed to give the shareholders the unsecured non-interest bearing notes of the new corporation, payable five years after date, the new corporation at the maturity of the notes to have the option of either giving new notes bearing interest and payable in five years or of exchanging them for the company's 6 per cent non-cumulative preferred stock at par, or to pay the notes in cash.

In order to accomplish the reorganization it will be necessary for the trustees to sell the existing trust estate. The estate will then be acquired by a similar corporation organized under the railroad laws of Illinois and probably with almost the same name. If authorized by the participation shareholders, the trustees can be ordered to sell the properties at a price and upon terms determined by the shareholders in voting for the sale. A valuation of the properties is now being made so that the sale of the trust estate can be made with absolute knowledge of the values involved and the new corporation capitalized in the same way with these values in view.

In the notice to participation shareholders Samuel Insull, chairman of the board of directors, points out that the business of the company has shown rapid and continuous growth, but that because of the restrictions in the trust agreement it has been impossible to provide the capital necessary for added improvement and facilities. He said:

> Continually increasing revenues will be the determining factor in the life and success of the properties and to obtain such revenues large capital expenditures will be required. We should not, in my opinion, hesitate to make these expenditures for our experience in the last six years shows that $1 of new revenue has been produced by approximately $1.53 of capital expenditures.
>
> These properties have proved themselves to have great possibilities, but in the future they must be given the aid of capital through sound and flexible financing plans.

HANDICAPPED BY CLOSED MORTGAGE

Mr. Insull points out that the company at present is handicapped with a closed mortgage limiting it to the issuance of $10,000,000 par value of bonds. Of these $4,060,000 were issued in acquiring the properties through reorganization. The company has since issued $2,845,600 of these bonds for capital expenditures, but because of inability to market them at a satisfactory price, these were pledged as collateral to secure notes. The company cannot issue junior securities, such as preferred stock, because of the restrictions of the participation trust agreement, and therefore the only other permanent financial resource lies in its bond issue, 70 per cent of which has been exhausted either through sale or pledge.

During the period of ownership ended Sept. 30, 1922, it is pointed out, the company issued $5,190,000, par value, of secured notes, including notes given for equipment. Of these approximately $2,925,000, par value, were outstanding. On the same date additions and betterments to property over the period totaled $5,659,255. Of this amount $1,882,098 was obtained through sale of securities, $572,500 from real estate and bank loans and the balance of approximately $3,200,000 came from operating revenues and operating reserves. Less than 40 per cent of the capital expenditures of the company have been funded, and of this amount approximately $147,000 must be retired annually.

The provisions of the trust agreement under which the participation shares were issued in exchange for the old first mortgage bonds require the trustees to set up on their books as a dividend account for the benefit of the participation shares 30 per cent, less certain deductions for interest, of the gross revenues of the two properties included in the reorganization—the Chicago, North Shore & Milwaukee Railroad and the Chicago & Milwaukee Electric Railway, owning the Milwaukee city line—or the net revenue, whichever may be the greater. These dividends have been retained and used for capital expenditures, shareholders being paid interest upon them.

A statement of the meaning of the plan to the shareholders follows:

1. It will give the Chicago & North Shore a clean financial set-up retiring all equipment notes, collateral notes and floating debt and doing away with present sinking funds.
2. It will make the bonds and stock issues the only outstanding obligations of any kind aside from current liabilities.
3. It will place the company in a position readily to obtain working capital to care for the rapid growth of its business.
4. The shareholders will receive in exchange for present participation certificates (on which they do not now receive dividends) preferred stock paying 6 per cent dividends, which rate can be safely earned and which shareholders should immediately receive.
5. Shareholders will receive the cumulative dividend which it has been impossible to pay them, in the form of non-interest bearing notes, payable in five years. The company will have the privilege of either giving new notes bearing interest or exchanging the company's 6 per cent non-cumulative preferred stock at par for the notes or paying them off in cash, as it may elect, at maturity. The cumulative dividend on the first preferred participation shares now amounts to $25 and there is approximately $24 owing on the second preferred participation shares.

Operating revenue of the company has shown a continuous increase, as follows: 1916, $1 157,191; 1917, $1,751,-373; 1918, $2,899,975; 1919, $3,237,921; 1920, $4,193,869; 1921, $4,500,805.

The report for the year 1922 is expected to show a healthy increase both in operating revenue and net income over the preceding year.

Plan Approved for Funding Accumulated Dividends

Stockholders of the American Railways, Philadelphia, at a special meeting in Camden on Feb. 1, approved plans for funding the accumulated dividends on the preferred stock, authorized an increase in the issue from $4,000,000 to $8,000 000, sanctioned the abolition of the $4,000,000 second preferred stock, none of which has been issued, and the transfer of stocks of certain subsidiary companies to the Consolidated Light, Heat & Power Company, owned by the American Railways.

It was also voted to change the name of the American Railways to American Electric Power Company. There were voted 28,940 shares of the 40,000 outstanding shares of preferred stock and 138,170 shares of the 189 200 outstanding shares of common stock.

Van Horn Ely, president, said there was a wonderful future for the company. He estimated this year's net income would be 50 per cent greater than that of 1922, when 7 per cent was earned on the preferred and 9.3 per cent left for the common.

The value of the properties embraced in the system was $80,000,000, he declared, and these are capitalized for $70,000,000. He considers the financing plan a constructive move. The amount of the new financing, Mr. Ely continued, would run from $11,000,000 to $12,000.-000, and would net the company $900 on the $1,000. Reports of the bankers' engineers, he said, showed 90 per cent of the properties in 100 per cent physical condition.

A general outline of the terms of the plan was published in the ELECTRIC RAILWAY JOURNAL for Jan. 20, page 142.

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Duluth-Superior Increases Net

Though the gross revenue of the Duluth-Superior Traction Company for the twelve months ended Dec. 31, 1922, of $1,786,020 fell off $18,820, the net revenue of $380,654 increased $63,516 over the previous fiscal year, according to figures now obtainable from the annual report of the company, which has just been made public.

Decrease in operating expenses through a cut of $87,939 under that item of expenditure is largely responsible for this showing. The decrease in the operating expense is attributed to the most rigid economy in the operating of cars in Duluth under a standard of service fixed by the City Council.

The number of revenue passengers carried during the year reached a total of 32,036,900, as compared to 34,596,264 for 1921, and 5,366,900 transfers were redeemed, as against 5,809,271 for the preceding year. An unusual amount of

Income	1922	1921
Railway operating revenue from transportation	$1,745,306	$1,761,503
Revenue from other operations	13,740	15,826
Totals	$1,759,046	$1,777,330
Operating expenses		
Way and structures	$212,749	$205,324
Equipment	180,229	197,891
Power	160,455	152,374
Conducting transportation	659,549	740,415
Traffic	322	229
General and miscellaneous	213,386	918,319
Transportation for investment—credit	21,328	1,251
Net railway operation	$353,681	$284,025
Taxes assignable to railway operation	113,273	107,410
Operating income	$240,407	$176,615

track construction and reconstruction was undertaken and completed during the year. In addition to $113,333 expended for renewals and charged against depreciation reserve, there was expended during the year $173,464 for additions to the property.

Five dividends at the rate of $1 per share up to the quarter ended June 30, 1922, were paid upon the 4 per cent cumulative preferred stock, but no dividends were declared upon the common capital stock. Operating expenses were 85.03 per cent of the gross income, as compared to 88.69 per cent in the preceding year. Upon the preferred 6.14 per cent was earned and $5 paid and upon the common stock 0.92 per cent was earned.

The company's road and equipment on Dec. 31, 1922, was valued on the books at $10,019,099, as compared with a valuation of $9,836,635 at the end of the preceding year.

In the review of the year's work by A. M. Robertson, Minneapolis, president of the company, he calls attention to the increased fare contest and its present standing. An appeal has been taken by the city of Duluth to the United States Supreme Court, where the case is now pending.

President Robertson also referred to the action of the Duluth Chamber of Commerce in appointing a special committee with instructions to take up negotiations with the city of Duluth and with the railway company with the object of settling by compromise all litigation now pending between the company and the city and the reaching of an agreement upon certain extensions of lines to be made during the coming year. The hope was expressed that the agreement would result in a mutually satisfactory adjustment of all the present controversies with the city of Duluth.

The comparative statements of the system's revenue account for 1922 and 1921 are shown in the accompanying table.

More than Agreed Rate of Return Earned in New Orleans

The income statement of the New Orleans Public Service, Inc., for October, November and December has been made public. The figures are separated by departments. The statement covers the first three months of the test year to which present rates are to be subjected under the agreement reached by the security holders of the corporation and the city, before a change in car fare charge or the rate for gas or electricity may be made. The statement discloses that the corporation has earned 7.80 per cent, or a little more than the basic rate of return of 7.50 per cent agreed upon by the conferees.

The report is a very flattering one, in the opinion of Commissioner Paul Maloney of the Department of Public Utilities, to whom it was submitted, and according to him gives rise to the hope of a reduction in rates, if the earnings during the remainder of the year are as satisfactory as the figures for the first three months.

On the other hand, Vice-President O'Keefe, in the absence of President Hecht, in commenting upon the report, was of the belief that the return of 7.80 per cent during the peak period presaged a return of not more than 6.80 per cent in the dull months of summer.

The report of the railway department and of the railway, electric and gas departments combined is contained in the accompanying table.

Railway Wins Tax Suit

The Public Service Railway will save $150,000 in taxes and the Public Service Electric Company and the Public Service Gas Company will profit to the extent of $100,000 and $50,000 respectively in assessments as the result of decisions made public recently by the State Board of Taxes and Assessment.

In the case of the railway company the city of Newark took appeal to the State board from the decision of the Essex County Board of Taxation in canceling the assessment levied for the year 1922.

The Newark officials taxed the "subway" of the company in the amount of $150,000, but this assessment was canceled under a law passed in 1919.

This statute imposes an additional franchise tax upon the gross receipts of street railway, traction, gas and electric corporations using or occupying public streets, etc., in lieu of taxation of certain property of such corporations, and is termed "personal property." However, the city contended this law did not include subways.

Price Fixed at $18,000

The purchase price of the Bay Shore Railway property, 1.5 mile of track extending from Green Bay to a municipal amusement park, was fixed by the Railroad Commission of Wisconsin at $18,000. The line was sold last summer by the Bay Shore Railway to the Park Railway Company, a subsidiary of the Wisconsin Public Service Corporation, under contract calling for the price to be fixed by the commission.

The line has never paid expenses and the Wisconsin Public Service Company, reluctant to burden other city lines with this one, formed the new company to take it over. It is in operation only during the summer months.

The transfer was in question for several months and the companies were as far apart on the matter as the difference between $29,000 and $9,000, the original investment and the scrap value respectively.

NEW ORLEANS PUBLIC SERVICE, INC.

	October	November	December	Three Months' Total
Railway department:				
Operating revenue	$654,361	$613,305	$658,645	$1,926,312
Operating expenses, including renewals and replacement reserves	468,301	442,703	458,867	1,369,872
Net operating revenue	$186,060	$170,601	$199,778	$556,439
Taxes	62,000	62,000	62,808	186,808
Net operating income	$124,060	$108,601	$136,969	$369,631
Miscellaneous income	2,674	8,920	9,739	21,334
Gross corporate income	$126,734	$117,521	$146,709	$390,965
All departments:				
Operating revenue	$1,173,195	$1,166,679	$1,251,994	$3,591,870
Operating expenses, including renewals and replacement reserve	773,483	757,658	792,154	2,323,297
Net operating revenue	$399,712	$409,021	$459,839	$1,268,373
Taxes and uncollectible consumers' accounts	112,715	113,875	112,959	339,549
Net operating income	$286,997	$295,146	$346,880	$929,024
Miscellaneous income	4,338	13,683	15,483	33,505
Gross corporate income	$291,336	$308,829	$362,364	$962,529
Income deductions	146,010	191,239	182,943	520,193
Balance available for sinking fund requirements, dividends and surplus reserve	$145,325	$117,589	$179,420	$442,336

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Prosperous Year in Cleveland

Year's Earnings Make Possible a Five-Cent Fare With Eleven Tickets for Fifty Cents

Stockholders in the Cleveland (Ohio) Railway, at their annual meeting Jan. 31, were informed by the president, John J. Stanley, that their company enjoyed a most prosperous year in 1922. Mr. Stanley pointed out to the stockholders that another result of this prosperity would be evidenced on March 1, when the rate of fare would be reduced to 5 cents cash, eleven tickets for 50 cents with a 1-cent charge for transfer.

The company ended the year 1922 with an actual surplus of $1,134,657, although the gross income of the company for the year, amounting to $17,082,393, was a decrease of 4.02 per cent over the year previous. The prosperity of the company in 1922 is best summarized and explained, in spite of the reduction in gross income, by the fact that expenses per car-mile in 1922 were 34.24 cents, as against 38.04 cents per car-mile in 1921, and 38.85 cents per car-mile in 1920.

The interest fund, which is the fare barometer, contained $502,429 at the beginning of this year, as compared with a deficit of $89,034 at the end of 1921. When this fund drops below $300,000 the fare goes up and when it goes above $700,000 the fare must automatically be reduced. The company's fiscal year ends on March 1, at which time there will be transfers from surpluses in other funds to the interest fund, which will bring this sum over the $700,000 mark. In addition to the surplus and interest fund, the company also ended 1922 with a surplus of $790,780 in its maintenance reserve fund and $500,677 in its operating reserve fund.

President Stanley reported that the stockholders now number 5,936, of which 5,327 are Ohioans and 3,957 live in Cuyahoga County.

During 1922, the riders numbered 402,262,233 as compared with 399,429,666 in 1921. Taxes in 1922 amounted to $1,378,933 as compared with $1,181,144 in the year previous and now amount to 8.07 per cent of the company's gross income.

The result of the company's efforts to reduce the sums paid out for injuries and damages, by intensive safety first campaigns among employees and car riders, is reflected in the fact that the amount paid to claimants for damages and injuries in 1922 was $951,056 as against $1,216,949 in 1921.

Stockholders also were informed that probably some time during 1923 the company would purchase all of its power instead of generating 20 per cent of it, as it is doing at the present time, with the Cleveland Electric Illuminating Company taking care of the bulk of its requirements. Mr. Stanley reported it was costing the company more to produce its own power than the amount for which it could be purchased.

In 1922 the company operated 37,215,800 car-miles, while in the year previous the number of car-miles was 37,118,227.

Mr. Stanley concluded his report in the following words:

> We should plan for the year wherein 500,000,000 riders will seek our service. Our partner in this undertaking, the city, should not another year ignore its duty to enable us to obtain the funds to provide for the city's transportation needs. It realizes, as we do, that the city's growth in population and area and the hoped-for increases in our business demand service adequate to the increases and proper for the development of that area. It knows that that means additional rolling stock, tracks, buildings and power. The contract between us and the city was made for the purpose of securing "to the city of Cleveland adequate and efficient service," and, notwithstanding repeated failure of the city in the past, I believe it will realize its duty to put us in a position to give it that which we contracted to give.
>
> I repeat for the third time the policy to which your directors will of necessity adhere until the city acts.
>
> Because of lack of funds that we may use on capital accounts, it is necessary, in our own interest, to cease altogether the spending of money for additional property, even such as ought really to be regarded as essential to the prosecution of our business. We shall continue to maintain your property well and to operate it as efficiently as we may. The security of your investment and the certainty of the 6 per cent return thereon were never better than now. We shall not take any action that may jeopardize either, and, whereas our policy should be one of expansion it will be one of conservation.

Tidewater Bondholders Urged to Sell

The Birmingham-Tidewater Railway will probably again be operated entirely independent of the Birmingham Railway, Light & Power Company. The protective committee of the $15,000,000 of first mortgage 5's is in receipt of an offer of purchase of the bonds and has recommended its acceptance. The prospective purchasers have indicated that they will pay 68 per cent of the face amount of the bonds flat, claims for interest accrued but not paid to go to the purchasers. It is stipulated, however, that holders of 75 per cent of the deposited bonds must signify their willingness to sell for the deal to be put through.

The Birmingham-Tidewater Railway is the successor after reorganization of the Birmingham, Ensley & Bessemer Railroad. The first mortgage bonds of the company were issued in 1917 and are guaranteed principal and interest by the Birmingham Railway, Light & Power Company. The consideration for this guarantee was the transfer to the Birmingham Railway, Light & Power Company of all of the $325,000 capital stock of the Birmingham-Tidewater Railway.

In 1919 the railway and power company went into receivership. As the railway and power company is to be reorganized and as the guaranty of that company to the Tidewater Railway is a simple contract that may possibly be set aside in the reorganization, leaving the Tidewater holders with nothing ahead of them except the prospects of foreclosure, the committee is urging the bondholders to sell. In this connection it is cited that the Tidewater lines were operated at a loss every year since 1918. The committee says that it "feels it is not more practicable now than it was in 1916 successfully to operate these properties as an independent traction system."

New York City Transit Lines Show Profit

The November reports of the transit companies of New York City, recently tabulated by the Transit Commission, show an aggregate profit of $61,696, against $6,000 in October. This is the second time since the war that the combined results have shown a profit. So marked an improvement brought an expression from the commission's statistician that all the lines would likely show a small net profit for the fiscal year ending June 30, 1923.

During the fiscal year ended June 30, 1921, the deficits of the companies aggregated $16,914,256 and for the fiscal year ended June 30, 1922, they aggregated $3,043,760. For the first five months of the fiscal year 1922 an aggregate net loss to the companies was recorded of $522,982, a gain of $1,436,533 over the same period of 1921.

Auction Sales in New York.—At the public auction rooms in New York there were no sales of electric railway securities this week.

New Directors Chosen.—At an annual meeting of the stockholders of the Duluth-Superior Traction Company, Duluth, Minn., H. F. Salyards was elected to the board of directors and C. R. Fridley was elected to succeed W. H. Goadby.

Bonds Bought by Syndicate. — The Eastern Wisconsin Electric Company, Sheboygan, Wis., has sold $1,917,000 of twenty-year 6 per cent bonds to a syndicate including Hill, Joiner & Company, Paine, Webber & Company and Halsey, Stuart & Company. The property is controlled by the Middle West Utilities Company.

Tax to Be Paid.—According to orders issued by Judge W. I. Grubb, United States Judge of the Northern District of Alabama, to the co-receivers, Lee C. Bradley and J. S. Pevear, the Birmingham Railway, Light & Power Company's tax for the years 1920, 1921 and 1922 will be paid. This is the state franchise tax and amounts to $4,400 annually without interest.

I. R. T. Files $6,935,467 Claim Against Queens Line.—Judgment for $6,935,467 has been filed by the Interborough Rapid Transit Company, New York, against the New York & Queens County Railway. The complaint in the action was verified by H. M. Fisher, secretary of the Interborough company, and confession of judgment was acknowledged on Jan. 30 by A. Leon Pepperman, treasurer of the New York & Queens County Railway. Counsel of the Interborough said the road seeks to conserve its claims against the Queens company and that this judgment will be considered by the receiver along with other claims. This judgment, it was said, would be paid only in the same manner that any other claim against the New York & Queens County Railway would be paid. Col. Grayson M.-P. Murphy, chairman executive committee of the Interborough board, recently said the Interborough would no longer pay recurring deficits of the Queens County company.

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Traffic and Transportation

Interurban Rates Reduced

Slight Reduction at Racine Involves the Introduction of the Weekly Ticket or Pass

A slight reduction in rates and a readjustment in service were announced for Feb. 5 on the interurban electric line of the Milwaukee Electric Railway & Light Company between Racine and Kenosha, Wis.

The company has been operating one train an hour connecting Milwaukee, Racine and Kenosha and a second train between Racine and Kenosha, giving Racine and Kenosha half-hourly interurban service. Recently the company acquired the operating equipment of two bus lines which were competing with the interurban between Racine and Kenosha. A plan has been worked out whereby the bus service will be continued by the Wisconsin Motor Bus Lines, its subsidiary, it being co-ordinated with the interurban service in such a way that Racine and Kenosha will have one electric interurban train and two buses an hour, giving these cities practically twenty-minute service.

The one-way ticket fare between Racine and Kenosha will be reduced to 30 cents, with a transfer to city rail cars on the inbound trip and a city fare allowance of 7 cents on the presentation of a city rail transfer when the ticket will be purchased.

The company will also introduce on this line a weekly ticket or pass. This pass will cost $1.75 and will be good for unlimited riding on the interurban cars between the two cities from the south fare limits of Racine to any point on the interurban line in Kenosha and from the north fare limits of Kenosha to any point on the interurban line in Racine. However, on boarding the interurban either in Racine or Kenosha the passenger will either have to pay a city fare, present a city rail car transfer or exhibit a city weekly pass which is in use both in Kenosha and in Racine. Any one of these three forms of transportation will entitle the holder to a ride to the city limits, from which point his weekly pass can be used for the remainder of the journey.

This arrangement has been made in view of the fact that a large number of people in Kenosha travel only to the north limits of Racine, where certain manufacturing concerns are located. It has been computed that for a person making one round trip each day between Racine and Kenosha, the fare by using the weekly ticket and including the city fare in either city on the outbound trip will be approximately 19 cents one way as against a ticket fare of 30 cents.

Other forms of commutation such as the ten, twenty and fifty-two-ride tickets and the 500 and 1,000-mile mileage books will remain in effect.

Both the Milwaukee Electric Railway & Light Company and the Wisconsin Motor Bus Lines have announced in the public press that they are anxious to give Racine and Kenosha the best possible service, and that through co-ordination of rail and motor bus facilities they will be able to eliminate wasteful operation, permitting both lines to give the maximum service at reasonable rates with the greatest degree of comfort and when it is most needed.

Milwaukee Northern Changes Terminal

The Milwaukee Northern Railway announced that on Feb. 1 it would make its terminal at the Public Service Building in Milwaukee. The Public Service Building is the terminal of the Milwaukee Electric Railway & Light Company. The Milwaukee Northern was recently acquired by the North American Company, which also controls the Milwaukee Electric Railway & Light Company. It operates an interurban electric railway between Milwaukee and Sheboygan, a distance of about 50 miles.

At the same time the running time between Sheboygan and Milwaukee will be slightly reduced. The present terminal of the Milwaukee Northern is on Fifth Street between Wells and Cedar, about five blocks distant from its new terminal. In reaching its new terminal the Milwaukee Northern trains will pass the Chicago, North Shore & Milwaukee terminal and the Chicago, Milwaukee & St. Paul terminal and will be within two blocks of the Goodrich Transit Company's docks, thus permitting very close connections with these various lines for Chicago.

Kalamazoo Votes Down Bus Project

An attempt to establish a municipal bus system to supplant the Michigan United Railway street car service in Kalamazoo was buried under a storm of votes at a special election Jan. 30. Only 40 per cent of the total vote of 7,411 was favorable. Sixty per cent was necessary to carry. The street railway franchise expires Feb. 13.

The election came at the request of a few city officials who wanted Kalamazoo to experiment with bus transportation. A proposed franchise was rejected in order that the people might first pass on this question. A day-to-day agreement is now pending, which includes buses operated by the street railway on two proposed routes as auxiliary to established lines.

Statewide interest was aroused by the campaign. One reason ascribed for the defeat of the bus plan was that most of its warmest advocates were identified with interests that had automotive equipment to sell to the city.

Los Angeles Mayor Expresses Himself on Buses

Mayor Cryer of Los Angeles in discussing the pending franchises sought by new bus corporation to compete with the local railways declares that the railway in Los Angeles will soon be a back number. He has taken no definite stand in connection with the application of the new bus corporation for motor bus franchises in Los Angeles, and he declares that he enters into consideration of the matter with an open mind. However, his views are interpreted as being favorably inclined toward motor bus transportation. The Mayor said:

> In the matter of transportation accommodations, public interest is paramount to private gain. It may be the public interest, however, to permit present conditions of transportation to continue, augmented with additional and new facilities. That is the question that must be determined in our studies of the application for bus line franchises.

Under regular procedure a request for a franchise of any kind must be finally settled in the City Council. However, it is possible that the applicants may amend their application to operate bus lines and ask for permits which may be canceled by the city under certain stipulated provisions. In this event, the utilities board would be empowered to issue the permit without the sanction on the part of the City Council. The Council, if it is so inclined, however, may throw impediments in the way of such action through orders to any municipal department, which must then abide by the instructions of the Council.

Club Formed to Reduce Traffic Accidents

Co-operating with the Dayton (Ohio) Street Railway, the Dayton *Journal* has organized "The Journal Life Savers' Club" in an effort to reduce the number of traffic accidents in the Gem city. Thirty employees of the street railway company were announced as charter members of the club, to be presented with certificates and neat bronze buttons to be worn on the coat. These men passed through the entire year 1922 without a traffic accident.

The club is not to be confined to employees of the traction line, however, as from now on all operators of public conveyances, such as taxicabs, motor-buses, interurban cars, etc., as well as freight truck drivers, will be eligible for membership providing they went through 1922 without an accident. The same rule will apply at the end of 1923 for drivers who go through this year without an accident, and where a club member for 1922 also succeeds in "making the club" for 1923 his certificate will bear an additional indorsement, while a small bar will be suspended from his button to show two consecutive years without a traffic accident.

The plan has won the commendation of local city authorities, business men and others who are interested in reducing the number of traffic accidents in Dayton, and it is being studied for application in other of the larger cities.

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Changes Proposed in New Orleans

John A. Beeler, New York, who is now making a study of the Public Service, Inc. (the New Orleans Railway & Light Company), conferred recently with Commissioner Maloney of the Public Utilities Department of New Orleans, President Abels of the National Light & Power Company and R. S. Hecht, president, and A. B. Paterson, superintendent of the local company, with a view to reviewing certain recommendations of the Beeler organization. Included among the suggestions by Mr. Beeler are plans for the elimination of certain lines, the establishment of others and the rerouting of still others.

Nothing definite was done as the Beeler report will probably not be finished for some time. One of the proposed changes involves the widening of North Rampart Street from Esplanade to Elysian Fields Avenue. The carrying out of this suggestion would make it necessary for the railway to acquire a considerable amount of ground between the two streets. This would cost about $300,000. As the city is without money to buy, the expense of the improvement if the work is carried out would have to be borne by the railway. In this event, the cost would be carried to the capital account of the railway and increase the base amount on which the company is permitted to earn a return. In referring to the matter, Commissioner Maloney said that it was too early to speak definitely on the subject, but he was of the opinion that a way would be found to remedy the obstacles that appear to prevent the laying of double tracks on North Rampart Street.

Protest Interurban Fares

The City Attorney of Pasadena, Calif., filed a brief with the California State Supreme Court on Jan. 30 demanding that the situation be corrected with reference to the through interurban passenger rates as charged by the Pacific Electric lines between Los Angeles and Pasadena, pointing out that the through interurban fare is greater than the intermediate fare. The city attorneys of South Pasadena, Alhambra and Glendale also joined in the petition to the court.

The brief attacks the ruling of the California State Railroad Commission, establishing the fares now in effect, as a violation of the State constitution. As an example of the asserted discrimination, the brief points out that the fare on the Pacific Electric lines from Pasadena to Sierra Vista and from Sierra Vista to Los Angeles is 20 cents. The through fare from Los Angeles to Pasadena, however, is 29 cents, the brief affirms. It is also cited that the fare from Los Angeles to South Pasadena is 24 cents, while the short-haul fare is but 16 cents.

Petition on Fare Reduction Denied.—The Public Utilities Commission of Maine recently denied the petition of Charles Dick and others for a reduction in fare from 9 cents to 7 on the Androscoggin & Kennebec Railway. The petition was also denied for a reduction of the number of fare limits between Lewiston and Lisbon Falls.

Buses on Bridge Started.—The Springfield (Mass.) Street Railway's bus service across the Hampden County Memorial Bridge was started on Jan. 29. Trips are made every fifteen minutes, and transfers are given free to buses from the trolley cars and to the trolley cars from the buses.

Enters Bus Business.—The Waterloo, Cedar Falls & Northern Railway is planning to operate buses in connection with its regular railway service. As a step in this direction it has taken over the Johnson bus line, doing business between Waterloo and Cedar Falls, Iowa. The plan of the company is said to include provisions for issuing transfers from the buses to the cars in its electric interurban service between Waterloo and Cedar Falls.

New Signs Being Used.—The Memphis (Tenn.) Street Railway is installing new signs, marking cars with their routes. In addition to the names heretofore employed, numbers which more quickly identify routes are also being used in the new signs. The new markers are being located in plainer view just above the motorman's window. A duplicate of the front-end marker is also being installed on the side of each car. In several cases names of lines have been changed and shortened, allowing the use of larger letters. This makes the sign more legible.

Will Supplement Railway with Buses.—The Wilkes-Barre (Pa.) Railway is planning to operate motor buses over North Street bridge supplemental to the regular trolley service. This will be a convenience for thousands of west side residents, who heretofore had to suffer real hardships to get to town. A charter is being sought in the name of the Wyoming Valley Autobus Company and a hearing will be held on Feb. 13. The traction company had completed arrangements for opening the bridge as a trolley route, but pending necessary strengthening of the structure buses will serve the purpose.

Proposals Turned Down.—Proposals of the Indianapolis Board of Public Safety that street cars be stopped on signal of prospective passengers from the curb, thus minimizing the danger of persons being struck by automobiles while waiting in the street, have been turned down by the Indianapolis Street Railway. The principal objection on the part of the company is that such plan would place the entire burden of safety of passengers waiting to board cars upon the company and thereby relieve automobile drivers of responsibility. Other objections pointed out by Robert I. Todd, head of the company, state that it would be impossible for motormen to see passengers on the curb in rainy weather or at night, that the plan would cause innumerable arguments and complaints and that it would slow down the running time of the cars.

Book Reviews

Report of First Annual Conference of Tennessee Public Service Association

This is a full report of the meeting in Knoxville on Dec. 14, 1922, reported on page 1,018 of the issue of this paper for Dec. 30, 1922.

Preparation of Light Aluminum-Copper Casting Alloys

By R. J. Anderson. Technical Paper 287. United States Bureau of Mines, Washington. D. C.

A forty-four-page pamphlet giving an analysis of present methods used, with suggestions, by the author, as to the best procedure.

The Reorganization of Railways in Great Britain, Its Progress and Prospects

By H. B. Allin Smith, American assistant trade commissioner, London. Supplement to *Commerce Report*, published Jan. 10, 1923, by the Bureau of Foreign and Domestic Commerce. Twenty-eight pages.

The steam railroads of Great Britain have been going through a crisis somewhat similar to those in this country, and details are given of the pre-war rate-making system, the conditions which arose during the war with the increased rates put into effect, the subsequent lowering of rates and wages, and present conditions. Under the new railways act, by July 1, 1923, the existing 120 or more companies in Great Britain are to be arranged into four geographical groups. Details of the act, opinions on it, statistics of the railways and other facts are given.

Decisions of Courts and Opinions Affecting Labor in 1921

Bulletin 309, United States Department of Labor, Bureau of Labor Statistics, Washington, D. C.

Approximately 250 cases, illustrating many phases of the questions involved in the relations of employers and employees, are presented in this bulletin. One-half of these cases relate to questions arising in the administration of the workmen's compensation laws, while thirty-seven are selected cases relating to labor organizations, their status, activities, etc. Other subjects receiving attention are minimum wage laws under which four cases are considered, and the federal statute relating to railroad service, under which there are twelve. Although a great majority of the states have workmen's compensation laws, there is still frequent recourse to the common law or statutes relative to employers' liability, a score of such cases appearing in the report. besides a group in which the rights of seamen are considered. None of the cases is reproduced fully, but a summary statement introduces in most cases quotations from the language of the courts, setting forth concisely the principal points involved, in such a way as to facilitate an understanding of the subject matter.

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Legal Notes

CALIFORNIA—*Negligence of Mother Imputable to Father Claiming Damages for Death of Child.*

In father's action for death of infant child, in which the mother was not joined as a plaintiff the contributory negligence of the mother was a good defense, on the theory that in caring for the child she acts for her husband and her negligence in caring for the child is the negligence of the husband. [Kenna vs. United Railroads of San Francisco, 207 Pacific Rep. 35.]

ILLINOIS — *Profit from Other Business Need Not Be Considered in Determining Duty to Operate—A Reasonable Rate Does Not Mean a Nonconfiscatory Rate.*

Where a corporation was engaged in operating a street railway and also in furnishing light and power to the city, the fact that it was making a profit on its light and power does not authorize a requirement that it operate its street railway at a loss, but where the entire street railway system is earning a reasonable return, the company cannot even abandon the service on certain of its lines, because they do not yield a profit.

A public utility is entitled to a rate which will yield a fair return on the value of the property used by it for public convenience, and not a rate which is merely nonconfiscatory, and the public is entitled to demand that the rate be no more than will yield a fair return. [Northern Illinois Light & Traction Co. vs. Illinois Commerce Commission ex rel. City of Ottawa, 134 Northeast. Rep. 142.]

INDIANA—*School Wagon Driver's Negligence Not Imputable to Parent of Pupil Injured in Collision.*

The negligence of the driver of a wagon furnished by the township trustees to transport children to school and resulting in the death of a child, could not be imputed to the parent, who, while having the right to avail himself of the agency, had no right to control or regulate it. [Union Traction Co. of Indiana vs. Gaunt, 135 Northeast. Rep. 486.]

MASSACHUSETTS — *Negligence Cannot Be Assumed Because of Height of Running Board.*

In a passenger's action for injuries sustained by a fall in alighting, the testimony of an expert that the running board could have been lowered, with nothing to indicate how much lower it could have been made, and testimony that in Boston the running boards were only 17 in. above the track, 3 in. lower than defendant's running board, did not warrant a finding of negligence, defendant's railroad being in a country district. [Kinnarney vs. Milford & U. St. Ry. Co., 134 Northeast. Rep. 614.]

MASSACHUSETTS — *Automobile Passenger Negligent in Trusting Entirely to Driver.*

A woman riding with her husband in an automobile driven by him which skidded and turned over on street car tracks in front of an approaching car could not recover if she negligently abandoned the exercise of her own faculties and trusted entirely to his care and caution, and his negligence caused or contributed to the accident. [Lambert vs. Eastern Massachusetts St. Ry. Co. (two cases), 134 Northeast. Rep. 340.]

MICHIGAN — *City Has Power to Pass Ordinance Requiring Single Truck Cars to Travel More Slowly.*

An ordinance of a city limiting the speed of single truck street cars to 12 m.p.h. while permitting double truck cars to run 15 m.p.h., is one passed in the exercise of the police power, and it cannot be said that the city exceeded its power to classify the cars by permitting those equipped with double trucks to run faster. [Beaubien vs. Detroit United Ry., 185 Northwest. Rep. 885.]

NEW YORK—*Public Service Commission Law Applies Only to Transportation of Persons and Property—Extent of Debts No Reason for Not Compelling Street Railway to Conform Tracks with Grade.*

Public Service Commissions Law, Sec. 50, providing for regulation of repairs, improvements, changes, etc., of public carriers, applied to these matters only as they affect the transportation of persons and property.

Where it was the duty of a street railway under its contract with a city to conform its tracks with an altered grade of the street, mandamus would lie to compel the conformance, although the street railway had liabilities of about $900,000 and cash on hand of only $450,000, and the city had other paving work in prospect upon streets which, if prosecuted all at once, would be beyond the financial ability of the company, where there were sufficient funds to carry out the project in question. [City of Syracuse vs. New York State Railways, 189 New York Suppl. 763.]

NEW YORK — *Municipal Corporations Have Only Power Given by Legislature—Board of Estimate of New York City Has No Discretion but to Make Appropriations Requested by Transit Commission.*

It was the duty of the board of estimate and apportionment of New York City, upon receiving requisitions from the Transit Commission under the Public Service Commission Law, for an appropriation to pay expenses, to make the appropriation in the sum demanded, as in making such appropriation the board acts in a ministerial way.

A municipal corporation has no power except such as is given to it by the Legislature, and any power thus given may thereafter be modified, diminished, or recalled. [McAneny et al., Transit Commission vs. the Board of Estimate and Apportionment of the City of New York, 134 Northeast. Rep. 187.]

NEW YORK—*A Passenger Must Subject Himself to Reasonable Rules, and Has No Right of Action, Where Ejected from Street Car Because of a Late Transfer.*

Passenger on a street railway must subject himself to reasonable rules of the carrier and if a conductor insists that his transfer has expired, he should pay another fare and take the matter up with the company later. In this case the transfer was lost. The conductor declared it was late. The passenger did not notice the time punched but declared he took the first following car from the transfer point. [Coffrey vs. United Traction Co., 192 New York Sup. 96.]

PENNSYLVANIA — *Injury to City Employee Entering Work Car Held Not Actionable.*

Where a city employee inspecting track repair work, whose employment did not require him to ride on the street railway company's work car, entered the car to eat his lunch at the invitation of the company's foreman, he was at the most a mere licensee, and not entitled to recover against the company for injury by the lurching of the car when the motorman lost control while shifting it on a grade, unless the injury was the result of intentional, wanton, or willful acts. [Bally vs. Pittsburgh Railways, 116 Atlantic Rep. 161.]

MONTANA—*Company Held Not Entitled to Discontinue Part of a Unit of Its Lines. Fare Provisions and Paving Requirements Subject to Regulatory Power of State.*

A proviso, in a street railway franchise that the company shall not be required to operate its lines or any "part or portion thereof at a loss," only grants permission to discontinue the entire system, or any entire unit, not any part of a line. Nevertheless, the city's right to enforce that requirement by injunction is subject to the power of the state, through the Public Service Commission to relieve the company therefrom. Provisions in a city ordinance requiring a street railroad company to pave the streets between its tracks and to sell commutation tickets, and that cars make a minimum number of trips daily between designated hours, do not relate to property rights which are beyond legislative control. [City of Helena vs. Helena Light & Ry. Co., 207 Pacific. Rep. 337.]

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Personal Items

Britton I. Budd Heads Northern Illinois Company

The Public Service Company of Northern Illinois on Feb. 6 announced the executive reorganization of the company to meet exigencies created by the death of Frank J. Baker, vice-president of the company. Samuel Insull resigned from the presidency to become chairman of the board with general authority over the company's affairs conferred by amendments to the by-laws. Britton I. Budd, president of the Chicago Elevated Railroads and the Chicago, North Shore & Milwaukee Railroad, was elected president; John G. Learned was elected vice-president in charge of the commercial and new-business departments, and Julius L. Hecht was made vice-president in charge of engineering and operation. Charles A. Munroe resigned as vice-president, but retains his position as a director and a member of the executive committee. John H. Gulick remains vice-president in charge of finances.

New Vice-Presidents in Atlanta

F. L. Butler and W. H. Taylor Both Advanced by the Georgia Railway & Power Company

Two new vice-presidents have been elected by the Georgia Railway & Power Company. They are F. L. Butler, in charge of operation, and W. H. Taylor, former executive assistant of the company.

Mr. Butler joined the Georgia Railway & Power Company in February, 1921, as manager of the railway department and was made general operating manager of the company on Feb. 1, 1922, in charge of railway, electric, gas and steam heating departments. When he became associated with the company he took over the duties which until that time had been performed by W. H. Glenn, who resigned from the company to become president of the Shippers' Compress Company. At the time of his appointment to the company in Atlanta Mr. Butler was manager of the Winnipeg Electric Railway, which he served for three years, first as general superintendent and later as general manager.

Mr. Butler was born in Terre Haute, Ind., in 1874. At the age of twenty years he entered the employ of the Vandalia Railroad, now a part of the Pennsylvania system. He was employed in various capacities in several towns along the line of the Vandalia Railroad until February, 1909. He then resigned to become superintendent of the Denver & Intermountain Railway, Denver, Colo. He subsequently became vice-president of the company.

Mr. Butler resigned on Sept. 1, 1911, to accept the position of general manager of the Alton, Jacksonville & Peoria

F. L. BUTLER

Railroad, then under construction. Shortly thereafter he was appointed receiver of the company and later completed the line as far as Jerseyville, Ill. In July, 1913, he became general manager of the Chicago & West Towns Railway and of the Suburban Railway, with headquarters in Chicago, and remained in charge of those properties until April 1, 1918. He then resigned to join the Winnipeg Electric Railway.

Mr. Taylor is a widely known public utility executive, having been for seven years president of the Omaha Gas Company. He was located in Philadelphia as an executive on matters of appraisal before joining the Georgia Railway & Power Company Feb. 1, 1923.

Mr. Taylor was graduated from the Stevens Institute of Technology in Hoboken, N. J., in 1902 as a mechanical engineer. The bulk of his work for several years before he went to Atlanta was in connection with rate cases either as a witness or as a rate and appraisal expert.

He joined the Omaha (Neb.) Gas Company in 1913 as general manager of its properties, and shortly thereafter was elected president of the company.

W. H. TAYLOR

Prior to that time he was with the United Gas Improvement Company as engineer in charge of the gas and electrical properties on the main line out of Philadelphia. He had previously served with the Fulton County Gas & Electric Company, Gloversville, N. Y., for a period of three years, during which time he was also engaged in engineering work. While president of the Omaha Gas Company Mr. Taylor served on various committees for the American Gas Association and was also representative of the association in the Iowa district. He was also president at one time of the Iowa District Gas Association.

New Operating Head, Chicago

G. A. Richardson, formerly vice-president in charge of operation of the Philadelphia Rapid Transit Company, has been elected vice-president Chicago Surface Lines, in charge of operation. He will enter upon the work of his new position at once.

Dinner Tendered General Andrews

Gen. Lincoln C. Andrews, formerly chief executive officer of the New York Transit Commission, was tendered a dinner at the Engineers' Club on Feb. 5 by his many friends among the New York railway men and members and employees of the commission. The occasion was the recent appointment of the General as receiver of the New York & Queens County Railway and general manager of the New York & Long Island Traction Company and the Long Island Electric Railway. It was an evening that the General will long remember for the expression of fellowship, admiration and well-wishing that was manifested by the character of the gathering and the talks of the guests.

The dinner marked the passing of the General from the field of regulation and his entry into the rôle of operator, which his railway friends took occasion to warn him, in jest, nevertheless with feeling, meant that his troubles now begin. The evening was indeed one of play and celebration, though the forty-odd men present took away with them a note of serious purpose from the very interesting and appealing talk by General O'Ryan, member of the commission, who characterized the world situation today as a race between the forces tending to destroy civilization and the time in which the United States can be brought to a realization of its obligations.

Those present at the dinner were Chairman George McAneny and Messrs. LeRoy T. Harkness, General O'Ryan and Sverre Dahm of the commission; Robert Ridgway, chief engineer of the commission; Frank Hedley, Judge James C. Van Siclen, W. S. Menden, C. E. Morgan, R. E. McDougall, S. W. Huff, W. G. Gove, J. S. McWhirter, J. S. Doyle, G. H. Pegram, J. F. Egan, L. V. Morris, George Keegan, Col. Merritt H. Smith, Dr. C. E. Lucke,

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H. L. Brown, J. Waldo Smith, Thaddeus Merriman, Thomas Mullaney, T. H. Whitney, Arthur Peacock, E. A. Roberts, C. S. Cooke, Arthur McKinney, J. H. Madden, Dr. Edward Levy, E. T. Fitzgerald, Fred Wilcock, J. O. Shipman, J. E. Cooper, H. J. Alexander, R. H. Jacobs, J. T. Kane, J. H. Myers, C. D. Searle, Edward Dalton, George L. Lucas.

W. T. Masengill has been appointed superintendent and general freight and passenger agent of the Pacific Coast Railway, with headquarters at San Luis Obispo, Calif. Mr. Masengill, whose appointment became effective on Feb. 1, replaced J. M. Sims, resigned.

Donald F. Hine has resigned from the editorial staff of the ELECTRIC RAILWAY JOURNAL and *Bus Transportation*. The recent death of his father made it seem to Mr. Hine to be necessary to return home and take up a part of his father's duties as general manager of Fishers Island Farms, Inc., Fishers Island, N. Y.

Henry C. Truesdall was recently reappointed a member of the board of street railway control of Toledo by Mayor Brough. His reappointment is for a term of six years, beginning Feb. 1. Other members of the board are W. W. Knight and David Goodwillie. Truesdall was one of the original members of the board, his term being the first to expire. He is president of the Union Savings Bank, vice-president of the Northern National Bank and secretary Standard Steel Tube Company.

Merrill B. Knox has joined the editorial staff of ELECTRIC RAILWAY JOURNAL and *Bus Transportation*. He comes to the McGraw-Hill Company from the Chicago Elevated Railroads, where, as student engineer for the past two years, he has worked in several departments and gained a well-rounded experience in the elements of electric railroading. He thus brings to the editorial staff first-hand knowledge of the policies and practices of one of the leading railway operating organizations of the country, which has also been among the most progressive in taking up the bus. Mr. Knox will make his headquarters in the Chicago office of the JOURNAL. After graduation in 1920 from the Massachusetts Institute of Technology, department of mechanical engineering, Mr. Knox was for a short time employed as designer in the gas power engineering department of the International Harvester Company, leaving this position to enter the railway field. He received his early education in the public grade schools and the R. T. Crane Technical High School of Chicago, later continuing a junior college course at Crane. After Mr. Knox was graduated from the Crane School and previous to matriculating at "Boston Tech" he was employed in the signal department of the Chicago & Northwestern Railway. During the war Mr. Knox served as seaman, second class, U.S.N.R.F., stationed at Boston. He was born in Goshen, Ind., Nov. 17, 1896.

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Petroleum Activities Countrywide Through Expansion of Texas Company

What is known as "the complete cycle" in the petroleum industry has now been completed throughout the United States by the Texas Company, producers of Texaco petroleum products. This complete cycle includes production, refining and marketing facilities, and the Texas Company now has facilities in all three phases from coast to coast and from the Gulf of Mexico to the Great Lakes. This complete cycle has been achieved by the recent developments and expansion of the Texas Company in the Far West, which was the link needed to make its activities countrywide. The production is from the company's wells in the Salt Creek Fields in Wyoming and the refining facilities have been accomplished by the erection of a splendid new refinery at Casper, Wyo. Along with these production and refining facilities has been the organization of a Western sales department, with headquarters at Denver, Colo., and the establishment of stations and other marketing equipment throughout the new territory. Fred W. Freeman has been named as general Western manager and H. W. Dodge has been appointed Western sales manager.

Interurban to Replace Rotaries for 60 Cycle

The Cleveland, Southwestern & Columbus Railway has closed a contract for the purchase of 60-cycle power to supply its entire railway and lighting and power service. This will mean the abandonment of its present 25-cycle power plant at Elyria, Ohio, and changes in its railway substation equipment to receive and use 60-cycle power. A contract for the power has been placed with the Ohio Public Service Company, which has a generating plant at Lorain, Ohio, in which plant considerable additional capacity is being added, and a modern plant at Melco, which is near Mansfield, Ohio. That company has transmission lines into Mansfield, Ashland, Lorain, Elyria and Berea, all points on the lines of the railway.

The plan is to purchase power at four different points on the railway property, namely, Elyria, Berea, Mansfield and a new additional substation which will be known as Chestnut. The power company will supply 22,000-volt, 60-cycle service direct into the present 22,000-volt lines of the railway, as this is the standard distribution voltage of both companies.

The railway will continue in use its 25-cycle transformer equipment for operation on 60-cycle service, but will replace all the present 25-cycle rotary converters with six-phase, 60-cycle machines. In making this change it is planned to equip four substations for full automatic operation and seven substations for semi-automatic operation, the equipment that is being specified for semi-automatic operation being such as is necessary to protect the station and to shut down the rotary in case of power failure, trouble within the station, and at night after the service is off the lines, the station being started manually by the agent.

The reason for making the change to 60-cycle service is that the company is faced with the prospect of extensive additions to the present equipment, building a new plant or the purchase of power. The location of the old plant has not the water supply to permit the development of a large plant, and the economic solution of the problem is to buy the power needed for the system, which is available only as 60-cycle power.

Dates of Foreign Trade Meeting Changed

The dates on which the Tenth National Foreign Trade Convention will meet in New Orleans have been postponed to May 2, 3, 4, 1923, according to announcement which has been made by O. K. Davis, secretary of the National Foreign Trade Council.

The convention will devote special attention to the European situation, the part played by imports in our national life, and transportation by rail and water. Group sessions will deal with the practical details of export sales management, finance, credits, and advertising, with particular consideration to problems affecting the Gulf Coast and the Pacific.

Metal, Coal and Material Prices

Metals—New York	Feb. 6, 1923
Copper, electrolytic, cents per lb.	15.00
Copper wire base, cents per lb.	17.125
Lead, cents per lb.	8.00
Zinc, cents per lb.	7.30
Tin, Straits, cents per lb.	40.50
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$8.00
Somerset mine run, Boston, net tons	3.925
Pittsburgh mine run, Pittsburgh, net tons	3.125
Franklin, Ill., screenings, Chicago, net tons	2.625
Central, Ill., screenings, Chicago, net tons	1.625
Kansas screenings, Kansas City, net tons	2.50
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.	7.25
Weatherproof wire base, N.Y., cents per lb.	17.125
Cement, Chicago net prices, without bags.	$2.05
Linseed oil (5-bbl. lots), N.Y., cents per gal.	92.50
White lead, (100-lb. keg), N.Y., cents per lb.	12.75
Turpentine, (bbl. lots), N.Y., per gal.	$1.44

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Rolling Stock

Miami (Fla.) Traction Company recently purchased four new cars from the J. G. Brill Car Company.

New Brunswick Power Company, St. John, N. B., will purchase twelve new safety cars for one-man operation on the streets of St. John and suburbs.

New York & Queens County Railway, Long Island City, N. Y., has put into service twelve new one-man cars, the order for which was placed some months ago.

Connecticut Company, New Haven, Conn., suffered the loss of its carhouse in Meriden recently at an estimated loss of $150,000. Eight passenger cars and eight work cars were destroyed with the buildings.

Augusta-Aiken Railway & Electric Corporation, Augusta, Ga., expects to put on fifteen new one-man cars for service in Augusta. It is expected the cars will be in operation by March 1. The cars were purchased from the National Safety Car & Equipment Company and were built by the Cincinnati Car Company.

Chicago, North Shore & Milwaukee Railroad, Highwood, Ill., has received the twelve new safety cars for use on the Milwaukee city line operated by this company. These are equipped with plush seats, double doors and are 4 in. wider than the single-door safety cars which the company has in operation in Waukegan, Ill.

Washington Railway & Electric Company, Washington, D. C., recently ordered ten more one-man cars. This makes a total of forty that will be added to the company's rolling stock during 1923. Some time ago an order was placed for thirty new cars of the most modern, pay-within type to be delivered early during this year.

Cleveland (Ohio) Railway will soon buy fifty new motors and trailers. A resolution asking the Cleveland City Council to authorize this has already been introduced and is now in the hands of the Council street railway committee. Fifty new motors are already on the way for the company. Some of these will be in service by March 1. Not a single new car was added to the company's property during 1922, while thirty-eight were retired from service during that year, leaving 1,478 revenue cars owned by the company at the start of this year.

Track and Roadway

Wichita Falls (Tex.) Traction Company has begun the extension of its lines about ½ mile. Workmen were placed on the job the next day after the franchise was arranged.

Los Angeles (Calif.) Railway will extend its Seventh Street line. About $50,000 will be spent in extending the line from Hoover Street west to Vermont Avenue. The work will take six months to complete.

New Brunswick Power Company, St. John, N. B., will lay new heavy rails on three streets, according to a recommendation of M. A. Pooler, general manager of the company.

Puget Sound International Railway & Power Company, Everett, Wash., has asked the County Commissioners of Snohomish County for permission to install new siding and wye track at Lowell, as part of certain contemplated changes in service on its Lowell line outside the city limits. The changes include additional track facilities and installing 195 ft. of siding.

Trade Notes

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., will equip the new safety cars for installation on the city lines in Lima with two Westinghouse 508-A motors and double end control.

J. G. Brill Company, Philadelphia, Pa., at a special meeting of its directors declared a dividend of $1.25 on the common stock, payable March 1. This is the first dividend on common since 1908, when $2 was paid.

Differential Steel Car Company, Findlay, Ohio, through its officials, announced on Jan. 26, that it would employ more men, as soon as steel deliveries speed up. The company has added traction snow plows to its list of products.

Paul T. Buckler, for fourteen years with the Detroit Stoker Company as manager successively of the Pittsburgh, Cleveland and New York offices, is now with the Power Specialty Company, for which he is assisting the New York office of the company in the sale of Foster superheaters and economizers.

General Electric Company, Schenectady, N. Y., has received an order from the Philadelphia Rapid Transit Company for equipping the 520 new cars referred to in these columns of Jan. 27. The order consists of 1,040 G. E. 275-A railway motors, two motors for each car. In addition there will be control equipment and an air compressor for each car. The cars are to be manufactured by The J. G. Brill Company.

Royal E. Terhune has been placed in charge of the northern New Jersey sales territory of the Uehling Instrument Company, Paterson, N. J., manufacturer of CO_2 recorders and other power plant equipment. Mr. Terhune was formerly associated with the Uehling Laboratories, and is, therefore, well qualified to co-operate with power plant operations on the important subject of power plant economy.

Ohio Brass Company, Mansfield, Ohio, announces that Tommy Jones has joined the sales force and will make his headquarters in Dallas, Tex. He was formerly with the Electric Appliance Company. William F. Whiteside has been appointed specialist in steam road electrifications. He was formerly with Westinghouse & L. M. Keating, connected with the Mansfield office for a number of years, has been transferred to the outside sales organization. He will take up his new duties about March 1, with offices in El Paso, Tex.

The American Engineering Company, Philadelphia, Pa., well-known manufacturer of Taylor stokers and A-E-CO marine auxiliaries, has taken over the Standard Crane & Hoist Company and the patent and manufacturing rights to the monorail electric hoist with the low headroom formerly known as the Standard. H. S. Valentine, chief engineer of the Standard Crane & Hoist Company, brings to the American Engineering Company his more than twenty years experience in the design and manufacture of hoists and the solution of material handling problems in practically every industry. He is directing the sales and supervising the manufacture of the hoists. The American Engineering Company has reorganized its No. 1 plant to accommodate the work of building and testing the hoists on a commercial basis and is now manufacturing them in quantity.

The Standard Conveyor Company, North St. Paul, Minn., has announced that it has acquired by purchase all the rights, titles and patents pertaining to the well-known "Brown Portable" line of portable and sectional piling, elevating, conveying, loading and unloading machinery for the handling of packed and loose materials. This line of machinery has been manufactured by the Brown Portable Conveying Machinery Company at North Chicago for ten years. Until further notice the plant will be continued in operation by the Standard Conveyor Company, and all inquiries and correspondence regarding "Brown Portable" products should be addressed to Standard Conveyor Company, "Brown Portable" Products Plant, North Chicago, Ill. The company also states that the organization which has so successfully developed portable conveying machinery, known the world over as the "Brown Portable" products for their merit, will continue with the Standard Conveyor Company in this line of work in which they are the originators.

New Advertising Literature

Irving Iron Works Company, Long Island City, N. Y., has issued Catalog 3A85, which tells how accidents are prevented by the non-slipping surface of the subway.

Quigley Furnace Specialties Company, New York, N. Y., has issued bulletin No. 53, describing and illustrating a method of reconstructing and patching boiler furnace walls. This method makes use of old furnace linings which are crushed and then mixed with Hytempite to bond the crushed material.

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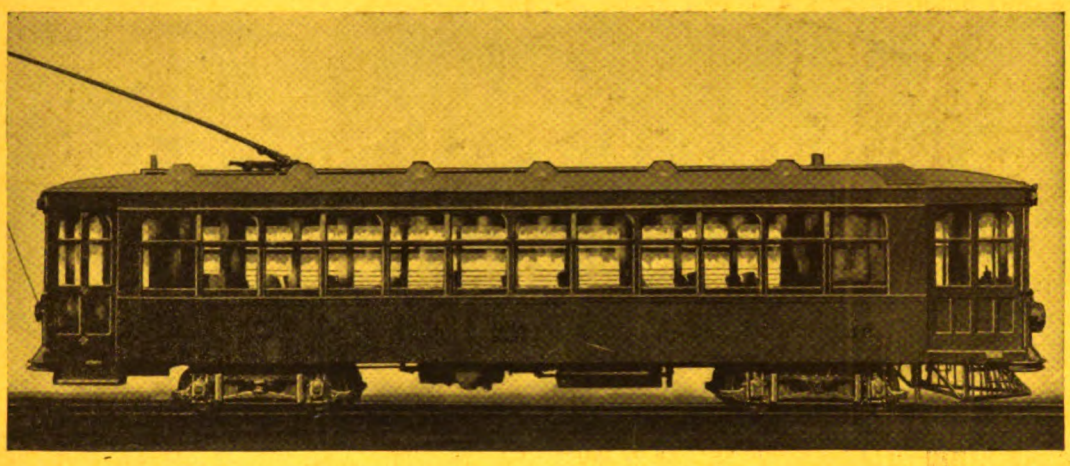
Light-Weight Interurban Cars "Ride Perfectly at any Speed"



33,000-lb. Interurban Car built by The G. C. Kuhlman Car Company for high-speed service

So says Superintendent of Transportation and Equipment, Western Ohio Railway Company, before Central Electric Railway Association

Mounted on Brill Low-level trucks No. 77-E, the ten light weight interurban cars built by our Kuhlman Plant for the Western Ohio Railway Company are very satisfactorily meeting the high-speed schedule requirements and according to this railway official "ride perfectly at any speed."

The results of their operation for the past few months are discussed in detail in the January 13th issue of the *Electric Railway Journal.*

Included among the advantages which these cars have demonstrated to this railway company are

Worthwhile Saving in Power
Lower Track, Car and Equipment Maintenance
Easier to Maintain High-Speed Schedules
Fewer Serious Accidents

Write for complete information to

THE J. G. BRILL COMPANY
PHILADELPHIA, PA.

AMERICAN CAR CO. ST. LOUIS MO. — G.C. KUHLMAN CAR CO. CLEVELAND, OHIO. — WASON MANF'G CO. SPRINGFIELD, MASS.

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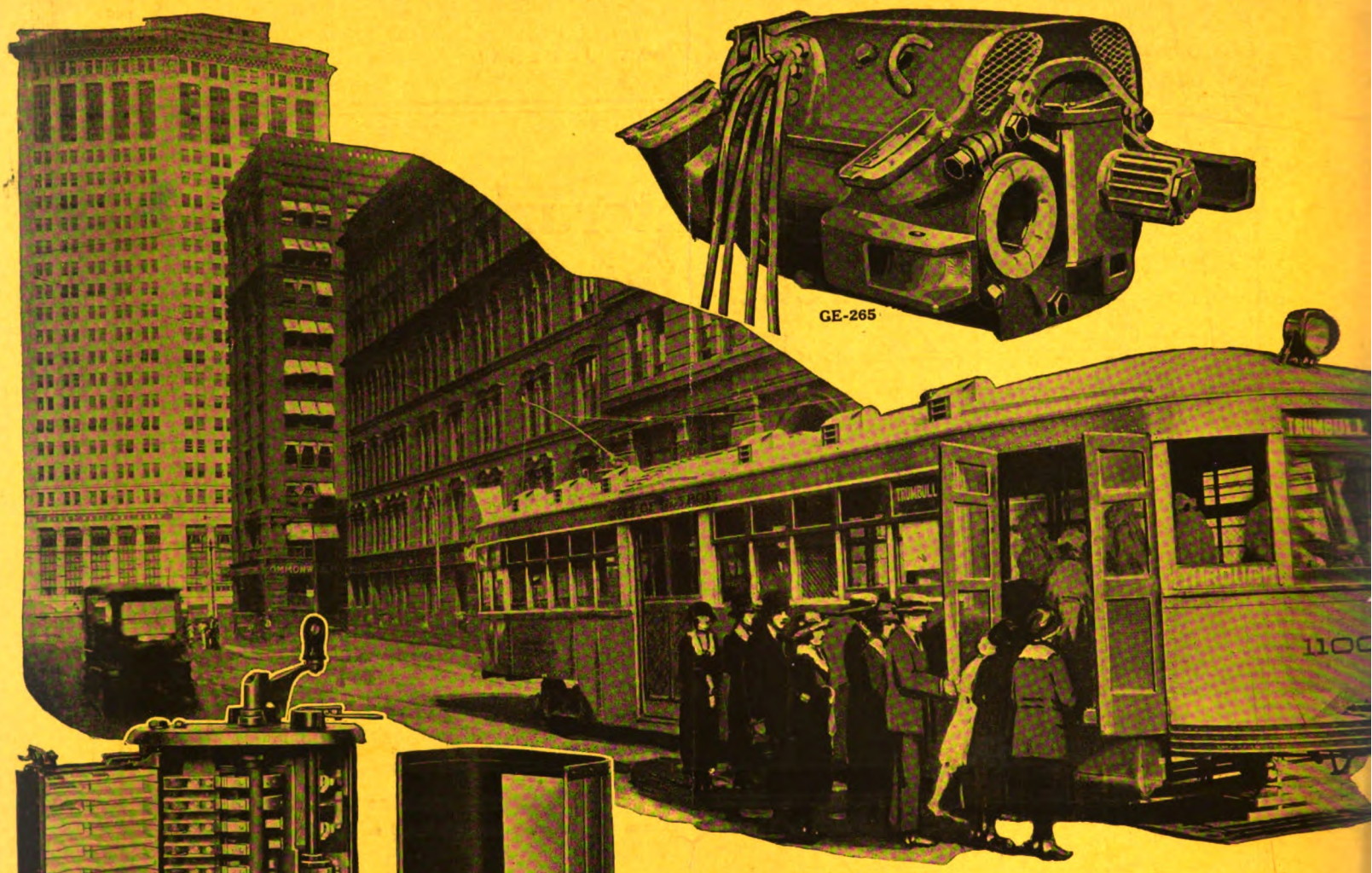
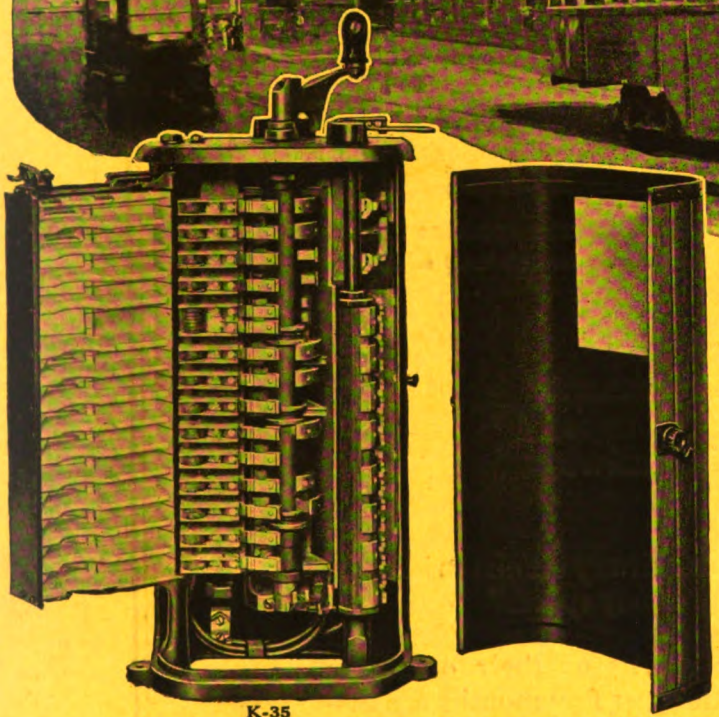
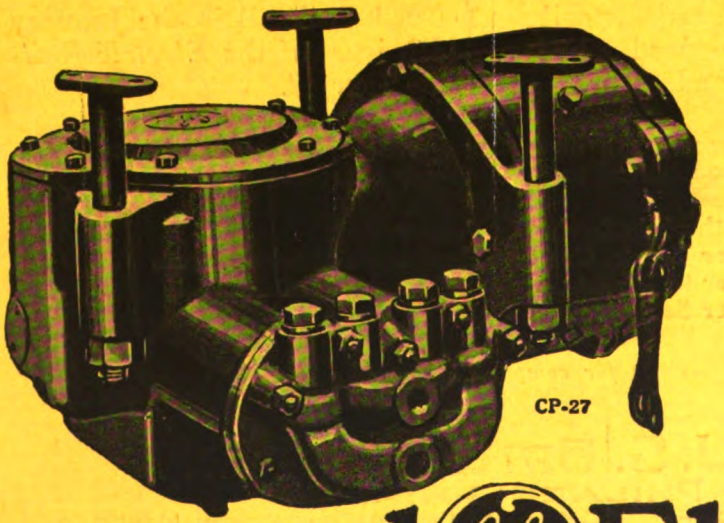




Detroit's Light-Weight Cars

The re-habilitation of the Detroit Street Railway is being undertaken with the most modern equipment. GE-265 Motors, K-35 Controllers and CP-27 Compressors are on 200 new, light-weight double-truck cars now in operation. The same motive equipment on 50 other cars has given this road successful service for more than a year.



General Electric Company

General Office
Schenectady, N.Y.

Sales Offices in
all large cities

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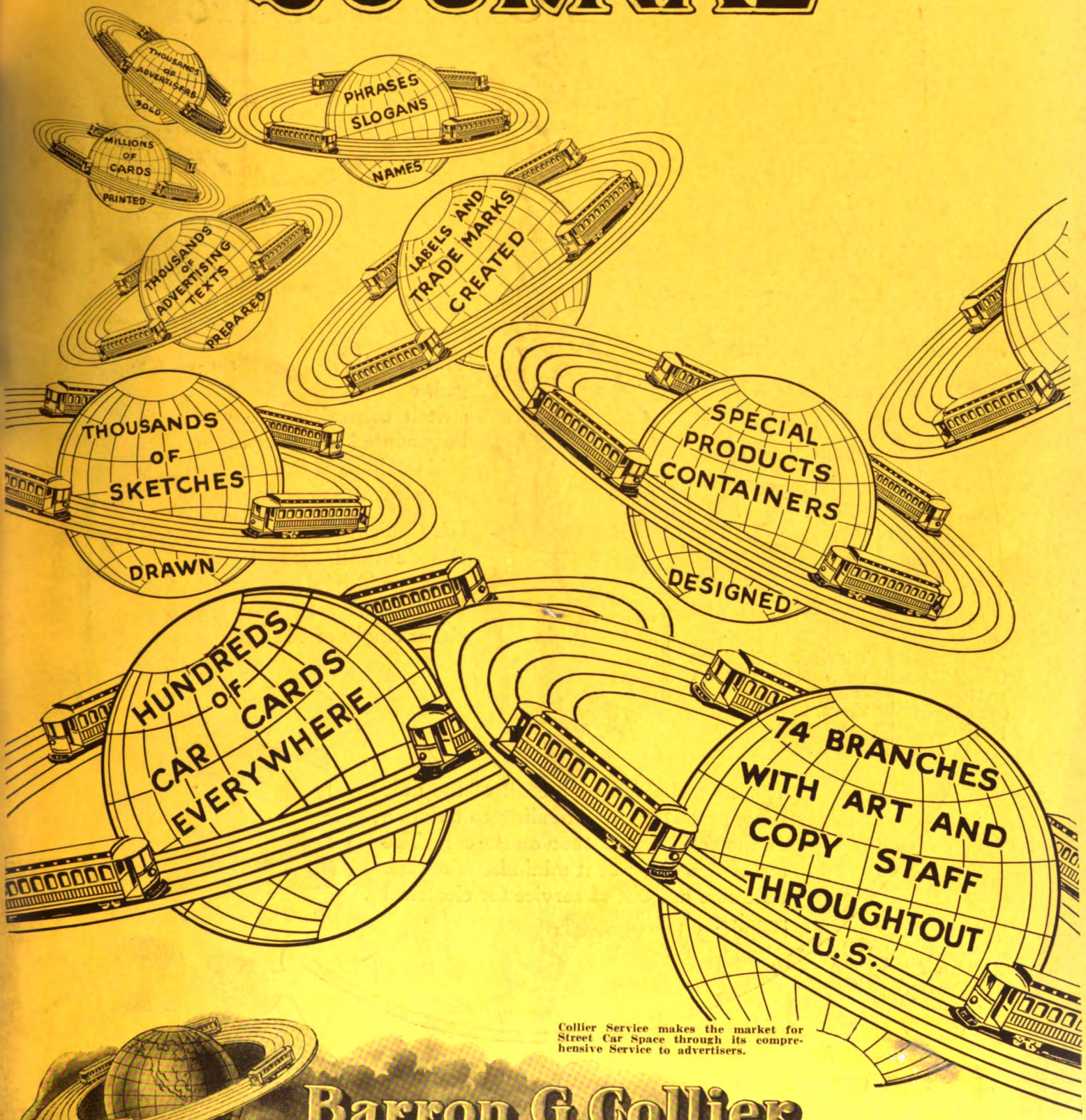
ELECTRIC RAILWAY JOURNAL



Collier Service makes the market for Street Car Space through its comprehensive Service to advertisers.

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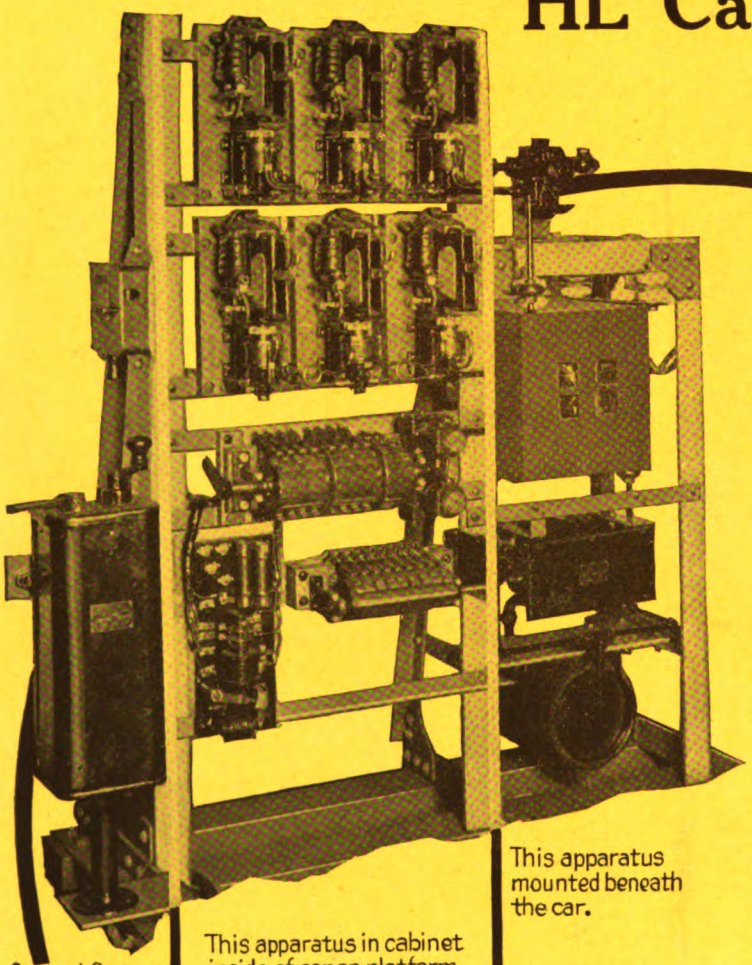
For Low-Floor Cars

HL Cabinet Control



This apparatus mounted beneath the car.

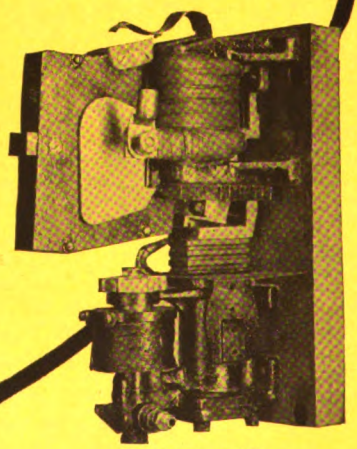
This apparatus in cabinet inside of car on platform, or under seats, or beneath the car floor.

Control Switch and Master Controller on platform.

This is a light-weight, rugged, easily accessible unit-switch control, which can be mounted in one or more cabinets located either above or beneath the car floor.

HL Cabinet Control meets the demand for a light-weight, multiple-unit control for low-floor cars, operated either singly or in trains.

The control elements are all of the unit type, permitting overhauling to be done on the bench rather than on the car. The use of this equipment minimizes the time that cars are out of service for electrical repairs.



Switch Unit

MEMBER AMERICAN ELECTRIC RAILWAY ASSOCIATION AERA

Westinghouse

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ELECTRIC RAILWAY JOURNAL

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Company, Inc.

HENRY W. BLAKE and HARRY L. BROWN, *Editors*

Volume 61 New York, Saturday, February 17, 1923 *Number* 7

Midyear Conference a Constructive Gathering

A SPLENDID meeting, instructive, inspiring and encouraging, is the impression one has in reflecting upon the Washington midyear conference yesterday. J. N. Shannahan and J. H. Hanna, chairmen respectively of the program and dinner committees, may indeed be content with the success of their efforts in arranging the meeting, for which the industry is deeply indebted to them. The addresses not only represented the thinking of some of the best minds of the country on the topics considered, but the men who uttered these thoughts were of such position in public life that the expression of their views gave ground for encouragement that these views may some day prevail—to the deserved relief of the electric railways. A better appreciation of the good in state regulation was manifested, and, on the other side, a better understanding of what *is* good regulation.

Another outstanding value of the convention was the far-reaching impression made by devoting an entire afternoon to the subject of taxation, with which the electric railways were admitted by public authorities to be particularly burdened. This was the first time that taxation has been made a subject of the midyear conference program, and it developed information as to the magnitude of taxes, taking all forms together, that was startling even to many railway men. Some very pertinent suggestions were also made to remedy the situation, as noted in the report of the meeting.

The Electric Railways Are Not Without Friends

COULD any one retain a feeling that the electric railways are without friends among the representatives of the people after sitting through the midyear conference and dinner? There was a warm message from the President of the United States, who also received at the White House a body of the delegates representing the convention. The Vice-President of the United States came to the first session of the conference and made an address that showed his appreciation of the great public service being performed by our industry. The former Vice-President of the United States and the Secretary of the Interior honored the railway men with their presence at the banquet and made friendly and constructive addresses. The president of the national association of public utilities commissioners made the principal address at the morning session, and several other state commissioners took part in the discussion. A State Senator of New York was the principal speaker at the afternoon session and it was he who surprised many of the railway men with the information that in New York State the electric railways are paying 44 per cent of their aggregate net income in taxes of all forms, frankly pointing to the injustice of this situation. In this figure only the roads showing a net profit are included.

Truly, could there be any greater expression of the respect with which the great electric railway industry is held or the appreciation of the tremendous public service it performs?

State Regulation a Development of Modern Utility Conditions

IT WAS extremely appropriate that at a time when some states are talking about changing from state to local regulation of utilities, the American Electric Railway Association should make "Regulation" one of the two main topics for its midyear meeting. Many persons outside of the industry and even within it do not realize the great development in regulatory practice which has taken place in the short time, less than twenty years, during which the present form of commission with broad powers over utilities has existed in this country.

The statement has often been made that a principal reason for the appointment of the original state regulation was to curb the rapacity of certain utilities, but that changing conditions found the commissions obliged, if they were to carry out their duty of seeing that utility service was supplied at a reasonable charge to the public, to raise rates more often than they had to lower them. While this may have been true to some extent in certain states, it is an incident only of the very much greater work which has been accomplished since commission rule became general and which has resulted in the establishment of the principles of commission government. This has meant not only what the relations should be between the utilities and the public, but the manner in which these relations should be put into force and maintained by the commission.

Some pioneer work along these lines had been done, it is true, by the Interstate Commerce Commission, but state problems are not always like national ones, and where a difference of practice was required because of this fact, the best method had to be determined. The practice of the state judiciary also furnished some help to state commission practice, but probably even less in amount than the Interstate Commerce Commission, because while a state commission acts in part as a judicial body, it also has many executive functions, and often like a prosecuting officer has to take the initiative in making investigations.

Perhaps the state commissions which have been the most successful in their work have been those which have realized that the various commission laws have created a new kind of state agency, partaking of both legislative and judicial attributes, to settle certain ques-

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tions relating to utilities. In consequence, they have developed to a considerable extent their own forms of procedure for making investigations, though guided in their conclusions by established judicial and commission precedents. While this new branch of our political system was a somewhat hazardous experiment, it has done well, and the results should be better as time goes on.

One definite function of a commission is that of stimulating a better understanding of utility problems by the public and of the public's problems by the utilities, before conditions get strained over matters which easily could be settled by agreement. This is one of the main points stressed in the paper by Mr. Lewis at the Washington convention. If the public can be made to understand that any particular cost or rate is reasonable, according to Mr. Lewis, it will be accepted. Here is where action by an impartial body is of value. Its opinion should carry weight with both sides.

From a Time of Pressure to a Time of Prosperity

ALMOST encouraging note was sounded as regards business in general and that of transportation in particular in the morning session by Vice-President Coolidge, who honored the association by his presence Friday. The Vice-President was particularly qualified to talk to the members of the association, because, while Governor of Massachusetts, he had to give special attention to the electric railway problem of that State at a time when conditions were most acute. His ability satisfactorily to solve these problems is being shown by the excellent condition of electric railways of that State at present. Like every address which Mr. Coolidge makes, it was well worthy of the high office which he holds and shows him a close student of national conditions.

The address of Mr. Coolidge shows that he believes the prosperity of the country to be closely allied with that of its transit facilities, and the large business being done now by the steam railroads is indicative of an industrial change from a time of pressure to a time of prosperity. In this condition the electric roads should share.

Light on the Tax Situation May Lighten the Taxes

TAXATION has been in force since the governments of prehistoric times were established, but it seems to have progressed very little as a science since the earliest days. While it is true the collection of taxes is not now farmed out as in Roman times, the taxation of today is most crude, inequitable, discriminatory and intricate, being based more on the principle of raising the tax from the persons who could not escape rather than those who are best able to bear it. As Senator Davenport pointed out at the Washington meeting this week, these crudities and inequalities have not, up to within recent years, caused a great amount of injustice in this country. This has been true only because the needs of government have not been great and the tax burdens have been light. The country has now passed into an era, however, when so many expenses are being defrayed by government that some changes are most necessary.

Incidentally the study of the taxation conditions in New York State by the legislative committee, of which Senator Davenport was chairman, showed that of all of the business enterprises of the state, the utilities were taxed the highest, and among the utilities the greatest burden, when measured as a percentage of either gross or net earnings, fell upon the electric railways. To make matters worse, as Senator Davenport pointed out at Washington, these properties as a rule are those least able to pass this tax on to their customers because many are operating under fares established by franchise agreement.

While the conference on this subject at the Washington meeting did not bring out any solution, it did the next best thing, which was to show that there was a condition which should be remedied. One step in advance would be to carry out the suggestion made at the meeting that a study similar to that conducted in New York be made in other states. Another and one which any company can carry out is for it to determine exactly what its own taxes aggregate, including the paving burden, and make this point clear to the public, especially in connection with any rate increase. The public can then realize what part goes to the company and what are taxes.

By thus bringing light to bear on the real tax situation as it confronts the industry, the midyear conference may have served as the impetus for remedial measures.

A Change from State to Local Regulation a Backward Step

IF REPORTS from Albany are correct there is growing opposition in the Assembly to Governor Smith's plan to turn the clock back in the State, as regards utility regulation. The Governor reiterated his program at a meeting on Feb. 3 of the New York Board of Trade, at which he was the invited guest. He spoke again of the large number of changes which there had been in the personnel of commissions since 1907, about fifty-six different commissioners having served during that time. He also spoke of municipal operation of the water supply as an argument in favor of the municipal operation of the transportation utilities. He failed to point out, however, that the operating problems of the water supply systems and street railways are entirely different, and that if there have been frequent changes in the commissions it is the fault of the law by which such changes can be made, not of the principle.

If New York State changes from state to municipal regulation of its utilities it is safe to say there will be an outcry from local politicians all over the country for what they will call "home rule" over these same corporations. Naturally the local politician will want to get these utilities again under his thumb, but such a plan would tend to bring a return of the abuses which existed when this method of utility regulation was being followed before.

Governor Smith speaks about State regulation as involving divided responsibilities. Actually, when a board of aldermen or a common council is in charge of regulation, responsibility is much more divided than where the regulation is in charge of a State commission. Moreover, with a State commission acting under definite rules, with proceedings conducted entirely in public and with politics excluded, there is much more chance for both utilities and public that justice will be administered. With the introduction of the Governor's bill for New York City, developments may be expected.

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Regulation from the Viewpoint of a Commissioner*

Street Railways Are a Necessity—The Public Is Entitled to the Lowest Rate Consonant with an Adequate Return on the Value of the Property Used—Customer Ownership Desirable—There Should Be Legislation Against Unfair Competition of Motor Buses and Trucks

By Dwight N. Lewis
Member Iowa Railroad Commission and
President National Association of Railway & Utilities Commissioners

STREET railway companies would have fared better and left a better taste in the public palate if there had been a carefully planned and executed system of educating the public to their financial needs. The American public means to be fair. But when following the war, wages were reduced and the utility rates, including car fares, remained at a high figure or were advanced, there was a fruitful field for the blatant demagog to sow his seeds of suspicion and hate. Regulating commissions were anathematized if they dared to permit an advance in rates. The question caused overthrow of a splendid state administration of utilities in one of my neighboring states.

It is not easy for a regulating commission to serve the people of its state honestly. The man who desires office rather than be honest is too numerous to be entirely ignored. He inflames the public mind against the utility and against the utility commission, and we have today state legislatures discussing the abolition of state utility commissions or fearful of extending their jurisdiction. On the other hand, utility companies are not always just. Some of them seem to think that regulating commissions have no thought but to follow popular demand, and that they recognize no function except to demand better service, at decreased rates. I know very many utility commissioners, and I know no finer, fairer set of men may be found in the public service. The utility commission is, above all things else, desirous of doing right, but to do right it must have the whole story.

Equally true is it that those representing the consumers of utility companies' products must be honest and sincere. If we could get both the operators of public utility companies and their patrons to understand that their interests are mutual, and that team work will produce enhanced service, at a reduced cost, most of the troublesome problems would be solved. Just a case in point. One of our transmission line companies furnishing light and power to many communities, under low contract rates, found, at the close of the war, that increased cost of fuel and other necessities had made a continuance of the rates impossible, without bankruptcy. The moment it suggested a raise there was an outcry and most decided objection. The public demanded

DWIGHT N. LEWIS
President National Association of Railway & Utilities Commissioners

to be shown. It appealed to our board and, although we have no authority over rates, our electrical engineer made a careful survey of the plant, with analysis of expense and earnings, finding that the cost of production was exceeding the rate charged. This was published in full by the transmission line company, was carefully examined by the public interested, and proper advance in the rate was actually agreed to by the consumers, and there was no court fight on rights of contract.

But the public must be shown.

CHANGED POLICIES BRING BETTER RESULTS IN DES MOINES

In my own home town the street railway company had for years been dealing at long range with city fathers and the riding public. There was a feeling, justified or not, that the management was too far removed from Des Moines and that the attitude of the owners was that Des Moines was a hick town out West somewhere and they would show those rubes who were running the street cars. It is hard to eradicate an ill sentiment in a day, and practically nothing was done to enlighten the public or to indicate to the car rider that the owners of the property cared a continental whether Des Moines people liked the way things were done or not.

When the people rose in revolt, no matter how wrongfully or rightfully, then the company sent diplomats. But there was still the patronizing air of the Eastern provincial toward this uncouth Western brother. And our folks on Main Street didn't like that, and said so. Well, you know how it was. But we are getting to understand each other better now. Every week a little folder is issued to the public, taking the public into the car company's confidence, telling of its finances, its plans, its hopes, with even some good jokes in it, and while none of us likes to pay an 8-cent fare, I hear very little "cussin'" of the street railway company, and the service is quite as good as a city the size of Des Moines has reason to expect. It is amazing to note the change in the attitude of the average man toward the company. Folks are fair, but when a question concerns public utilities, we are all from Missouri.

OPEN POLICY THE BEST

I have always insisted, when occasion has arisen, that public service corporations would have saved themselves much trouble, adverse criticism and oppressive laws if they had always been open, fair and square with employees and public. I know, and count among my friends, men who work for public service corporations in various capacities, trainmen, station men, motormen, conductors and others. They have discussed these matters freely with me. They have felt sometimes that their employers were not fair in discussing wage disputes; that they were concealing the real truth about their financial conditions. Sometimes they have come to me, and, when claims of unsatisfactory financial conditions made by managers of utilities have been confirmed, they accepted gracefully that which might have called forth a walkout. Such confidence must be had in utility companies that the public will feel absolutely safe in dealing first hand with such companies. I believe the greatest good a regulating commission can do is to bring about co-operation, mutual understanding and trust between the using public and the public service company, replacing suspicion with confidence, concealment with open understanding, and a frank, free, get-together policy all along the line.

As war seldom establishes a principle or adjusts a dispute, but, instead, leaves desolation and distrust to breed another era of hate, so complaints against public service corporations which must be decided by a utility commission seldom permanently settle anything, or bring about an era of mutual faith and understanding.

*Abstract of address presented at mid-year meeting of the American Electric Railway Association, Washington, D. C., Feb. 16, 1923.

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There is much demand today in states having utility commissions that utility regulation must go back to the municipality. "Home Rule" is the slogan. I believe, in large part, this is due to the tendency of recent years for Congress to centralize in Washington authority in so very many affairs. People are getting tired of long range regulation, and demagogs are taking advantage of this to bait utility companies, especially steam and electric railways. Nearly all this outcry is based upon the fare charged, and the man in whom the public relies, instead of helping to clear up the situation, is oftentimes found capitalizing for his own political preferment the prevailing unrest and dissatisfaction with transportation service and charge.

It is not easy for the public to understand that burdensome taxation of a street railway must be borne by the car rider. We think we have put one over on somebody who owns the stock in an electric street railway when we require such company to pay for the paving between the rails and as far on either side as we think we dare go. The public should be educated to the fact that that misguided policy is one of the reasons for high fares. A town in my state, that could scarcely support its little street car system, undertook to require a lot of paving in the streets upon which the cars were operated, making the usual provision for the street railway company to pay the major portion of the bill. The street car company notified the City Council that when the paving was started on that basis the car system would be abandoned. An enlightened public, desiring car service at reasonable fares, will not sanction unjust and burdensome regulations, either as to taxes or service, when it understands that those burdens must be reflected in the fare paid for a ride. State laws making burdensome requirements as to paving should be repealed, and the regulating power should be permitted to determine the extent of the car company's liability, if any, for any paving on the streets upon which street cars are operated.

Principles of Regulation

Three fundamental principles must forever be used as guides in the regulating of utilities:

1. The people are entitled to good service at reasonable rates.

2. The public service company is entitled to a fair return upon the value of the property used in providing the service.

3. Competition in public utilities is waste, which must be paid for by the people.

It is a notorious fact that utility companies, including, of course, street railways, went through the period during the latter part of the war and the years immediately following without adequate returns on their investments. It is only recently that the credit of utility companies has, in a measure, been restored. This, of course, is in the public interest, and I believe utility commissions should honestly endeavor to see that, while proper and adequate service is provided, such rates and fares are authorized as will restore the confidence of the investing public in the securities of such utility companies.

It is estimated by competent authority that the total capitalization of street railways at the present time is $5,750,000,000, of which $2,500,000 is represented by stock. These stocks and bonds are largely owned by people who have invested their savings in them, and they are entitled to consideration by the managers of the companies and the utility commission or other regulating body. Twenty-three city railway properties valued by public service commissions or other public authority in 1919 indicated a property value of $725,096,077, as against $794,594,660 total capitalization, an excess of capitalization over value of about 11 per cent. Statistics compiled by President Emmons of your association for 1922 indicated a hopeful trend.

High Spots Emphasized by Mr. Lewis

The utility commission is, above all things else, desirous of doing right, but to do right it must have the whole story.

Folks are fair, but when a question concerns public utilities, we are all from Missouri.

Such confidence must be had in utility companies that the public will feel safe in dealing first hand with such companies.

The greatest good that a regulating commission can do is to bring about co-operation, understanding and trust between the public and the public service company.

The motor bus competition has been, in some cases, most disastrous to electric street and interurban railways. Nearly two years ago, in speaking before our state electric railway, light and power association, I advocated such legislation as would protect the public against the unfair competition of motor bus and truck. The bus and truck usually insist on paralleling, as near as possible, the electric interurban railway. To my mind, this is neither fair to the public nor just to owners of the interurbans. Already a committee of our State Senate has been in to consult our commission several times in the drafting of a bill properly to supervise and tax the motor bus and freight truck using the public highways. The cities out our way have had their fling with city passenger buses, and I believe are through with them, except, perhaps, as feeders for car lines, which I am glad to note your association believes in and advocates.

The motor bus should not be driven out of commission, but should be as strictly held to account as are street railways and should bear its proper share of the public expense. No legislation should be enacted that will prevent establishment of needed and desirable motor bus and truck service for the public good, but most assuredly established investment in street railways and interurbans should be safe guarded in the interest of good service to the public, against the piratical and destructive competition that has been so prevalent everywhere.

As my commission is not a regulating commission for street railways, I have stood on the side lines and watched the game. And like the man on the side lines, I have thought I could see where the plays might be improved. But I realize how different it is when one is in the thick of the actual conflict. Then decisions must sometimes be made and acted upon in the swift movements of contending forces.

Fundamentals Stated

Street railways are now a public convenience and necessity, and, so far as I can see, will be for many years to come.

The public is entitled to the lowest rate consonant with adequate return upon the value of the property used.

Burdensome paving and other taxes should be removed by competent authority, in the interest of the car rider, so that he may have a lower fare.

There should be the utmost confidence in the inherent virtue of fair play in the American public, and there should be no concealment of operating results.

The public and the utility company should be educated to know that each is dependent on the other for the enjoyment of material blessings, and team work will accomplish what constant heckling by either side can never attain.

Excessive dividends, stock and otherwise, by some of the great corporations of the United States have led men to believe that all corporations, including public utility companies, are getting enormously rich at the expense of the common consumer. The enormous profits gouged by some concerns out of the necessities of the people furnish the text for many a philippic against the public utility company, and against all aggregations of capital for any purpose whatsoever. In despair, some honest students of the question see the only solution in public ownership and operation. And, indeed, some owners of utility company stocks and bonds would welcome a sale to the municipality as a blessed relief from the bickerings and political fights necessary to go through to establish the sanctity of property rights.

I am glad utility companies are urging their employees and their customers to invest their savings in stocks and bonds of such companies, with plans for easy payment. It is the kind of public ownership in which I most heartily believe. With the stocks and bonds eventually in the hands of the workers and the users, and the profits of the operation (and there would be profit then) going to such persons, most problems of public relations would be solved.

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Railway and Motor Bus Regulation*

By Bringing Aggrieved Parties Face to Face, Many Troubles Which Appear Insurmountable at First Will Fade Away

BY CHARLES C. ELWELL
Public Utilities Commissioner,
State of Connecticut

IT IS almost universally conceded that all organizations formed to supply a public utility, including transportation by rail and motor cars, should be under public supervision. For the purpose of regulating public service companies there have been established in nearly every state public utility commissions, which are clothed with power to make rules and orders which, if unsatisfactory to the parties in interest, may be taken on appeal to the courts.

A well-balanced commission will endeavor to limit the number of formal petitions and orders, acting preferably, as far as possible, as a medium through which differences may be amicably adjusted. Joint conferences with the commission and aggrieved parties bring the contestants face to face. This results often in a fading away of troubles and all parties separate with a much better understanding. Experience has shown that the utilities frequently need the advice and help of the commission, and in many cases what seemed to the utility at the time to be an unreasonable requirement has proved of great benefit.

Among the most important of our public utilities are the electric railways. Their systems are made up of numerous short lines, originally constructed to serve small communities. By the union of these short arteries of transportation we have in this country today a number of big corporations. The greater their number the more difficult the problem of the commission, as each management possesses very strong views as to the best method of handling engineering and transportation problems. It devolves on the regulating body, in order to secure uniformity, to settle questions of method and manner of construction, to rule on the type of equipment to be used, approve standard signs and signals and, as far as possible, establish uniform rules for operation, to investigate accidents and make suggestions with a view to preventing similar accidents in the future. The most perplexing of all the problems confronting a public utilities commission is establishing rates that will give sufficient revenue to operate the utility, pay a reasonable return on the capital that is invested and at the same time satisfy the public.

During the recent war the costs of labor and material advanced so rapidly that the fare rate did not keep pace. Electric railways all over the country operated at a loss, while hundreds of miles of road which had been profitable previously were either forced into receivers' hands or abandoned altogether. In 1920 there were being operated by companies in Connecticut 776 miles of electric railway; since 1920 65 miles have been discarded and at the present time 120 miles are being operated by receivers. People objected to paying a higher rate of fare than 5 cents with a transfer privilege, making it possible in many cases to ride 15 miles or more for one fare. This was not only unjust to the company but to the short rider as well. Many plans were discussed by our commission and the companies with a view to establishing rates that would correspond more nearly with the miles traveled, and several tests were made, but all proved unprofitable, unpopular and difficult to operate.

CHARLES C. ELWELL
Public Utility Commissioner,
State of Connecticut

A return to the original fare limits followed a trial of the second distance tariff scheme and the rate advanced to 10 cents, resulting in increase of revenue, which, after fifteen months, was found sufficient to warrant a reduction to a token fare of 8½ cents. A further modification is expected on April 1, when the token fare will be lowered to 7½ cents. The State Legislature of Connecticut in 1921 relieved the electric railways by reducing taxes, bridge and paving obligations, and further by declaring jitneys common carriers and placing them under the jurisdiction of the Public Utilities Commission.

The jitney made its appearance in Connecticut in 1915, and for about six years ran over the streets and highways, and the general public as well; they were unrestricted and unregulated; they operated when and where they pleased, and finally became so numerous that they fought among themselves, seeking in some way to reduce their own ranks in order that a reasonable number might survive. The routes chosen by the jitney usually paralleled the street railway and steam railroad lines, causing a substantial decrease in the revenue of both. Two years ago the perplexing question of regulating this seething mass was placed in the hands of our commission; hearings on the question of public convenience and necessity were held in all parts of the State, resulting in a reduction of the number of jitney operators from 1,000 to 225. Today, in place of reckless, independent and irresponsible drivers, we have a very respectable lot of jitney managers, including such men as Lucius S. Storrs, whom you all know is a past-president of this association, and I venture to paraphrase the immortal bard and say, To what base use we mortals come at last!

Mr. Storrs has read the handwriting on the wall and very wisely is "getting in out of the wet," realizing that there is a public need and demand for bus service, which can better be provided by the trolley management than by a large number of jitney operators.

The Public Utilities Commission has a superintendent of its jitney department, who has general charge of their regulation. At the present time there are eleven companies or corporations and forty-nine single operators running jitneys in Connecticut. All have been given certificates by the commission when as a result of hearings it developed that public convenience and necessity required them. These certificates are good until revoked by the commission for cause. There are posted in each car, for the benefit of the public, the rates of fare, schedules, etc. All operators are licensed and governed by various commission rules. By virtue of the law, electric railways may operate buses without a certificate from the commission. Our jitney operators have a state organization, headed by a president who is a lawyer. Different districts of the state are represented on the board of directors, which meets monthly. It was prophesied there would be bills presented to the Legislature now in session providing for the repeal of the jitney law or a modification whereby many of the old jitney lines might be restored. The limit set for presenting bills has passed without any such requests appearing. The few bills affecting jitney transportation which have been introduced were first submitted to the commission for its criticism and approval.

MOTOR BUS OPERATION WILL INCREASE

I do not look for any further extensions of street railway transportation, believing that buses will be employed on streets and highways which are built and maintained by municipalities. People want to retain the street railways, but they do not frown on the jitney, some communities even showing a marked preference for such means of transportation.

As an operating railroad official, when unhampered by those above me, I was fairly successful in getting close to the patrons of my division, and now as a commissioner I am constantly suggesting a closer union of the utility companies with the public. This unity cannot be accomplished by following any

*Abstract of address presented at mid-year meeting of American Electric Railway Association, Washington, D. C., Feb. 16, 1923.

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fixed line of procedure, but in all cases, in order to obtain the best results, the initiative must be taken by the highest official of the utility, if he expects to win the confidence and co-operation of those who, in the case of railways, furnish the money to keep the wheels turning.

Many of the "big bosses" are too old-fashioned and must be "born again" before they can expect to accomplish much along these lines, but if they once do "hit the trail" and make a determined effort they will be surprised to see their example spread through the different grades, reaching even down to the lowest employees at the foot of the list, and, after they get the habit, the perplexing problem will be solved. But remember, "the old man" must take the lead.

It is my opinion that electric railway presidents have too many high fences erected between themselves and their kicking patrons, which gives them an excuse for the many letters appearing in the kickers' column of local papers. Straphangers never have a chance to even see the head of the bloated monopoly, who, they claim, is getting richer and richer day by day in every way, even going to the extent of jacking up trolley fares at the slightest pretext. I suggest when you go home to-morrow that you rip out those gates with their concealed latches, which, expert that I am, will not respond to my manipulations—I mean the gates that always swing out when you want to go in, and swing in when you want to go out, and that have stationed behind them men who demand one's card and business and who confuse the caller so that he can't tell even his own name, but if he finally succeeds, the porter always returns, after five minutes absence, bringing the same old message, "The president is busy just now, and suggests seeing the superintendent," who, by the way, has been seen several times without obtaining satisfaction. After such an experience the truth seeker leaves the president's office and if gifted tries his hand at writing for the papers, or, if not, takes it out by applauding the regular writings of Veritas and Vox Populi, cussing the company from the top to the bottom, as he sings, "I'll never go there any more."

HAVE AN "AT HOME" DAY

Establish a calling day. Put a notice in the papers that "You will be at home on Wednesdays from two to three, when you will gladly meet those having any fault to find with your management, or consider any suggestions that will make you a better servant of the public." The gate, if you still have one, should be fastened wide open and the porter instructed to take a facial massage to iron out that look which should be replaced with his broadest smile of welcome for Mr. Public, the man for whom you are all working.

You can answer all questions by the help of charts and diagrams, showing your visitors why you cannot do all they think you should, but when the people find out how easy it is to meet the president and what a fine fellow he is, very few will come, if any, and you will have ample room in your office for like conferences in the future.

The greatest assets any utility can have are the good will of its employees and the confidence of the public which it serves—assets obtainable and retainable only by according fair treatment to those who are on its payrolls and by giving good service to its patrons.

Our commission is forbidden by law to interfere with the contracts between public utility companies and their employees, but it can, and will, insist on service that is reasonably adequate, not forgetting, however, that the obligation rests upon it to see that the rates charged are sufficiently high to provide service that is ample and dependable.

Relations of Utilities and Commissions*

Entire Confidence of the Public Toward the Electric Railways in the Community Must Be Established Before Regulation Can Be Made Satisfactory to All Parties

BY COL. CHARLES KELLER
Corps of Engineers, U. S. A.
Engineer Commissioner of the District of Columbia,
Chairman Public Utilities Commission

THE law creating the Public Utilities Commission of the District of Columbia was passed March 4, 1913. Under this law the Public Utilities Commission of the District of Columbia consists of three members—the Commissioners of the District of Columbia, who, when serving as Public Utility Commissioners, perform this added duty without further compensation. Jurisdiction is limited to the boundaries of the District of Columbia, which contains 69 square miles.

Until after the World War had been in progress for some considerable time no important public utility problem, other than the valuation of the various companies doing business in the District of Columbia, had arisen. Since then, however, we have had the same experience as other communities. Mounting costs have necessarily compelled the fixing of increased rates, and while neither street car fares nor any other public utility rates are now at the high points, they are still considerably above the pre-war rates, and to that extent they afford play for the operation of that human weakness or fallibility which tends on occasions to find fault. For some reason or other, difficult to understand, human beings otherwise reasonable seem to take a most unreasonable attitude in regard to public utility companies, particularly street car companies. It may possibly be because payment of car fare is a cash transaction that takes place two or more times every day and that the performance of this cash transaction causes irritation which its frequent repetition exaggerates. In any event, people who would hesitate to ask a merchant to sell his goods habitually below cost seem to feel that there is nothing out of the way in demanding that a street car company shall furnish service at cost or less. This mental attitude, hard as it is to explain, is exaggerated by the demagogue whose stock in trade it is to attack public utility rates without reference to their fundamental fairness. The public mind is seemingly never properly adjusted so far as concerns street car rates, and it seems difficult to get a hearing before the public at which the underlying facts may be fairly set forth and safely left to the sense of fairness of the whole body of well-meaning citizens.

Summing up Mr. Lewis' paper, it might be said that what he endeavors to inculcate is a spirit of complete fairness on all sides of the public utility problem. He wishes the street railways to demand no more than a fair return upon the value of the property used in serving the public, and he believes that competition in performing public utility service is wasteful, and inferentially that it should be prohibited. These conclusions might be tersely summed up in the Golden Rule—the willingness, the anxiety, of every party engaged in giving or receiving public utility service to treat all other parties as they would desire to be treated themselves. We must all agree that the rule deduced from Mr. Lewis' paper is a fine and worthy one, but experience shows that the rule is more often discussed than practiced in business affairs. Until the public utility companies everywhere have created in the public mind a belief in the entire good faith of their policies, demagogues and men of ill will generally will be able to mislead the public mind by fantastic tales of all kinds, so that it behooves the enlightened men who are the trustees and custodians of this vast interest—the American Electric Railway Association—to do what they can to educate the public and to stimulate public belief in street railway policies. This cannot be done by discussions before such a body as this, or even by articles printed in technical or trade publications. Apparently it can be done only by publicity conducted in the community affected, accompanied by works confirming assertions of good faith. As illustrating what I mean by works, I will refer to a specific case.

The Public Utilities Commission of the District of Columbia, practically as soon as it was organized, entered upon the valuation of the various companies doing business in the District of Colum-

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bia, such valuations being required by the law above referred to. These valuations were begun in 1914 and concluded in 1916. Naturally they were affected by all the variable and conflicting factors consequent upon the war; and it would have been unreasonable to expect that the valuations, however large their totals, would be accepted without protest by the companies concerned. No criticism can therefore justly be made of any company that challenges these valuations, because in its opinion the unit prices used therein were too low, or because the valuations did not, for example, cover the complete cost of reproduction. Differences of opinion might with great propriety arise as to these and other details; but I believe that it is not speaking too strongly to say that when a valuation is challenged, not only for these reasons but because it fails to include allowances for inflated assets in the way of rights of physical property never used in the public service and for commissions or cash payments alleged to have been made to purely speculative promoters, then the public may well be excused if it turns a deaf or skeptical ear to other and possibly more meritorious pleas. I suggest that in my opinion the regulation of public utilities can be made satisfactory to all parties concerned and almost automatic in its operation only when that complete confidence upon which alone satisfactory business dealing can be based has been established in the community concerned. I have no doubt that when this millennium dawns, those of the present generation of public utility commissioners who are not then numbered with the angels, elevated or fallen, will gladly join in the chorus of praise.

Electric Railway Taxation*

An Exposition of the Work Done a Year Ago in New York State by the Legislative Committee of Which the Speaker Was Chairman, with a Consideration of Methods of Taxation

By Hon. Frederick M. Davenport

Senator from 36th District, New York State, and
Chairman of the Special Joint Legislative Committee on Taxation and Retrenchment

TAXATION has always been rather a hit and miss affair in most of the states of the Union. The subject of taxation requires a pretty wide information and a knowledge of underlying scientific principles which are to a considerable degree lacking in both legislative and administrative circles. It is technical, and the men who have the capacity to master it are apt to choose something else upon which to exercise their mental acumen.

In the early stages of the history of this country, taxation was not so vital a matter as it is now. There were comparatively small expenditures, and all the government had to do when it needed funds was to lay a tax on the nearest thing at hand, the thing that couldn't get away.

At first the government laid taxes on heads—poll taxes—they could not get away very easily; on land, that could not get away, and on the public utility corporations, because they could not pull up their tracks and pull down their transmission lines and take them over into another state very easily.

I have noticed vast differences between the ways in which the manufacturing companies and the public utilities are treated with respect to taxation. The manufacturing corporations got away without much for a good long time, and their assessments of taxes were less than those of other bodies. The reason was that the corporations would threaten to move from the state. But a public utility cannot do this very well.

In the days of smaller things, when taxes were small, it did not make very much difference if there were slight inequalities or injustices. The country was rich as a class, and almost any person could stand the taxation of that day. All that has now been changed.

F. M. DAVENPORT
New York State Senator

Taxation has become one of the most vital issues of the world. Misgovernment shows itself in overwhelming taxation. The matter was considered so important that the State of New York, where I have had my experience, undertook a study of its existing tax system a year and a half ago. We had a staff of engineers on an absolutely nonpartisan basis, and the chief men on it were not theorists but statisticians. Their findings were submitted to tax officials and others interested in every quarter of the state before the findings were submitted to the Legislature.

I think, on the whole, it is better not to hurry legislation. When definite and widespread changes are being attempted in a system of taxation, things must have a period of gestation, like the human embryo, before they get to a point where they are ready to be born.

We found that New York State had a great mass of exemptions from taxation. In real property from one-fifth to one-quarter had been exempted. There were also radical different methods of taxation. There was a general line of development, which included general property, personal property, and other forms for individuals and institutions that could not be reached under the old general property tax. Then there were great inequalities. Thus we had one net profits tax in our state, the tax on manufacturing corporations, which is 4.5 per cent, and includes financial institutions, public utilities, etc. In the case of banks, the national banks pay 6.8 per cent, the state banks 6.58, trust companies 7.33, investment companies 3.13, and in the class of the public utilities are the following rates: Steam railways 27, electric railways 44, telephone and telegraph 16, gas and electric 23. The utilities included were only those operating at a profit.†

So much for the inequalities. Now as to the methods and number of taxes, I will quote the facts on several utilities:

1. Steam railroads:
(a) General franchise tax (article 9, section 182, Tax Law). (Franchise tax is based upon the capital stock of the corporation. Tax rate variable, depending upon dividend rate, relation of assets to liabilities, and average price of stock sold.)
(b) Additional Franchise Tax (article 9, section 184, Tax Law). One-half of 1 per cent on gross intrastate earnings not including earnings derived from business of an interstate character.
(c) Special Franchise Tax (article 2, sections 44-49, Tax Law). (Tax Commission annually determines valuation of special franchises subject to assessment in each city, town or village. Final equalized valuation is the assessed valuation on which all taxes based upon special franchise are levied by local authorities. Tangible property situated upon streets, highways, public places or public waters in connection with the special franchise is taxed with such franchise).
(d) General Property Tax. (Real and personal property, excluding that which is

*Abstract of address presented at mid-year meeting of the American Electric Railway Association, Washington D. C., Feb. 16, 1923.

†For further particulars of this report see ELECTRIC RAILWAY JOURNAL, Feb. 4, 1922 pages 186-188.—EDS.

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assessed with special franchises, is taxed under this head.)

2. Telephone and telegraph companies.

(Taxed upon same basis as steam railroads.)

3. Elevated or surface railroads not operated by steam.

(a) Franchise Tax (article 9, section 185).

1 per cent on gross earnings from all sources within the State. 3 per cent upon amount of dividends declared or paid in excess of 4 per cent upon actual amount of paid-up capital.

(b) Special Franchise Tax (article 2, sections 44-49, Tax Law).

(Same as steam railroads.)

(c) General Property Tax. (Same as steam railroads.) Then the following miscellaneous provisions were made:

4. Other transportation companies (taxed upon same basis as steam railroads.)

5. Waterworks companies, gas companies, electric or steam heating, lighting and power companies.

(a) Franchise Tax (article 9, section 186).

One-half of one per cent on gross earnings from all sources within the State.

Three per cent upon amount of dividends declared or paid in excess of 4 per cent upon actual amount of paid-up capital.

(b) Special Franchise Tax (article 2, sections 44-49, Tax Law, same as for steam railroads).

(c) General Property Tax (same as steam railroads).

Electric Roads Taxed Most Heavily

Not only are electric roads, for example, taxed as you notice, far more heavily than the gas companies, but there is a great deal of difference in the possibility of shifting their taxes to their customers, as between most gas companies and the electric roads where the fare is fixed by franchise. The gas companies generally have the opportunity to shift their burden through higher rates, but there is no such a chance with the electric railway, which has its fare fixed. Then, of course, the question arises, whether it is fair to shift into a body of consumers an unequal share of the tax burden. We had to report, in the case of this investigation, that our method of taxation was an arbitrary, uncertain, intricate, meticulous hodge podge. We found that the inequalities were scandalous and that they constituted disgraceful discrimination.

A Reason for Some of These Provisions

There was a reason for some of these intricacies. New York State originally had a tax on the capital stock of utility companies, but the bonded indebtedness was deductible from the value of capital stock. But as many companies issued large numbers of bonds, certain classes including elevated and surface railways, were withdrawn from this tax and subjected to a 1 per cent gross earnings tax, plus a tax of 3 per cent on dividends in excess of 4 per cent upon the actual amount of paid-up capital.

Light, water, gas, heating and power companies were also withdrawn and taxed in the same manner as the street railways except that the rate of gross earnings was made 0.5 per cent. There was no apparent reason for the difference.

In 1899 the Roosevelt administration in New York State put a special franchise tax into effect to prevent evasion. The language used in connection with that Act was as follows:

"Value of all franchises, rights, authority, or permission to construct, maintain and operate, in, under, above, upon, or through, any streets, highways or public places, any mains, pipes, tanks, conduits or wires, with their appurtenances, for conducting water, steam, heat, light, power, gas, oil or other substance, or electricity for telegraphic, telephonic or other purposes" was declared to be real estate for the purposes of taxation assessable by the State Tax Commission for state and local purposes.

These special franchises had often escaped taxation prior to this, since, as personality, any indebtedness could be deducted from their value. This was an important step in advance. There has been, however, much difficulty in defining the special franchise, and the operation of the law has been greatly hindered in consequence. Further, equalization of special franchises and other real estate was permitted until 1911, and the more efficient central assessment led to discrimination against the possessors of franchises. Much litigation ensued, and half of the taxes imposed between 1899 and 1911 remained unpaid at the end of that period. There has been less trouble since the amendment.

There was a good deal of discrimination against the possessors of franchises as compared with the way in which ordinary real property in those locations was assessed, because the ordinary property was assessed far below the value, and in 1911 there was a clause added to the Act, for the purpose largely of clearing up ambiguities in interpretation of the earlier law, and the corporations were reclassified in 1906 for the purpose of the capital stock tax.

Objections to Franchise Taxation

I will call your attention next to the fundamental defects of methods like those which I have described, in the case of public utility taxation, as they have appeared to us. In the first place, the lack of certainty in such methods, especially such taxes as special franchise tax, to which I have just referred, would cause a great deal of confusion.

There is no entirely satisfactory way I know of to determine the processes by which to value a special franchise.

This lack of certainty, especially in the special franchise element, has, as I have said, caused a great deal of trouble, and there is no entirely satisfactory way of determining the precise value of special franchises to use the public highways. All such determination necessarily involves a large measure of personal judgment, and this is a difficulty recognized by the Tax Commission of New York in its method of determining intangible franchise values which is adopted in accordance with the so-called net earnings rule as prescribed by the courts, that is by capitalizing the profits of the corporation in excess of a certain rate upon the value of the investment, in calling that the intangible value of the franchise. That is a practical way out of the difficulty, but still arbitrary, because of the uncertainty of factors involved—the value of the investment, for example, and the rate of interest to be employed.

So with the tangible part of the special franchise. How are tracks, wires, poles, conduits of the public utility corporation to be valued? What is the proper basis of valuation, cost, replacement value, with or without depreciation, or what? And when the method of valuing is determined upon, the separate valuation of the tangible part of the special franchise as a basis of taxation involves serious uncertainty. What value has it anyway, except as a part of the whole equipment of the corporation as a going concern?

In 1919 the State Tax Commission of New York, in view of the abnormal conditions of the preceding three years, averaged a period of five years in the attempt to produce fair valuations. There is nothing very certain about a value which has to be obtained after this fashion.

Expenses of Tax Collection

There is, of course, a dead loss to the State in all excessive costs of collecting and administering taxes. There is dead loss to the taxpayer in complying with complicated tax laws. The labor of keeping special accounts, of filling out complicated forms, of getting doubtful points decided in the interpretation of the facts or of the law, the expense of contesting assessments, necessitates an expenditure for clerical force, accountants, tax experts and attorneys which is a very serious burden to many corporations. The whole thing is wrong.

Remedies Suggested

I will say a word now about the recommendations we make in our report to the Legislature in the State of New York as bearing on the whole problem. We want to wipe out the special franchise tax entirely, and wipe out the tax on the tangible personalty. The value of such property has little relation to the ability of the corporations to pay taxes. With the adoption of a sound basis, the necessity of any tax upon personal property will disappear.

As to the tax on real estate—there should be left to the localities the income from the tax on the real estate of public utilities, closely defined. The definition of real estate has been broadened to include classes of property of public utility corporations which are really personal property. All real estate is planned to be assessed by some central authority or else by an advisory authority.

In our new plan we take the position that a public utility corporation pays more than its share. Conditions surrounding public utilities have changed very radically since the beginning of the twentieth century. The trouble is, however, that public opinion is still based largely on the assumption that the old conditions still obtain which were, at the time, as we all know, loose, unregulated and often deplorable, but that is the condition of public opinion which you have to face in settling this matter.

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The whole question of public utility taxation should now be reconsidered in the light of the changed conditions with respect to the public control of rates of charge. The State has been using public utilities as tax collectors, imposing upon them obligations justifiable only upon the assumption that the extra burden can be passed on in higher charges to certain particular sections of the consuming public. Some can pass it on and some cannot. Even in the case of those which can pass it on, the question arises as to the equity of hitting certain large bodies of consumers unfairly or even laying taxes in proportion to the use of public utilities at all.

There is a good deal of reason for the opinion that public utility taxes will play a relatively small part in the future of tax systems in case the present system of regulated rates proves to be effective and is continued. Under public control of rates, the true function of a public utility tax should be so designated that in cases where several companies operate under the same controlled rate, more tax would come to the State from the profits of companies which are more favorably circumstanced, therefore able to earn more than a fair return. There is probably a necessary inexactness of the rate-fixing process, and taxation can help out this inexactness when it works out more than fair profits for certain companies.

Public utilities have always properly been taxed on their local real estate, narrowly defined, as a reimbursement to the locality for services rendered, like protection of the property.

An additional tax is levied on net income, defined so as to permit the deduction of a sum equal to a fair return upon all the money invested, whether borrowed or not. So in this case there is a tax on real property, narrowly defined, and a tax on what might be called pure economic profit. If the whole system of taxing public utilities can be reduced to these two ways, we are getting somewhere and will be on a really sound basis.

There has been an alternative suggestion, and that is a gross or net tax, on the ground that the state must have a regular income. Is the support of the state to be limited to those corporations that make profits? All real estate owners have paid a real tax. The farmers have to pay these taxes in lean years just as well as in fat years. The government must function in years when business is poor as well as in years when business is good. The practical phase in New York has led to the suggestion of an alternative gross or net tax which will replace the present series of state taxes.

Taxes in Other States

Just a word about the tax conditions in other states. The report shows quite a medley. There is the ad valorem property basis; secondly, the capitalization basis, and thirdly, the earnings basis.

The ad valorem basis is difficult and expensive, requires a large staff of experts familiar with the details of the business of corporations involved, and personal judgment enters to a large degree. There are also many serious questions as to the valuation of physical property. Again, physical value alone is not a true measure of a corporation's worth nor of the taxes it should pay. The thing that gives worth to a corporation really is its earning power. The earnings tax is simple and clear, and the consensus of public opinion in the country seems to be in favor of taxes upon incomes or earnings and the rapid development of such taxes. California, Minnesota and Connecticut have led the way.

I might, in addition, advise you not to try to force through any legislation by more or less clandestine, undesirable means—great harm has been done by such a method in the past, and I have never seen a business group try that way of securing legislation that didn't get the worst of it. What are required, chiefly, are facts, time, and conciliation. Bring forth the figures of New York State, or some other place, and have these figures so verified and substantiated that you know exactly where you are, and then you can have a real, fundamental drive upon intelligent public opinion.

Taxation and Regulation*

The Virginia State Corporation Commission Regulates Rates and Assesses Property for Taxation—Comparison of Tax Increase by Years—Tax on Earnings Discussed

By Alexander Forward
Member State Corporation Commission of Virginia

In VIRGINIA in 1921 the electric railways paid in taxes 36.6 per cent of their total net revenue. In 1917 they paid 13.61 per cent of their net revenues in taxes.

Most of the electric railways in the Virginia cities and some of the companies operating interurban and summer resort lines are also in the light and power business, and two or three are in the gas business. The electric railway companies paid in 1917 in taxes on their light, power and gas properties 4.65 per cent of their net revenue, which had increased in 1921 to 6.97 per cent. The percentage of taxes to net revenue advanced 50 per cent in the five-year period on light, power and gas operations, while on electric railway operations it advanced 269 per cent. The effect of the heavy relative increase in railway taxes is reflected in the total company taxes of those corporations doing allied business, so that these company taxes increased from 8.9 per cent of net revenues in 1907 to 16.12 in 1921.

No federal taxes are included in any of these figures, and it is evident that should they be taken into account the percentage of tax to net revenue of electric railways in Virginia would not be less than 40 per cent.

Now the sum of electric railway taxes has not increased to an alarming extent. We have had marked advances in the state tax rate, and that fact, with larger collections from franchise taxes on gross receipts due to higher fares in many instances, accounts for the increase in total taxes. The trouble is not with heavier taxes but with lessened net revenue, which was 40 per cent less on Virginia electric railways in 1922 than in 1917. The causes are, of course, easily discernible—higher operating expenses with rapid increases in the use of both privately owned and publicly operated motor vehicles.

Taxes, therefore, constitute only one of the problems of the electric railway today, and so far as Virginia is concerned, they are a minor problem. It is, however, evident that a system of taxation that consumes 36.6 per cent of net revenue plus federal levies cannot be defended.

It is quite true, as Senator Davenport suggests, that under regulation the public utility acts as a tax collector. The rates must be made sufficient to meet the taxes as an operating expense, so that the heavier the taxes the heavier the burden not on the utility but on the consumer of its service. There is much that appears in his plan for a tax on earnings to supplant a tax on property, especially if it can be devised so that the more profitable companies will pay the larger percentage of taxes on earnings. The Virginia State Corporation Commission is possibly the only regulatory commission in the country which also assesses the property of all public service corporations for taxation, state and local. We fix the value, and the General Assembly decides the rate to be applied for the State, and local bodies fix it for the several communities. Our constitution has certain requirements as to assessment which preclude any change in the system unless and until the fundamental instrument is changed.

There are difficulties in any method. A tax on gross earnings alone will not make for equality. In Virginia the electric railway with the largest gross earnings is by no means in the best position to pay, for its statements show deficits in its railway operations. We have that sort of tax now supplemental to the property tax, and I have shown you the results. A tax on net earnings would sharpen the knife of regulation. The public has a sort of suspicion that corporations and individuals are now sometimes engaged in finding means of increasing their expenses to lessen the sum of their federal income taxes, and this sort of suspicion might easily be directed to State and local levies determined in the same manner.

*Abstract of discussion presented at mid-year meeting of American Electric Railway Association, Washington, D. C., Feb. 16, 1923.

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How Should Railways Be Taxed?*

An Explanation as to How a Disproportionate Burden Is Now Placed on Electric Railways as a Result of Piling One Tax on Another

By Alfred T. Davison
General Counsel Third Avenue Railway, New York, N. Y.

SO LONG as governments exist the imposition of taxes is, of course, fundamentally necessary. The ways and means of raising taxes has been handled in the past as a political question rather than a scientific, economic question, with the result that we find the tendency in the past has been to impose the tax indirectly upon people rather than directly. Thus we find the public utilities burdened with taxes in various forms imposed upon them with the idea that such utilities would act as tax collectors in that the tax would be passed on by such utilities to the users of the utility by the fixing of rates of fare or charges sufficiently large to include such taxes, or by reducing expenses by reducing service.

The disproportionate burden which as the result of piling one tax on another is now placed upon street railway companies—in common with, but more than, other utilities—is explained by the history of the industry. In the beginning, when the operation of street railways was unrestricted, high burdens by way of taxation were also imposed as a means whereby the state could participate in assumed huge prospective profits. The next step came when the so-called special franchise taxes were imposed as a means of giving to the municipalities a method of reaching intangible property, on the theory that the intangible property, to wit, the franchise, was producing large revenues to the private owners, and that part of this should come to the municipalities.

During all this time, however, the street railways, being unregulated especially as to service, could, and actually did, pass on these taxes to the car rider. They were in reality tax gatherers. Now we are under a system of state regulation by which rates are limited to the cost of service and the amount of service itself is under the direct control of the state. With this radical change, however, there has been no compensating change in taxation. Thus the inequality and disproportion in taxation of public utilities has come about. Whereas before state regulation the utilities could unquestionably pass on the tax to the consumer, now if earnings are not sufficient to pay the tax and the return on the investment the public utilities cannot pass on the tax and therefore are not tax collectors, but must themselves pay the tax, regardless of whether the earnings are sufficient to pay a fair return on the property. In other words, the tax must be paid and the investor gets what is left. The important point is that the inability to pass on the tax is due to the drastic regulation by the state, whether it be in increasing the service or in reducing rates.

Senator Davenport mentioned the difficulties of using street railways as tax gatherers. Because this proposition forms the basis of later deductions which I shall suggest, let me give a few reasons why street railways, as distinguished from public utilities generally, cannot be used as tax gatherers.

For a public utility to be used as a tax collector, the rates charged consumers must be susceptible of increases to cover all operating expenses and taxes and a return on the property invested. This is feasible with public utilities generally. It is not possible in the street railway business.

In the first place, carfares are not susceptible of changes from time to time. It is only under the stress of extraordinary circumstances when increases in fares are tolerated. In the larger cities the American public has been educated on the basis of a 5-cent fare, and street railways have been able to obtain increases in certain parts of the country only as a result of war conditions. The public certainly would not tolerate variations in the rate of fare to cover merely taxation.

Investor Frequently Penalized

In the second place, in all utilities outside of street railways the rates charged the consumer are susceptible of change to cover variations in operating expenses, including taxes. For example, a gas company charging $1 or $1.25 per thousand cubic feet can by increasing its rate 1 cent, which means less than 1 per cent of the entire rate, obtain sufficient revenue to cover its taxes. This is not true in the case of a street railway company, where the increase of 1 cent, which is the lowest increase there can possibly be, means an increase of 20 per cent in the rate of fare.

Since, therefore, street railways cannot pass on the tax to the street car rider, one of two results must follow—where street railways are not earning a fair return on the capital invested, the investor is paying the tax; to the extent that he loses a fair return on his investment, because of the imposition of the tax, the investor is in reality paying the tax.

Nor is that all. If the street railway company is not making any return on its capital, this tax is taken out of the investor's principal. This result must necessarily follow where operating revenues do not meet operating expenses. If the business is to continue, taxes must be paid first. Other expenses must be cut or postponed. Naturally the first expense which is postponed or eliminated is the expense of keeping the property in good condition. The deterioration thus resulting actually lessens the value of the property in which the investor has put his money. Thus, to the extent that the payment of taxes imposed upon the public utility has brought this about, just to that extent has the payment of this tax come out of the principal of the investor. On the other hand, in the case of a street railway which in addition to paying the taxes is earning sufficient to pay a fair return on its property, the tax is in reality an income tax.

Aside from the fact that the passenger in the first case does not pay the tax, and in the second case is paying the tax, the further inequality is apparent. In the one case the tax is a hardship and a penalty, and in the other it is not. The street railway which cannot afford to pay it must pay it; the street railway which can easily afford to pay it is not paying it, but the passenger is paying it.

Senator Davenport stated, and it is indeed the unanimous verdict of all who have investigated the subject, that any tax imposed on a street railway company should be on the basis of income. Likewise all agree that an ad valorem tax has no place in a scientific system of utility taxation. The question is, what income of a street railway shall be taxed? I believe that the only tax which should be imposed on a street railway is a tax on its net income over and above a fair return on the capital invested or the value of the property in public service.

I believe that those who advocate a tax on gross revenues have failed to appreciate that gross revenues of a street railway company or any other business are in no sense earnings or income. The fundamental reason why an ad valorem tax on public utilities is abandoned is because earning power is the criterion or standard of its value. The gross revenues of a public utility have no relation whatever to its ability to earn and its ability to pay a tax. Many companies having large gross revenues have no net income whatever and many companies having small gross revenues have a large net income. Therefore, the very reason for advocating the income tax or a tax on earnings has no relation or application whatever to the gross revenues. An income tax is recognized as one of the fairest methods of taxation yet devised, and yet all income tax systems are based on net income and not on gross. A tax on gross income as applied to a public utility may result in more injustice and inequality than an ad valorem tax on its property. As applied to a street railway company the result often is that the greater the numbers of the public who are transported on its cars the greater the tax it is required to pay, regardless of its ability to pay.

State regulation of rates and service has had a far-reaching effect on taxa-

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tion of street railways. The theory under which state regulatory bodies are created is that rates and service are so regulated that the investors, who are in reality the owners, of street railways receive only a fair return on the investment or the value of the property in public service. Thus it is fundamentally established that street railways cannot, like ordinary business, make any profit above a fair return on the money invested. In other words, street railways, while privately owned, are publicly managed and the situation of the investors, who are the actual owners of the property, is no different from the investors in municipal bonds, the proceeds of which are used to construct a municipally owned and operated street railway. For the same reason that no one would ever advocate taxing municipal bonds, the proceeds of which are used for the construction of a municipally owned and operated street railway, the investors in the privately owned but publicly managed and operated street railways of today, who can make no profit on their investment, should not be taxed. Nevertheless, under our present system of taxation, as the result of state regulation of rates and service, this is exactly what is happening.

It, therefore, follows that the only tax which should be imposed on a street railway is a tax on its net income over and above a fair return on the capital invested, or the value of the property in public service. Another way of putting this is, the investor should first get a fair return on his investment and then what is left may be taxed. The investor in public utilities should be treated no differently than the investor in municipal bonds, the proceeds of which are used to construct a municipally owned and operated street railway.

Such a tax as is here proposed, namely, a tax on the net income over and above a fair return, would work in absolute harmony with rate and service regulations. If the utility is so regulated that the investor receives no more than a fair return upon his investment, then he is really in the class with the holder of a municipal bond, and should not pay any tax merely because he has happened to choose street railways as his form of investment, for the reason that he is making no profit and the utility is performing a public service without profit to any individual.

If, on the other hand, the public utility is so regulated with respect to its rates and service that the investor receives more than a fair return on his investment, then such investor is not in the class with the owner of municipal bonds, and will be required to pay a tax upon his earnings over a fair return, for the reason that while the utility is performing a public service, it is also affording to the extent just mentioned a profit to an individual.

It is time to realize that if we are to have state regulation of rates and service on the theory that utilities are public corporations, then our system of taxation must be based on the same principle. In other words, utilities should not be regulated on the theory that they are public corporations and taxed on the theory that they are private corporations.

If taxes are to be based on income rather than capital, on earning power rather than realized wealth, and if ability and not possession is to be the measure of the tax, then net income over and above a fair return on the capital invested is the only scientific basis.

The tax on net income over and above a fair return should be in lieu of all other taxes and charges whatever, whether fixed by statute or imposed by franchise obligations. This also includes paving charges.

The argument has been made that because franchise obligations are in the nature of a contract as between municipalities and the street railway corporations, any change made in the legislature would impair or interfere with the obligations of such contract. The United States Supreme Court, however, has upheld the authority of the state to alter the obligations contained in franchises granted by municipalities and accepted by the street railway companies. I refer to the decisions of the United States Supreme Court in City of Chicago vs. Chicago Railway and others, 257 U. S.; Worcester vs. Street Railway, 196 U. S., 539, and the cases there cited, and City of Pawhuska vs. Pawhuska Light & Gas Company, 250 U. S., 394.

Community Interest Between Railways and Bankers' Association*

Electric Railways Should Lose No Opportunity to Broaden the Viewpoint of Public Officials and to Broaden the Knowledge of the Public Itself

BY JOHN ADAMS PRESCOTT
President Investment Bankers Association of America

JOHN A. PRESCOTT
President Investment Bankers Association of America

THE investment bankers are very proud of some of the investments they have handled in electric railways and not so proud of others. It appears, however, that the latter feeling reflects the great changes in conditions that have taken place rather than the poor judgment in making these investments. In discussing the address by Senator Davenport I wish to speak particularly of the effect of federal taxation upon electric railway financing. The cost of new capital to electric railways has been increased at least 2 per cent because rich men can no longer afford to invest in public utilities. The high surtaxes force them to invest in tax-exempt securities. Hence the supply of new capital must now come from small investors and customer ownership plans. To give employment to soldiers returned from France, great impetus was given to the issuance of state and municipal tax-exempt bonds in order to do great public work. The effect of this is now beginning to be realized, as it has meant great increases in taxation to everyone and particularly the utilities. The most notable effect has probably been upon the interurban railways. It seems an irony that these roads, which have served the public well for many years and paid their share of the burden of government, should now be taxed to furnish facilities for unregulated and untaxed competitive transportation in the form of buses and trucks. The public is awakening to this situation as is indicated by the agitation for a constitutional amendment prohibiting tax-exempt securities and by the introduction of bills in state legislatures that would tax and regulate users of the highways. The growth of taxes has so cut down the margin of earnings over tax requirements that this has added to the lack of confidence in railway securities created by the public agitation against the railways.

To meet this situation men of the industry should lose no opportunity to broaden the viewpoint of public officials. Of even greater importance is the need to broaden the knowledge which the public itself has of this situation. I urge the advisability of the heads of railways appearing personally at luncheons and other gatherings to speak, rather than to send a representative, so that people can see that these men have no horns and are very human and ready to meet the public face to face.

*Abstract of discussion presented at mid-year meeting of American Electric Railway Association, Washington, D. C., Feb. 16, 1923.

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Country Past the Peak

Vice-President Coolidge in an Address at the Convention Declares Business, Including Electric Railway Industry, Is Returning from a Time of Depression to One of Prosperity. He Congratulated the Delegates at Washington Upon This Condition and the Opportunity Thereby Afforded to Give Better Service

VICE-PRESIDENT CALVIN COOLIDGE, in an address at the midyear meeting of the American Electric Railway Association on Friday morning, said:

"Mr. President, members of the Association: Some of my numerous friends who belong to your association extended to me an invitation to come here to give you, at least, my greetings.

"You have been working under the difficulties for the past few years that every regulated enterprise has felt.

"It is notorious that the action of the government follows and does not precede the development of business conditions; and while you saw an ever-increasing cost of operation, your ability to secure increasing returns, in very many instances being dependent on the action of some governmental body, hardly kept up with the requirements that you felt.

"I am sure that you, in common with all the rest of the nation, are glad to see a time when you are returning to a sound and substantial basis of operations — when you can look into the future with some degree of being able to tell what the future holds, what your costs are going to be, and what plans you can make for development and for furnishing the necessary service to your patrons.

"The electrical development of the nation in the last twoscore years has been perhaps its most wonderful development. Without it, it would not be possible at the present time to carry on the business of the nation as it is carried on, either for the transmission of intelligence or in the transportation of merchandise and of the people. It is a program that is not yet solved, one on which the very best of brains and financial ability of the nation are still working, and I have confidence that the problems that are undertaken by those who represent our country in those fields will ultimately be worked out to the satisfaction of our people.

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Calvin Coolidge
Vice-President of the United States

"You are dependent very much on the action of the local and the national governments. I think you have recognized a desire, both of the localities which you serve and of the nation, to co-operate with you, to support you, and to help you work out those problems the solution of which would give you the ability better to serve your patrons.

"One of the chief causes of the great increase in costs, of course, it goes without saying, has been the excessive public expenditures that our country, in common with most of the other countries of the world, have been compelled to make during the past few years. Even in a great and rich country like America, you cannot raise and expend more than $60,000,000,000 in the short space of time in which we have done that without putting a very excessive strain on the whole financial fabric of our nation.

"But we have met that strain better and easier than any other country on earth has met similar strains from these excessive expenditures. We have passed the peak and are working back now toward the time of stability. We have paid off something more than one-seventh of our national debt, reducing it from $26,000,000,000 plus down to $22,000,000,000 plus. We have reduced our great burden of taxation, not to its minimum — that depends on the expenditures that are being made from year to year — but we are reducing these steadily and consistently as fast as they can be reduced and maintain the necessary efficiency in the public service.

"You are feeling the results of that in your business, as all the people are feeling it in their business, and we are returning from a time of depression to a time of prosperity, a time when the carloadings of trade are reaching almost their highest point, a time when the consumption of the great basic materials and their production, whether it be of iron and steel, copper or cotton — any of those prime necessities that go into the business life of the nation — show by their statistical position that our country is in an era of bounding prosperity.

"That has been brought about by the co-operation that has existed between the business enterprises of the country and the government of the country. This is going to do a great deal to solve those pressing problems that have come to every business enterprise in the land. It is going to bring more nearly together the expenses of operation and the returns from income, so that the margin which has heretofore been on the wrong side of the ledger is being steadily transferred to the right side of the ledger.

"I want to congratulate you on the great service which your operation is rendering to the country; on the prospect of the returning prosperity and on the hope and the confidence that on your ability to serve America, you are going to make it great and powerful, acting with the other great interests of the country, making it a land able to take care of its people at home and able to render such a service as it finds necessary to the other people of the earth."

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Industry Coming to Better Days*

Meeting at Washington Calls to Mind Value of Work of Federal Electric Railways Commission—Important Problems of Industry Reviewed by Association President in Banquet Address

By C. D. Emmons

President United Railways & Electric Company of Baltimore
President American Electric Railway Association

THE meetings today have been interesting and most profitable, and I know that you will enjoy the program for this evening. May I take this opportunity of acknowledging publicly the hard work and many courtesies extended by the Capital Traction Company, the Washington Railway & Electric Company and the Washington-Virginia Railway, for without their assistance and whole-hearted co-operation we could not have had the successful meeting which we have enjoyed.

It is fitting as we assemble here in the capital of our country to pause for a few moments to express our appreciation to the federal government for its constructive assistance to our industry.

In May, 1919, the then Secretary of Commerce and the then Secretary of Labor, together with the National Association of Public Utility Commissioners, the Governors of many states, and the Mayors of many cities, joined in a request to the President to authorize a commission to study the electric railway situation. As a result the Federal Electric Railways Commission was organized, consisting of representatives of the various departments of the government, the banking interests of the country, the municipalities and the employees and management of the industry itself. Before promulgating its report, this commission spent more than a year in painstaking work, calling many expert witnesses to its aid. This report pointed out plainly the joint obligations of the managements and the public to bring the industry back to a healthy state. It gave courage to managements to wage their present battle to restore the industry to its proper place of service to the public, confidence to its investors and peace and comfort to its employees.

Tonight, we feel that we can at least make a good progress report—that we are waging a winning fight and keeping faith with the government itself.

The industry is in better condition than it has been at any time since the European war, and if the public—including our state and city officials, will continue to adhere to the principles set forth by the Federal Electric Railways Commission as zealously as the greater part of the industry is trying to carry them out, the electric railway problem will be solved.

Improved public relations and conditions in general invariably have followed frank dealings with the public and the public officials. Frankness has become widespread; three hundred companies today are telling their story by advertising through the newspapers, car signs, booklets and speakers; whereas, when the commission made its report very few companies were taking the public into their confidence.

C. D. EMMONS
President American Electric Railway Association

That the managements themselves have effected striking operating economies is shown by the fact that in the commission's report issued in 1920 of a group of twenty-one city and interurban companies, the operating ratio—that is, percentage of operating cost to revenue, was 78.4 per cent. The operating ratio for the year just closed for a similar group of railways, with gross operating revenues remaining practically constant, was 72.4 per cent, a decrease of 7.6 per cent.

This reduction in operating ratio has been brought about almost entirely by a reduction which has been effected in operating expenses through the following means:

1. Use of the one-man car.
2. Use of trail cars and lighter weight cars.
3. In some instances, the abandonment of unprofitable lines.
4. Through improved routing and rearranging of schedules.
5. Through the use of labor-saving devices.
6. Through the more economical use of labor generally.

With economies has come improved service. The money that was spent for operating cars on little used lines is being put into increased service on the lines where service heretofore was inadequate.

The tax burdens of the street railways are almost as numerous as Heinz's famous fifty-seven varieties. A record of five companies taken for study in this connection recently shows a total of thirty-seven different kinds of taxes. Many of these special taxes are unjust and unfair, and in so far as they benefit the entire public alike (and I might say in many cases they are of greater benefit to the automobile riders or non-patrons of the street car than to the car riders themselves), they certainly should be eliminated. The fact is often lost sight of that all tax burdens, special or otherwise, placed upon the street railway company must in the end be reflected in the cost of rides to the street car patrons.

The destructive competition by jitney buses or motor buses as common carriers is becoming less acute, for the reason that in the last several years there has been an unquestioned demonstration of the fact that, in order to obtain the best service for any community, unrestricted competition between electric cars and jitneys or motor buses cannot exist. In some cities, buses are now only permitted to run under proper regulations and must first obtain a permit of convenience and necessity from the regulatory bodies. Gradually they are being required to pay their fair share of taxes and to carry a bond for the faithful performance of service and for accident liability. In many communities, electric railways are voluntarily supplementing their service with buses, and the authorities, recognizing the advantages of a single dependable transportation system, are protecting the companies against unfair competition.

No street railway company that is at all progressive can avoid the expenditure of large sums of money each year in extension of tracks, adding to the equipment of power house and substations, adding to the car equipment, etc., in order to give proper service to the public. Without a fair margin over all operating expenses and fixed charges, money for such extensions cannot be obtained.

The ancient cry of a 5-cent fare, regardless of cost, is uttered now only

*Abstract of address presented at banquet at midyear meeting of American Electric Railway Association, Washington, D. C., Feb. 16, 1923.

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by a few demagogs, generally by those desirous of obtaining personal advertisement by this form of a supposed popular movement. Practically every one of them knows his plan is economically unsound. Serious-minded, constructive citizens, realizing that fares must vary with differing conditions, are demanding a fare which will be reasonable and just, not only to the car rider himself, but to the company, whether it be 5 cents, 10 cents or something else. They want good service and realize they must pay an adequate fare to get it.

It is futile to expect the threadbare cry for the 5-cent fare ever to die, but persons with the slightest knowledge of economics realize it is as unjust as would be a demand for the return of the 25-cent meal, the $2 shoe, the 5-cent movie or a good 5-cent cigar.

MUNICIPAL OWNERSHIP TRIALS UNSATISFACTORY

The wisdom of the Federal Electric Railways Commission's declaration that the time is not ripe for municipal operation seems to be borne out by the outstanding present-day experiments in Seattle, Detroit and San Francisco.

Seattle's municipal experiment thus far has been a marked failure, accompanied by high fares and continued accumulated deficits. The last available official statement for the years 1919, 1920 and 1921 shows an accumulated deficit of $1,526,869. Recently the Seattle City Council in an effort to increase the earnings of the lines voted to reduce the fare to 5 cents with a 2-cent cash or 1½-cent token charge for a transfer, in the vain hope that many additional passengers would be attracted. This was done in the face of a report from George F. Russell, superintendent of public utilities, that such a plan probably would mean a net monthly operating loss of $129.227, a loss of $1,550,700 per year. Constant efforts have been made by persons interested in decreasing the car fare to take the deficit out of the general tax fund of the city, but this has been successfully resisted by the taxpayers.

Even under such a capable and practically non-political management as that of Senator Couzens, the Detroit system has been unable to reduce fares under those charged by its former private managements and has had to appeal to the people for $5,000,000 for which to make improvements. This was voted down by a large majority.

Notwithstanding the favorable conditions under which the Detroit property was purchased and is being operated, the city lines still have the same rate of fare as charged by the former or privately owned company.

Some of the factors which ought to enable this municipally operated road to grant a lower fare are as follows:

1. Through greatly reduced fixed charges, because the company was forced to sell its city lines for $22.250,-000. which was actually $9,250,000 less than was offered for the same property in 1919. Capitalized even at 5 per cent, this would show a saving of $462,-500 per year

2. Through the possible assistance of all city machinery and departments in the operation of the road.

3. Through the gradual elimination of jitney competition, which was not restricted but rather encouraged during private operation.

4. Through the extensive use of the one-man cars under city operation, which cars the city itself did not permit private management to operate.

Despite the fact that the San Francisco Municipal Line operates chiefly on the two principal streets of that city, carries only the cream of the traffic and serves little of outlying territory, the official municipal report for the year ended June 30, 1922, shows that when proper allowances for taxes and other imposts charged private companies are made, the line had a deficit of $190,866 between July 1, 1921, and June 30, 1922. The report also shows that by absolving the municipal line from taxes properly chargeable to it, a "bookkeeping" profit of $55,669 was made, but everyone knows that bookkeeping cannot pay taxes. Somebody has to pay the taxes which the San Francisco Municipal Line is not paying. It is only fair to state, however, that under this favorable tax plan, the municipal line has accumulated a reserve for depreciation and accidents which is comparable with those set aside by well maintained properties under private management.

Daily evidence of the value of state regulation of electric railways, so indorsed by the Federal Electric Railways Commission, are found on every hand, not only on the part of the street railway companies themselves, but on the part of the public and the car rider. A return to the old order of local regulation would fill managements with uncertainty and immeasurably halt rehabilitation of properties and their return to the condition necessary to give reliable and satisfactory service.

Governor McCray of Indiana says: "The Public Service Commission is a most necessary part of governmental machinery. It has been maligned because it has been misunderstood. The laws governing it may not be perfect, but they can and will be corrected. To abolish this commission would mean the return of political wire pulling and domination of public utilities of every city and town of our state. This would indeed be a step backward and must not be thought of." Sentiments of this character have been expressed by Governors of thirty-seven other states during recent years.

Certainly the electric railway industry cannot be expected to function efficiently and economically if it is compelled to take up the old burden of being subjected to the personal whims and wishes of local politicians instead of scientific regulation by state experts removed from political influence.

The electric railway industry as a whole is striving to do what the Federal Electric Railways Commission and its own experience tells it it is best to do, and the public reaction to that effort makes us confident of the future.

Railways Emerging from Serious Conditions*

Some of the Problems Which Have Confronted the Electric Railway Industry During the Last Few Years Have Been Hard to Solve—State Regulation Has Saved the Industry

BY THOMAS N. MCCARTER
President Public Service Railway
Newark, N. J.

AS A successful operating proposition, after the early days of experimentation, the electric railway industry is approximately thirty years old. Thirty years is a short period in the cycle of time, but it is a long period to voyage upon a sea of trouble. This particular period of time to which I refer has been, perhaps, the most remarkable period, industrially speaking, in the history of the world. In it machinery, as the great saver of human energy, has been brought to its present high degree of development. Science and invention have done their greatest work during the span of these years. Many of the great inventions which are now regarded as necessities of life were either altogether unknown at the commencement of this period or, like the electric railway industry itself, were in their swaddling clothes. In 1893, the use of the telephone was extremely limited in its extent and the telephonic art was amateurish in the extreme as compared with its development of today. The internal combustion engine and motor car had not proceeded beyond the brain of the inventor. Now, the motor industry is said to be our largest industry with 12,000,000 cars and trucks upon the streets of this country alone. Mammoth steamships, of a character and size then uncontemplated, now race over the seas. Wireless long distance communication was as yet unknown. The operation of the submarine was confined to the works of Jules Verne; the Wright brothers had not yet made their great discovery, which culminated in the development of the modern aeroplane, and now within the last two years has come radio, with its attend-

*Abstract of address presented at mid-year banquet of American Electric Railway Association, Washington, D. C., Feb. 16, 1923.

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ant wonders. The electrical industry itself, in the matter of generation, transmission and distribution as compared with present-day conditions, was in the infant class. Surely there is no thirty-year period in the history of the world which can in any way match this period of inventive and industrial development.

So, also, there has been simultaneously taking place the world over during this period a sort of social or economic revolution, which is finding expression in different degrees of radicalism—some greater and some less—all over the world, the underlying principle or substratum of which seems to be an attempt toward a greater equalization and distribution of wealth than has ever existed before; a rebound from the period during which enormous fortunes were made as the result of inventive genius or unusual business sagacity; a disposition to control and to limit the activity of the individual for the so-called benefit of the many. Much of this has been greatly exaggerated by the World War, reaching its most extreme realization in the deplorable conditions existing in Russia today. In our own country it has manifested itself through the medium of death taxes, high income taxes, especially surtaxes, and as to railroads and public utilities, through the excessive and misguided application of the principle of regulation.

For Regulation Within Bounds

I find no fault with the principle of regulation itself as applied to our industry. It is all right if kept within reasonable bounds. Our industry has both suffered from and benefited by it. It is well to be perfectly frank in considering a question of this momentous character. The very great advantage that has come to this industry from the principle of regulation, as I see it, is this: Most of the franchises of the electric railways of the country, especially in cities, contained fare limitations—generally of the 5-cent variety. These provision were in the nature of contracts that could not have been avoided without the consent of the municipality making them, or by the act of the state, of which the municipality was the creature. Then the principle of regulation became fashionable ten or fifteen years ago, the state enacted statutes creating commissions, with rate-making powers, to fix just and reasonable rates for all public utilities, the effect of which was, in most cases, as the courts have held, to wipe out these old fare limitations contained in the franchises. Had this not been so, great and irremediable disaster would have overtaken the industry in 1918, when overnight, as it were, the costs of operation of the railway systems of the country were doubled, due to conditions created by the war. The relief that commissions were able to give and did give to the companies under the law, as above set forth, saved the industry during the war period and thereafter. Certainly we must admit that this life-saving relief to the industry came as a result of the application of the doctrine of public utility regulation. To have been forced to deal in this emergency with the political ramifications of municipalities would have been disastrous and, I fear, unavailing. Utilities other than electric railways, generally speaking, have not received this benefit from the development of the regulation idea because, as a rule, the price of their

THOMAS N. McCARTER
President Public Service Railway

product was not denominated in the bond. These utilities could have met the situation, in the absence of regulation, by legitimate increases in the cost of their product. So, too, it is undoubtedly true that some commissions, by their high character, painstaking effort, and fearless performance of their duty, have stabilized the credit of certain of our properties to their lasting benefit. Unfortunately, however, this has not been the universal practice.

Too often have commissions been guided in their conclusions by political considerations. While under the law the exercise of the power of rate making by the state is a legislative function, it is, nevertheless, one of a quasi-judicial variety, a fact too often forgotten by those administering the power through political preferment. Fine spun theories of theoretical doctrinaires have been allowed to prevail over the seasoned experience of hard-headed men. The effort has been to give as little relief as possible, not to meet the situation squarely. The result of all this, carried to the *n*th power, has been a blight upon the railroads and other public utilities of the country, including, to a marked degree, electric railways, during the last fifteen years. Instead of large expenditures to keep pace with the proper development of the nation, the railroad mileage of the country is actually contracting.

Capital is on strike and will not further participate in such undertakings. Is it any wonder? An effort is now being made in certain localities to substitute municipal regulation for state regulation of public utilities, under the guise of the fetish of home rule. If this be accomplished, the evils of regulation to which I have alluded will simply be accentuated and the properties thus regulated will be completely submerged in the vortex of politics.

Jitney and Bus Competition

In the last few years there has been let loose, from time to time, in varying degrees of intensity, a hybrid character of competition with our industry, known as the "jitney." Now, of course, every industry existing for the public convenience, as our industry does, must take its chances against the development in the future of some form of transportation better suited to the public need. If we are engaged in an industry that has become archaic, we must pay the price. This is the history of our own industry. The old stage gave way to the horse car; the horse car to the cable car, and the cable car to the electric car. Of this we cannot complain. But no one whose judgment is seasoned or entitled to respect upon this subject believes that the jitney bus can ever replace the electric railway industry. Massed surface transportation can still be infinitely better handled in larger units by electric railways.

I do not say that the motor bus has no place in modern transportation. On the contrary, properly to supplement and complement electric railway transportation in line extensions otherwise impractical, in cross-town service, in boulevard service and the like, co-ordinated with railway service, I distinctly believe in it. But the unlimited, indiscriminate, unregulated competition of irresponsible jitneys, paralleling electric railways, upon the same streets, which are not yet developed to their capacity, is a competition of a destructive character that not only paralyzes the opportunity for development of the railway company but, if allowed indefinitely, will cripple, if it does not destroy, the essential service which the public needs. The interests of the public and the company, in the long run, are identical in this matter, and what affects the company adversely will eventually injure the public. It is apparent that the country is beginning to appreciate this situation. Generally speaking, the jitney menace is passed. Unfortunately, this is not the fact upon the property administered by my associates and myself, but sooner or later the experience of the county will be repeated there, too.

I do not wish to be thought unduly pessimistic. I have been endeavoring to state exact facts—and only facts. I see, so far as our industry is concerned, distinct signs of improvement. We are slowly emerging from the serious result to our industry caused by the greatest war in human history. Every person in this room will be affected, economically if in no other way,

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by that war until the end of his days. The price our industry had to pay as its share of the war cost was none too much for the results achieved by the triumph of right over the lust for world dominion and power. Everywhere throughout the country the eranings of our properties are slowly but steadily improving. Commissions are beginning to take a more rational view of our problems; deficits are changing into earnings. The improvement is slow but sure and the future is full of promise. As it is with our industry, so I think it is with our country. Meeting here in the nation's capital, we have reason to give thanks, in no pharisaical spirit but in deep humility, for the blessings of our country as compared with the nations of the world. Everywhere about us are signs of great activity and coming prosperity. The financial affairs of the nation, under the leadership of the present great Secretary of the Treasury, are showing a marvelous stride of improvement. The agreement with Great Britain for the funding of her debt, upon terms fair to both countries, will sound a stabilizing shot which, like the shot at Lexington nearly one hundred and fifty years ago, will be heard around the world. Let us, therefore, keep courage; let us cease to grieve over the misfortunes of the past, recalling them only as a guide to shape our course toward better things in the future. So far as human foresight can predict with any degree of certainty, the electric railway industry will last and perform a useful service to the public, and, to use a well-known phrase, will grow better and better in every way day by day as the years go on.

Regulation and Taxation at Midyear Conference

Washington Meeting Was Devoted to Discussion of These Two Subjects, as They Relate to Electric Railway Companies—President Harding Sent a Message and Vice-President Coolidge Addressed the Conference

THE thirteenth midyear conference of the American Electric Railway Association was held yesterday at the Hotel Willard, Washington, D. C. The fact that several committee meetings were held on Thursday added to the number of attendants at the convention. Altogether there were about 600 who registered or were in attendance at the banquet in the evening.

President Emmons opened the morning session at 10 o'clock by announcing that the subject to be considered at that session was regulation. He then introduced as the first speaker Commissioner Dwight N. Lewis, Des Moines, Iowa, chairman Iowa Board of Railroad Commissioners and president National Association of Railway and Utilities Commissioners. Mr. Lewis' address will be found in abstract in another column.

During the presentation of the address of Mr. Lewis, the Vice-President of the United States, Hon. Calvin Coolidge, entered the room and was escorted to the platform by W. H. Sawyer and Charles C. Peirce. He was welcomed by Mr. Emmons and Mr. Lewis and gave a short address which will be found in another column. At the close of this address, Mr. Lewis resumed his speech, with the appropriate recovery of his audience by the remark that a dry bread sandwich is much improved by a tasty filling in the middle.

As Col. Charles Keller, engineer commissioner of the District of Columbia, was unable to be present on account of illness, his message to the convention was read by L. H. Palmer, Baltimore. This was followed by the paper by Commissioner Charles C. Elwell of the Connecticut Public Utilities Commission. These papers appear elsewhere in this issue. Henry L. Doherty was also expected to discuss the address by Mr. Lewis, but was unable to be present on account of sickness.

In discussing the suggestions of Commissioner Elwell about maintaining an open door to the public, Col. A. T. Perkins, St. Louis, told of the interesting manner in which complaints on the electric railway service, as written to the newspapers, are handled in his city. All letters which are sent to the principal newspaper there, making complaint about the street railway service, are set up and then forwarded to Colonel Perkins, who writes an answer which is published in the same issue with the complaint.

Public Meetings with Good Results

Thomas N. McCarter, Public Service Railway of New Jersey, told of the plan his company had followed the past year of having meetings in various communities over the territory served where three or four members of the operating and executive force would meet with the public. A little entertainment was provided in the form of a company quartet to make the gathering a little less serious. These meetings were attended by employees and a good many laymen. A representative of the company delivered some message and then opened the meeting to questions. He said that these meetings have been very successful in their effect upon public relations.

The plan is to follow these up with a series of luncheons in the various cities, to which 150 or more of the substantial business men of the community will be invited, and by the employment of this method the company officials are afforded an opportunity to show the intentions of the company to give the utmost in service and be friendly about it.

Mr. McCarter took issue with the suggestion of Colonel Keller in regard to his allusion to the tendency of railway companies to submit fantastic claims in determination of property values. Mr. McCarter said that the valuation of the property at best is only an attempt to get at the reproduction value and certainly that the preliminary items of expense, such as promotion, cost of money, commissions, and the other intangibles, are as much a part of the value as the rails and cars. He maintained that a railway property does not just grow, that it must be developed, and that the brains used and the risk taken must be compensated, as the result is of such great benefit to the public.

Major Whitman of the Maryland Commission spoke briefly of the trolley bus installation in Baltimore and Baltimore County, as an example of cooperation between public and railway. In this instance, the public put up $32,000 as a guarantee against loss by the company during the first five years of operation in order to get the extension of transportation service to serve this community.

Sentiment Gaining for State Regulation

Thomas N. Wheelwright, Richmond, Va., pointed out how the municipalities in the Commonwealth of Virginia are coming to realize the great need of state regulation of the utilities, in order to establish a basis of credit which will enable these companies to go ahead with improvements and extensions. He said that Virginia has no law regulating bus transportation, but that a law is now under consideration which will establish this as a state function. He mentioned also the fact that a new trolley bus line will be established in Petersburg, Va., next month and that similar installations are also being considered in the cities of Portsmouth and Norfolk.

Referring to the manner in which Colonel Perkins has been able to answer complaints in the same issue of the newspapers in which they were published, Mr. Wheelwright said that he has taken an opposite method by reprinting any complimentary editorial appearing in any local newspaper in large display advertisements. He jokingly said that this has had a very stimulating effect on such complimentary comment.

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Afternoon Session

The afternoon session was called to order by President Emmons at 2:30 o'clock and he introduced the first speaker, Senator Frederick M. Davenport of New York, who spoke on "Electric Railway Taxation." An abstract of this address will be found elsewhere in this issue. The following speakers were Major Alexander Forward, Alfred T. Davison and John A. Prescott. Abstracts of these addresses appear elsewhere in this issue.

J. Moss Ives of Danbury, Conn., told of his difficulties as a receiver in paying taxes in connection with the operation of a small street railway property. Connecticut has a 3 per cent tax on gross income, and while the company earned enough during the first two years of the receivership to pay operating expenses, during the third and fourth years it had an operating deficit, but in spite of that was assessed $7,000 taxes each year for the state. Why the state should expect a company to pay taxes when it could not pay coal bills and other operating expenses he could not understand. Thanks to the Birney car and the car trust agreement plan of purchase, he has been able to make operating expenses and pay the car trust notes as they fell due during the past year. But the property has been operated entirely in the interest of the traveling public and no taxes have been paid.

Mr. Ives told the convention that he has framed a bill which would relieve the street railways from the gross income tax and substitute a tax on the net earnings. He declared that he would go before the Legislature next week to urge its adoption. Unless this plan of taxation can be put into effect he could see no hope of getting his property lifted from receivership.

The next speaker was W. H. Maltbie of Baltimore, who said the first thing to consider in taxation is whether the tax could be passed on to the public. When this could be done a different question was raised than where there was a fixed franchise rate. Where there is a fixed rate, the tax is paid by the stockholders. In the former case it might appear at first sight that a company has no interest in the matter, but this is not so. In the first place, the country is staggering under a burden of taxation, and all forms of indirect taxation such as this tend to cloud the fact that taxes are being raised. Again, many people think the railway company is getting all of the receipts. The first remedial measure is to determine the aggregate of all taxes of a company and pass it to the people as a "bundle." This should be done not only with railways but with all taxes, and the people will take more interest in elections. Again, all taxes are levied either for the public good or for some special service. General taxes should be paid by all and taxes for special service should usually be charged to those directly interested, but there is no good reason for trying to collect general taxes through high charges for special service and it is economic injustice.

Henry D. Sawyer of Stone & Webster said that in the present methods of street railway accounting paving does not show as a tax and few companies know the aggregate amount of taxes paid by them. He hoped that the new form of taxation to be developed would be simple. The companies also should not have to pay taxes intended to be levied on the investor like the special mill tax in Pennsylvania and the 2 per cent on bond interest, as this does not lead to simplicity.

Thomas Fitzgerald said that in the new agreement made between the Pittsburgh Railways and the city the company would pay the city $200,000 annually in lieu of paving charges. This is equivalent to $800 a mile of track a year. Various imposts like car licenses, etc., formerly aggregating $175,000 a year have been reduced to $100,000 a year. These, however, are placed for payment after the return to the company and interest on new money and are payable only if earned.

At the conclusion of the discussion on taxation G. T. Hellmuth, Chicago Elevated Lines, and Victor T. Noonan, Cleveland Railway, made urgent pleas for companies to join the National Safety Council. The meeting then adjourned.

President Harding's Message

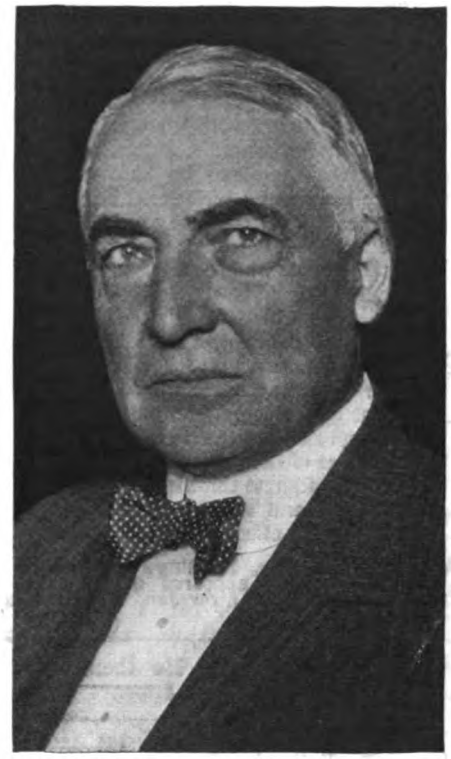
AT THE BEGINNING of his address at the banquet Secretary of the Interior Fall read the following letter to the convention from the President:

My dear Secretary Fall:

It has been in my mind that you are to deliver an address to the Convention of the American Electric Railway Association tomorrow evening. Having myself had the pleasure of speaking before this organization three years ago, I have an especially agreeable recollection of its gatherings and its membership. So I am writing to ask if you will be so kind as to convey an expression of my personal remembrances and regards, and to accompany it with the assurance of my continuing interest in the welfare of the great industry which is represented by the convention.

Most sincerely yours,

WARREN G. HARDING



THE PRESIDENT

ALBERT BACON FALL
Secretary of the Interior

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The Banquet

WITH a little over 600 delegates present, President Emmons presided over the midyear dinner at the New Willard Hotel, Washington. He took the opportunity to express the particular thanks of the association to the Capital Traction Company, the Washington Railway & Electric Company and the Washington & Virginia Railway for the splendid manner in which they had provided for the entertainment of the guests and the facil-

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President Harding Receives Railway Men

THE President was invited to address the American Electric Railway Association. With all his great tasks pressing upon his time, he was unable to comply, but expressed his desire to receive a small group of the electric railway men assembled in Washington. Accordingly, members of the executive committee and a few others were received by him at the White House at 1 o'clock on Feb. 16. The members of the party were introduced to the President and lingered a few moments while he referred in most friendly manner to the occasion three years ago when as United States Senator he appeared before the midyear convention of the American Electric Railway Association in Cleveland as the principal and much appreciated speaker. Electric railway men in advance of the public at large knew after that address that here was a man competent and worthy some day to fill the high office to which he was shortly thereafter nominated and then elected by a huge vote. They consequently were from that time on his ardent supporters. His words of sympathy and understanding of the serious problems then confronting the electric railways bespoke his great capacity to comprehend industry rights and relations to the public served. The words of advice he uttered then have since been studied, referred to again and again, and put into practice.

The members of the party were: C. D. Emmons, F. R. Coates, R. I. Todd, R. P. Stevens, C. C. Peirce, C. E. Morgan, J. G. Barry, J. N. Shannahan, C. C. Ellwell, H. D. Shute, B. A. Hegeman, J. W. Welsh, L. E. Gould, Labert St. Clair, E. F. Wickwire, H. L. Brown, G. T. Seely, J. P. Barnes, L. H. Palmer, T. N. McCarter, J. H. Pardee, L. S. Storrs, Carl Beck, L. C. Datz, T. A. Cross and W. E. Cann.

Mr. Harding's address to the midyear convention in 1920 appeared in the issue of the ELECTRIC RAILWAY JOURNAL for Jan. 17, 1920, page 155.

ities for the meeting. He then presented an address which appears elsewhere in this issue.

The next speech, that of the Hon. Albert B. Fall, the Secretary of the Interior, was a plea for good citizenship and for those in attendance to give personal attention to public affairs. Too many business men, he said, who shout in favor of the action of some public official will go to the golf links on election day, leaving those who disapprove of the action of that official to do the voting. The problems of public life, he continued, are more complex than ever before. There are no local or detached problems. A few years ago the cost of government was light. Now it is so heavy that the most casual of business operations must be considered in the light of present and prospective policies in finance and taxation. These facts emphasize the need for the good citizenship already mentioned. He concluded with comments on the progress of the country during the past two years, pointing out that taxes have been reduced, business revived, the national debt lowered and a danger of a war in the Pacific removed.

President Emmons next introduced Thomas N. McCarter, president Public Service Railway of New Jersey, whose address is printed elsewhere in this issue.

The final speaker of the evening was former Vice-President of the United States Thomas Riley Marshall, who spoke largely in a humorous vein and was very well received by the audience. He said it was quite the thing nowadays for people to run a business who know nothing about it. He, therefore, suggested that since the men assembled represented the stockholders and bondholders of the electric railways that he as a strapholder should undertake to tell them how to run their business. He suggested that the beautiful array of flowers on the tables be sent to the District of Columbia committee that is trying to establish the 5-cent fare, thinking it might help. But as the dinner committee had already made arrangements to send the flowers to the Children's Hospital in Washington it could not comply.

For many years it has been the doctrine, Mr. Marshall said, that every one is just as good as any one else and is just as competent and has just as good a right to run things as the fellow who is responsible. The former vice-president differed with this theory. He said we must come to understand that some men are made to do some things and others are intended to do other things and that the quicker we come to appreciate this the sooner we will have peace in this country. While it has been maintained that the common school education is going to be the salvation of this country, he maintained that when a born chicken thief is educated up to be a forger a distinct harm has been done. He emphasized that it is not the position in life one holds but the way he fills his position that counts.

THOMAS RILEY MARSHALL
Former Vice-President of the United States

He spoke of the troubles of the electric railways, but urged that it we are to measure accomplishment only in terms of dividends and bank balances we had better quit. He said he wanted the railways to make money and make plenty of it, but to make it by methods so clean that every dollar might be used for an infant to cut its teeth on without getting a single microbe. The real reward of our business will be the degree of service to the public.

In speaking of the changed economic situation of today which has called for big business as a necessity, it has tended to submerge the contact between corporations and labor. He admonished the assembly, if it would bring peace, to forget the law of the land and get a means of contact between the companies and the employees which would bring understanding. Differences should be threshed out by the spirit of democracy, which is the spirit of good fellowship, not by the legal rights available.

Ladies Are Entertained

AN ATTRACTIVE program was arranged for the ladies in attendance at the midyear meeting. The first event was on Thursday afternoon, when a trip was made to visit the grave of the unknown soldier at Arlington. This trip was followed by a reception and tea at the Willard Hotel.

On Friday morning the ladies were invited to participate in a trip to Mount Vernon by trolley, and this was followed by luncheon at the Columbia Country Club. Many of the ladies attended the banquet in the Willard on Friday evening, occupying the gallery.

The ladies' reception committee consisted of Mrs. W. F. Ham, Mrs. C. D. Emmons, Mrs. J. H. Hanna, Mrs. C. S. Kimball, Mrs. J. H. Stephens, Mrs. M. G. Stratton and Mrs. R. H. Dalgleish.

Washington Paper Gets Mixed on Titles

THE Washington *Times* for Feb. 15 published an article entitled "1,000 Here for Electric Rail Sessions," but accompanied it by a group picture of various officers of the association with a caption reading: "Officials of the Washington Real Estate Board, who will undertake, through a nation-wide campaign, to bring the headquarters of the National Association of Real Estate Boards to Washington. The headquarters are now maintained in Chicago. The board will hold a meeting tonight, when important action toward this end, it is said, will be taken."

The group view shown of the officials of the "Real Estate Board" were those of the American Electric Railway Association.

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American Association News

Committees Meet at Washington

A Large Number of Committee Meetings Were Held Previous to the Opening of the Midyear Meeting of the American Electric Railway Association and Much Valuable Work Was Accomplished

DURING the two days prior to the midyear conference, on Feb. 16, a number of committees of the American, Engineering, Transportation & Traffic and Claims associations held meetings in Washington. Some of these were the initial meetings and were for the purpose of organizing the work for the year, while others were to carry on work started earlier.

American Executive Committee

The executive committee of the American Electric Railway Association met at the Willard Hotel, Washington, D. C., on Feb. 15. Those present were: President C. D. Emmons, Executive Secretary J. W. Welsh, R. P. Stevens, C. E. Morgan, J. N. Shannahan, H. D. Shute, Arthur Hale, F. R. Coates, W. H. Sawyer, J. G. Barry, M. B. Lambert, E. F. Wickwire, C. L. Henry, L. E. Gould, L. C. Datz, G. T. Seely, L. G. Nicholson, Carl Beck, L. H. Palmer and J. W. Colton.

Brief progress reports were heard from the membership committee, the committee on co-operation with state and sectional associations, national joint committee of utility associations, committee on national relations, committee on location and exhibits, and committee on co-operation of manufacturers. Mr. Datz presented a recommendation of the Engineering Association executive committee that publication of the Engineering Manual as a bound volume to supersede the loose-leaf form in which it is now printed be authorized. The idea would be to publish this volume completely every three or four years as a revision became necessary and supplement this by the publication of a supplement each year. This was approved by the executive committee, and the engineers were requested to give consideration and make some recommendation as to what charge should be made for this volume and whether copies sold to member companies as well as those sold to individual members and non-members should be charged for.

Upon recommendation of Mr. Datz, the executive committee also approved a special session at the annual convention for the purchasing agents and storekeepers, under the auspices of the Engineering Association, provided this meeting was not scheduled at a time to conflict with the meetings of the American Association.

In making the report of the committee on co-operation of manufacturers, Mr. Wickwire pointed out that good results were being obtained from about thirty manufacturers, but that the others had not responded. He said that the work of this committee had gone far enough to determine that it was a feasible work and that nothing unreasonable was being asked of the manufacturers. The committee itself had been unable to get any co-operation from most of the manufacturers and he thought that about the only way this could be accomplished was for the railway people to bring pressure to bear upon those who have been indifferent to the committee's work. In other words, the condition should be brought about that manufacturers would know that lack of co-operation on their part will be noticed.

Mr. Henry, reporting for the committee on national relations, said that the Interstate Commerce Commission had reached a decision on the interchange mileage plan and that, as expected, the electric railways have been excluded from its provisions. However, any company not included under the decision may apply to the commission for permission to take part in the interchange or coupon arrangement.

A letter received from H. E. Fisher, chief surgeon Chicago Elevated Railroads, suggesting the organization of a section of the American Association for the physicians and surgeons connected with electric railways, was referred to the committee on policy. It was indicated that some provision will be made at the next convention for either a special meeting for the physicians and surgeons or a session of the T. & T. Association which will be of particular interest to them.

The next meeting of the executive committee will be held on Friday, April 6, at 10 a.m. in headquarters, New York.

T. & T. Executive Committee

At a meeting of the Transportation & Traffic executive committee on Thursday morning there were present: President G. T. Seely, W. H. Boyce, J. K. Punderford and Edward Dana. Progress reports of the various committees were read and generally approved. Various business matters and plans for the next convention were disposed of. A plan suggested to have a paper on the use of the radiophone in train operation was dropped on account of the finding that insufficient experience had been had along this line as yet by any railroad company to warrant a paper on the subject.

Engineering Executive

The Engineering executive committee meeting was held at the New Willard Hotel, Washington, D. C., on Feb. 15. Those present at the morning session were: President L. C. Datz, H. A. Johnson, R. C. Cram, C. R. Harte, Daniel Durie, C. H. Clark, R. H. Dalgleish, H. H. Adams, J. H. Hanna, C. S. Kimball, G. C. Hecker, and J. H. Stephens.

It was decided that the bibliography on heavy electric traction should be turned over to Prof. R. G. Warner of Yale University for correction.

Criticisms of the report of the subcommittee on revision of the rules for adoption of standards received from Mr. Johnson and others were read. The section pertaining to the details of voting was held in abeyance until a report of Mr. Kimball's committee on the method of weighting votes had been received and approved.

The report of the committee on manual, of which Mr. Cram is chairman, was received. One of the outstanding features of the work of this committee is the plan to publish the manual in bound form. The report discussed in considerable detail the renumbering of the specifications, the elimination of historical data pertaining to specifications, and revision of drawings to eliminate folded pages. The estimated cost of the manual as submitted was approved and a resolution was passed requesting the American executive committee to authorize the expenditure.

A communication from the American Engineering Standards Committee was read requesting the association to accept sponsorship of a sectional committee to reconsider specifications for 7-in. 80-lb. and 91-lb. plain girder rails and for materials for use in the manufacture of special trackwork. The association had submitted to the American Engineering Standards Committee these specifications some time ago, but on recommendation of the special committee of the A.E.S.C. they are to be referred to a sectional committee comprising all interested parties.

The American Engineering Standards committee has approved the American Electric Railway Engineering Association specifications on girder grooved and girder guard rails and joint plates. The manual committee was instructed to get up title pages for these specifications, designating them as American Standards.

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A request of the purchases and stores committee that it be permitted to hold a separate session at the time of the next convention was approved subject to approval by the American executive committee.

At the afternoon session Messrs. Datz Johnson, Durie, Harte, Clark, Daigleish and Hecker were present. The subject of a proper and adequate numbering system for drawings used in the manual and the proceedings was discussed at some length and then assigned to the manual committee.

Claims Executive

A meeting of the executive committee of the American Electric Railway Claims Association was held at the Washington Hotel Friday morning. The following members were present: Wallace Muir, president; E. L. Lindemuth, secretary; W. H. Hyland, H. D. Briggs, T. B. Donnelly, S. J. Herrell, Joseph Kubu and L. F. Wynne. H. V. Drown, S. B. Hare, C. B. Proctor and G. T. Hellmuth were also in attendance at the meeting. The following committees made reports: Accident prevention, automobile accidents, claims department costs, and subjects. The president appointed E. L. Lindemuth chairman of the attendance committee for the next annual convention of the association, with power to appoint a member of the committee from each state.

The tentative program suggested by the committee on subjects for the next annual meeting included papers and reports on the following topics:

MONDAY

Paper on "A Code of Ethics," by Hon. Russell A. Sears, Boston Elevated Railway.

Report of the committee on claims department costs, accompanied by a paper, by W. E. Robinson, Cincinnati Traction Company, to be followed by a written discussion by H. V. Drown, Public Service Railway of New Jersey.

Submission of questions for the Question Box.

TUESDAY

Report of the committee on the automobile accident situation, accompanied by a paper by G. T. Hellmuth, Chicago Elevated lines and North Shore Railway.

Two papers on "Automobile Accidents," one to be from the transportation standpoint, by Ralph Emerson, Cleveland, Ohio, the other to be from the claim department standpoint, by L. F. Wynne, Atlanta, Ga.

WEDNESDAY

This session to be devoted to a joint meeting of the Claims and Transportation & Traffic Associations, with the report of the committee on accident prevention, H. O. Allison, of the Beaver Valley Traction Company chairman, to be followed with a discussion for the claims department by W. G. Fitzpatrick, Detroit, and others.

THURSDAY

Paper on "Preparation of Litigated Claims," by Mr. Livingston, Boston.

Answers and general discussion of questions previously submitted for the "Question Box."

Dinner and Location

The midyear dinner committee met on Wednesday afternoon to complete final arrangements for the banquet and assign tables to the guests. The committee on location of the next annual convention met on Thursday morning and decided to recommend that exhibits be held. Reports were heard from subcommittees which had investigated Detroit, Buffalo and Atlantic City as locations for the convention and numerous details were given full consideration. The committee then gave its approval to a report to be presented to the American executive committee for its decision. Those present at this meeting were: Chairman C. E. Morgan, Col. A. T. Perkins, Secretary J. W. Welsh, Fred Dell, John High, H. L. Brown, A. M. Robinson, C. L. Van Auken, George Barnes, J. C. McQuiston, L. W. Shugg and A. L. Price.

Valuation Committee

The valuation committee of the American Association met on Thursday in Washington with Chairman J. P. Barnes, W. H. Sawyer, J. A. Emery, Col. A. T. Perkins, L. R. Nash, W. H. Maltbie, E. J. Bechtel, Frank Silliman, Jr., and J. B. Klumpp present. As this was the initial meeting of this committee, the discussion was principally in the direction of determining what the work of the committee should be this year. Two definite subjects were decided upon and sub-committees appointed to follow them up. One of these was a study on price trends of railway equipment and materials, as it was thought that the war conditions have perhaps now passed sufficiently so that the curve may be taking on some semblance of stability again. The sub-committee appointed to follow this was A. S. Richey and L. R. Nash. The other study that will be undertaken will be the determination of the relative weight to be attached to the various methods of valuation in arriving at the valuation of a property for rate-making purposes. This will probably resolve itself into an outline of the method of determining the proper weight to give each basis of valuation in any specific case. The sub-committee appointed to study this subject and report to the committee was Messrs. Maltbie, Bechtel, Klumpp, Silliman and Emery.

Bus Operation

The committee on bus operation of the Transportation & Traffic Association met on Feb. 15 in the office building of the Washington Railway & Electric Company. Those in attendance were: W. J. Flickinger, New Haven, chairman; W. H. Burke, Boston; A. H. Ferrandou, Washington; R. N. Graham, Youngstown, and J. M. Ives, Danbury, with J. K. Punderford and Edward Dana, sponsors. The answers to the questionnaire sent out by the committee were gone over and will be tabulated. It was decided to hold the next meeting early in April.

Rail and Wheel Contours

A meeting of the Engineering Association committee on rail and wheel contours was held in the morning and afternoon of Feb. 15. Those present were H. H. Adams, chairman; J. H. Hanna, vice-chairman; C. A. Alden, Victor Angerer, H. Fort Flowers, J. M. Larned, A. D. McWhorter, A. J. Miller and J. F. Miller. The committee considered the report of a sub-committee on the subject, consisting of Messrs. Angerer, Flowers and A. J. Miller. This committee submitted a number of wheel contours for consideration, together with an exhaustive study of the relation of wheel contour to rail contour. After considerable discussion the committee authorized the sub-committee tentatively to prepare eight wheel contours, these to apply to both chilled wheels and steel wheels. Mr. Flowers, who had been appointed a committee of one to take up the question of the contour of the head of a plain girder rail, submitted a report. This report was referred to a sub-committee consisting of Mr. Alden, chairman, Mr. Larned and Mr. Flowers, for further report. This committee was also instructed to consider the contour of a girder guard rail.

Special Taxes

There was a meeting of the American committee on special taxes at Washington on Feb. 15. Those present were W. H. Maltbie, Baltimore, chairman; H. D. Sawyer, Boston; A. J. Neal, Washington, representing W. F. Ham, and F. W. Doolittle, representing Edwin Gruhl. The discussion was largely along three lines, namely, to send out letters and find what public burdens are being carried in order to determine so far as possible the relation of the total public burden to the gross receipts; second, to try to start a movement for the simplification of taxes and, third, to enlist the co-operation of other national organizations that are interested in the problem of public utility taxation.

Coffin Foundation Committee Meets in Washington

THE first meeting of the committee which will have charge of the award of prizes for the Charles A. Coffin Foundation, recently established by the General Electric Company, held its first meeting in Washington, D. C., on Feb. 15. As specified by the provisions of the Foundation, the railway committee is composed of the president of the American Electric Railway Association, the chairman of the policy committee, and a third member selected by these two. President C. D. Emmons, Britton I. Budd, and James H. McGraw, president McGraw-Hill Company, who was selected as the third member, constituted the present committee.

At the Washington meeting a tentative letter was drafted for transmittal to the presidents of railway companies

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to inform them of the provision of the Foundation and to urge participation of their employees. The committee further laid out its plan of activity during the year.

Progress Report of Committee on Co-operation of Manufacturers

THE following progress report was presented to the American executive committee at its meeting on Feb. 15 by E. F. Wickwire, chairman, for the committee on co-operation of manufacturers:

An outline of the activities of your committee on the co-operation of manufacturers was printed in the February issue of *Aera*. This article gives an itemized account of the work that some of the leading manufacturers of the country are doing.

The article in *Aera* was compiled from answers to a questionnaire sent out recently and shows that about thirty important companies are carrying on the work intensively. Our records convince us that many more companies are engaged in the work, in one form or another, but failed to reply to the questionnaire. Why they are so secretive when they are not in the bootlegging business your committee cannot see, unless they feel that the electric railway companies are not observing the progress of our efforts closely enough to know what manufacturers are doing their part, and what concerns are not responding as they should.

There is every reason why electric railway men should lend real assistance to this committee by telling manufacturers that this work is important and that they notice it and appreciate it. The time has come for manufacturers to show where they stand on the issue, and your committee cannot understand why any manufacturer should hesitate to make clear his connection with the street railway industry and his interest in its welfare. It is a plain matter of self-interest on the part of the supply men for them to co-operate in improving the public relations of the industry upon which they depend for their livelihood. If they are not awake to that fact it is a kindness to set off the alarm clock in their ears. There are plenty of examples of companies who are successfully co-operating and accomplishing worth - while results. With the way made clear before them, there seems to be no excuse for any absentees in the roll call.

As a matter of fact, the work is progressing and plans for the immediate future will doubtless show still greater and more tangible results.

One of the outstanding things that manufacturers are doing now, under the general direction of your committee, is to co-operate with the local railways in an endeavor to cut down accidents. The manufacturer is in a very good position to carry on this work. Particularly, as a third party, he can induce local garage owners to put up posters which are being distributed through the advertising section, and thus be of great help. Two accident prevention posters have already been well and widely used in this manner.

The financial reports of the electric railway business during last year are just now becoming available. They reflect great credit on the industry and are to be used in many ways. Manuscripts for two articles which will be incorporated in material for speeches and also in booklets for general distribution are ready and will be sent out after this meeting. One of them is filled with facts which show that the industry is playing square with the people and is improving its service and its value to the public.

The other article, which will soon make its appearance in pamphlet form, may be used either for a talk or for general distribution. It brings out the enormous purchasing power of the industry and is directed to manufacturers' organizations with the idea of impressing upon them the fact that the electric railways are going to be good customers during the coming year and that they can help them to remain good customers. When we succeed in getting the individuals in these organizations to visualize their direct connection with the prosperity of the railways, they will be willing to ride a porcupine through a bed of cactus, to see that the railways are properly treated. This booklet also explains why it is necessary for electric railways to keep fares at their present level, and it discusses bus competition, special tax burdens, and other problems.

Plans for several other booklets are now being made. They will treat of paving relief, the necessity for the electric car, bus competition, etc.

Your committee is utilizing the radio in the dissemination of electric railway publicity material. On the night of Jan. 8, from the Pittsburgh station of the Westinghouse Company, the entire annual report of President Emmons was broadcasted. The advertising section now is preparing a series of five articles on the history of electric railway transportation which will be broadcasted later by the same station. Right here your committee wants to express its appreciation of the excellent work which Labert St. Clair, director of the advertising section, has done in the way of co-operating with the committee and supplying material for its use.

Manufacturers are using the regular monthly issue of *Truth* in encouraging numbers, and many have assigned special bulletin board space to it. One company has erected 100 special bulletin boards for its display, and smaller companies are displaying it proportionally.

Truth is really the backbone of our efforts in more ways than one. In the first place, misleading statements would get us nowhere and only create bad feeling. And in the second place, we could not hope to deceive the public even if we wished. Your committee would be seriously handicapped, in fact entirely helpless, if the electric railways were supplying poor service as an accompaniment to the efforts of the manufacturers. But, fortunately, taking the country as a whole, the electric railways are rendering the kind of service that makes our work easier and which furnishes the necessary groundwork for the success of our undertakings.

We urge that strong and continuous appeals be made to more and more manufacturers to use their best efforts, through the use of their shop papers, house organs and other effective channels, to reach their workmen, the men in overalls, those who ride in our cars and exert a strong influence on public relations. We suggest further that all manufacturers send regularly to our association headquarters copies of their shop publications and house organs so that we may know what manufacturers are co-operating in this movement.

In closing, the committee wants to emphasize again the importance of having the railway companies express their active interest in this work. Your committee is not requesting you actually to discriminate in favor of the manufacturer who is doing his part, but it is requesting you to ask the supply men, who are not using their strength, how they can reasonably expect to derive prosperity from the industry without putting a proper effort into the upbuilding of the business.

Information and Service

THE American Electric Railway Association has issued the following special reports which are available to member companies upon request:

"Trend of Trainmen's Wages, 1914-1922." This shows the maximum wage rate and the number of years of service necessary to reach it for the years 1914 to 1922 inclusive, for a large group of companies.

"State Versus Local Regulation." This is a compilation of arguments, reports, decisions, and expressions of opinion by experts and public men on this subject, indicating the trend of thought on regulation.

"Securities Issued by Public Utilities in 1922." This is a list of the new securities divided between electric railways and other public utilities showing type of securities, amount issued, maturity dates, interest rate and offering price.

"One-Man Car Operation." This is a supplement to the compilation of last Jan. 1, in which replies from thirty-one additional companies to the questionnaire sent out are summarized, giving also a complete general summary of all of the replies received, 140 in number.

In addition to the above supplement, a Fare Bulletin, Wage Bulletin, and cost of living studies have been prepared, bringing these compilations up to date.

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News of Other Associations

Observations on European Traction

Practice Regarding Type and Character of Rolling Stock, Electric Drive for Locomotives and Voltage Used in Electrification of Lines Is Commented Upon

By W. B. Potter
Chief Engineer Railway and Traction Department, General Electric Company

THE development of rail transportation since the day of stage coaches and horse-drawn tram cars has been a process of evolution in which some reminders of the past are still noticeable. Before the days of steam the track gage used for the tram cars of the British coal mines was presumably the origin of the odd dimension of 4 ft. 8½ in., which has become so generally accepted as the standard track gage of the railroads of today. In Great Britain freight cars are still called "waggons," and many of the older passenger vehicles there and on the continent are a sort of multiple-unit stage coach as if several coach bodies were mounted on a flat car, and to carry out the illusion, the exteriors of the separate compartments are sometimes so paneled as to resemble the outlines of a coach. The doors, windows and the interior are as nearly like the old stage as one could imagine, not omitting the looped strap arm rest for those sitting at the ends of the seats.

Our first electric cars were converted horse cars, and in keeping with their previous motive power there was at first a disposition to use much smaller motors than were suitable. About 1½ hp. was probably a fair average for the old horse car; and where two horses had served, an equipment of two 10-hp. motors seemed out of proportion despite the improvement in schedule.

While the speed was limited in the horse car days there was progress in other respects, of which one instance is worthy of note. Perhaps some of you may remember the red glass panel in the monitor of the Stephenson horse cars that once ran in New York. This panel was inscribed with the legend: "This car is equipped with super-springs, contributing to quiet and ease." You may also remember riding in these cars and the comfort derived from reading this sign—it at least had the merit of autosuggestion.

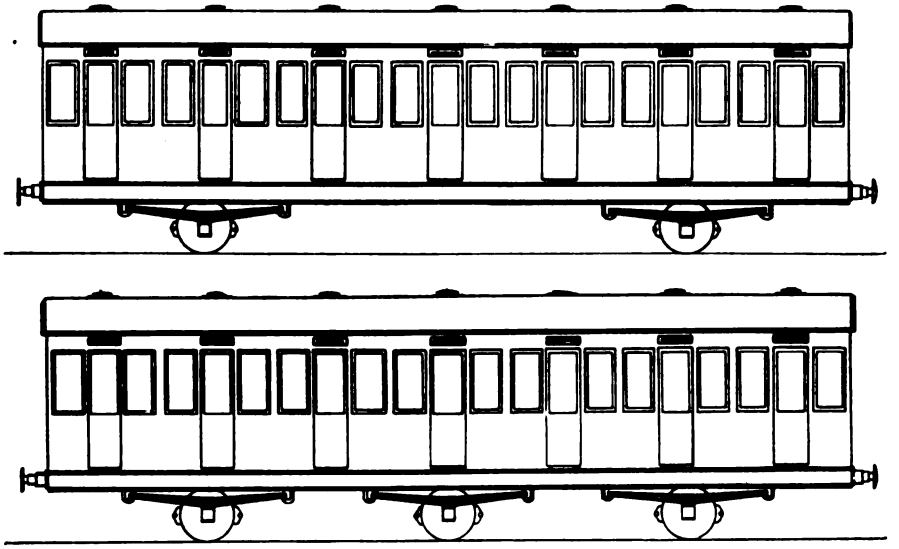
The single truck of the old horse car was not suitable for the higher speeds and longer car bodies required in electric service. The bogie of double-truck motor car so generally used today was a natural adaptation from steam railway practice.

While there is a similarity in the character of traffic and the conditions under which it is being carried on in the European countries, there is a great difference in these respects between Europe and this country. The influence of precedent, experience and individual opinion under these quite different conditions has naturally led to a different viewpoint and to some differences in practice between this country and Europe.

The weight of European freight trains and the maximum drawbar pull allowed are about one-quarter of what they are in this country. The weight of their passenger trains is about one-half. The permissible weight on driving wheels is about two-thirds and the weight per axle of their cars is about one-half of our usual practice. The low drawbar pull and car weight permit a relatively light mechanical design of rolling stock, and the requirements as to strength are further made easier by the method of car coupling.

The screw coupler, i.e., two clevises connected by a rod with a right and left-hand thread, is used almost universally. Each drawbar has a hook that is provided with a screw coupler, and in the process of coupling the clevis of one of the couplers is thrown over the hook of the other drawbar, and the cars in effect are jack-screwed together by hand. There are two mushroom-shaped buffers with faces about 1 ft. in diameter; the right one having a rounded face and the left hand a flat face, these are located near the outer end corners of the car. The initial tension on these buffers is about 2,000 lb., and when fully compressed the pressure is approximately 20,000 lb. As might be expected, there is ordinarily no shock when coupling with this kind of a coupler, as a slight compression of the buffers is all that is required. With our automatic couplers the shock of coupling is occasionally in the nature of a crash.

Admitting the advantages of the automatic type of coupler, the use of the screw coupler does permit a much lighter end framing on locomotives and cars. An inquiry as to European experience with automatic couplers brought forth the comment that the couplers were all right, but that the process of coupling wrecked the rolling stock. Allowing for various requirements, the weight of European electric locomotives is from two-thirds to three-quarters the weight of electric locomotives having the same horsepower in this country.



Cars with Two and Three Axle Trucks Used on European Railways

The speed of European trains on the average is rather higher than in this country. Many of the European cars have two or three axles, which does not seem to be a wheel arrangement that would provide for smooth running. In many instances these cars have no truck framing, but depend upon the car springs to hold the axles in alignment. These springs are usually about 6 ft. long and semi-elliptical in shape, although so little curved as to be nearly flat. The springs bear directly on the journal boxes and are so resilient that the vertical shock from track joints is very well cushioned. The shorter wheelbase two-axle car and many of

*Abstract of paper presented at mid-winter convention of American Institute of Electrical Engineers, New York, Feb. 11-16, 1922.

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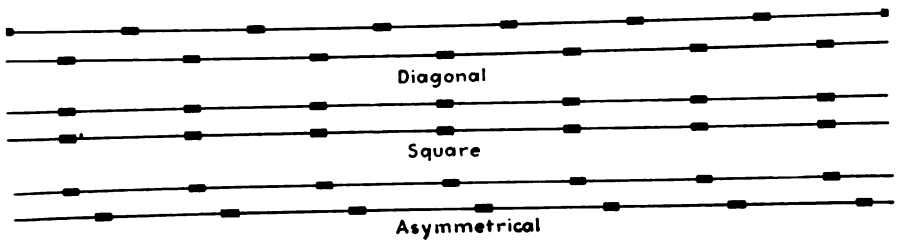


Plans for Locating Track Joints as Affecting Transverse Oscillation of Cars

the three-axle cars have a tendency toward transverse oscillation, which may be decidedly uncomfortable unless the cars are properly coupled together.

The combination of the screw coupler and buffers has more influence in steadying the car and preventing oscillations than might be supposed. When the coupling is set up sufficiently to compress the buffers, the friction between them is sufficient to prevent any relative movement so that each car is steadied by the one to which it is coupled.

On a fast train made up of similar cars having bogie trucks, there was a noticeable difference in the riding qualities of those cars on which the couplers had been screwed up and certain others so loosely coupled that the buffers did not touch. It is the usual practice to screw up the coupler sufficiently to compress the buffers, but there are exceptions. A remembered instance was a trip on a two-axle car of about 14-ft. wheelbase which was loosely coupled to the rear end of a passenger train. At a speed of about 55 miles the transverse oscillation, or "side slogger" as it has been called, was so bad as to cause some apprehension to the uninitiated. At the first stop the coupling was screwed up, which was all that was necessary effectually to check the "slogging." The frequency of these transverse oscillations appeared to be the natural period of the car body as established by the scheme and proportions of its flexible supporting structure. The track did not seem to induce any supplemental oscillation.

The method of locating track joints perhaps has more influence on the running quality of the rolling stock than is commonly appreciated. The European practice is to lay the track with square joints, i.e., with the joint of each rail directly opposite. The customary practice in this country is to lay the track with joints spaced diagonally and located midway between the opposite rail. The trial run on an electric locomotive over a track with square joints, which were in poor condition, afforded an exceptional opportunity to observe the reaction of a track with this arrangement of joints. This locomotive had bogie trucks, and at about 60 m.p.h. there was a very decided vertical vibration but no tendency whatever toward enforced side oscillation. With diagonally laid joints, in as poor condition, it is questionable whether any locomotive or car could have been run at that speed without something giving way; particularly if the transverse oscillation, which is diagonal in direction relative to the track, had happened to synchronize with a diagonal location of the low joints. Only one railway in Europe was noted where the rails were laid with diagonal joints. The manager remarked that his electric motor cars were subject to so much oscillation that it was his intention to relay this.

A comparison of the influence of square and diagonal joints on the running qualities of a motor car was recently observed in this country over a line having both kinds of joints. On the portion of track having square joints there was observed a slight steady oscillation of uniform character at the rate of about 150 per minute; on the portion of track with diagonal joints the same car did not oscillate with equal steadiness and at times had a noticeable swing toward one side or the other. As the car was running at about 60 m.p.h., the natural period of oscillation did not correspond with the location of the diagonal joints. Had the vibration synchronized with the joints, an enforced and increased oscillation might reasonably have been expected. This particular track was in good condition throughout.

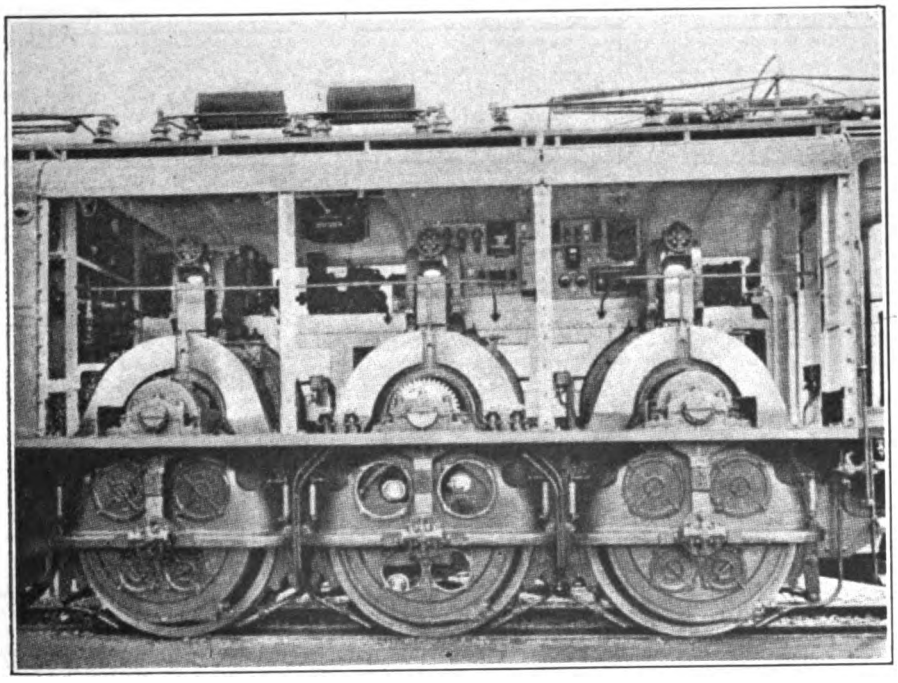
There is no doubt that track laid with square joints is more difficult to keep up as the impact on the ballast is more severe when both wheels strike the joints simultaneously. With the less weight per axle customary in European practice, it is much easier to maintain their track than it would be with our heavier weights per axle.

Asymmetrically Spaced Joints Suggested for Steadier Running

The writer suggests that it might be possible to secure the advantage of diagonal joints in respect to track maintenance and the steadier running quality of square joints by laying the track with joints asymmetrically spaced, that is, instead of overlapping a half rail length, to overlap between one-quarter and one-third, preferably a length of lap that would not be an even fraction of the rail length.

There was observed on the Great Northern Railway, England, an articulated arrangement of cars into groups, which is a departure from the conventional car with two bogie trucks. This articulation is accomplished by locating a truck midway between each of the several cars in the unit group, so that the number of trucks is only one in excess of the number of cars constituting the group. In the suburban service the trains were composed of two groups each of four cars, this requiring ten trucks for the eight cars. On the main line the train was made up of a number of individual cars and a five-car articulated group. The reduction in weight, compared with two bogie trucks for each car, was said to be about 10 per cent; it was also stated that the train friction was reduced. A noticeable feature on the main line train at high speed was the smooth running of the group; the riding was exceptionally good and noticeably better than individual care in the same train.

In the brief reference to electric locomotives, the motor car and steam locomotive were mentioned as prototypes



Locomotive with Outside Gearing on the Drive Side with Outside Sheeting Removed

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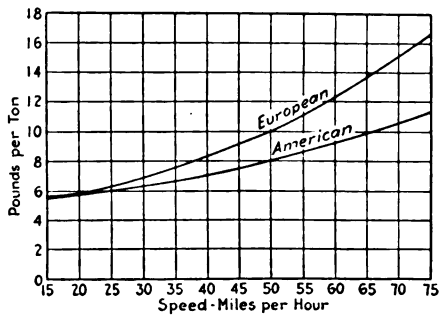
which have influenced the trend of electric locomotive development. To elaborate, there are at least seven general designs of driving mechanism or methods of motor mounting under which electric locomotives may be classified. These different methods may be briefly described as axle geared, quill geared, outside geared, axle gearless, quill gearless, direct-connected side rod and geared side rod.

Each of these methods of drive, with the exception of the outside gear, are employed in this country. In England the axle-geared drive has been most generally used, but there has been completed recently a high-speed locomotive for the North Eastern Railway equipped with the quill-geared drive. The side-rod drive does not seem to have met with favor; the following reference to side-rod drive is quoted from a paper by Sir Vincent Raven (North East Coast Institution of Engineers and Shipbuilders, Dec. 16, 1921):

"On the Continent, notably in France, Switzerland, Italy, Germany, Austria and Sweden, the connecting-rod drive in one form or other is almost universal. Up to the present electrification in these countries has been carried out mainly on the single-phase or three-phase system, and continental engineers consider that the additional complications caused by the introduction of cranks and coupling rods are more than compensated for by the advantage of having a free hand with the motor design.

"A large number of designs have been worked out. Some have proved quite satisfactory, others have given rise to a good deal of trouble. In most cases



Graphs Showing Relative Train Friction of European and American Passenger Trains

the trouble has been eliminated by strengthening up special parts such as crank pins, Scotch yokes, etc., and by introducing a certain amount of flexibility into the connections between the motors and the crankshafts."

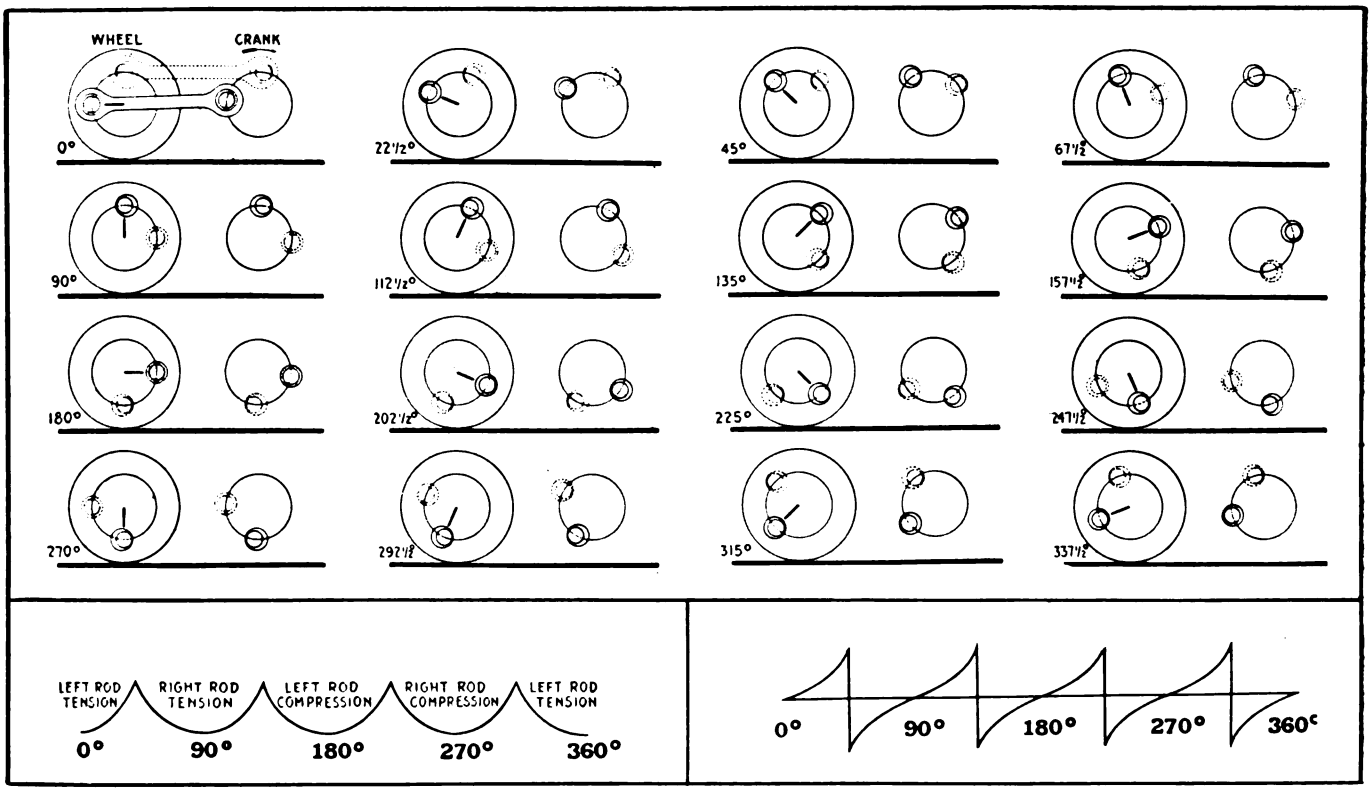
The mechanism of the motor-driven side-rod drive needs to be maintained in close adjustment and may reasonably be expected to require more attention and have a higher cost of maintenance than some of the other methods of transmitting power to the drivers.

The transmission of power from a motor-driven crank, whether direct connected or geared, introduces strains in the connecting mechanism somewhat different from those which occur in a steam locomotive. With the best adjustment and with operating clearance only in bearings, the motor-driven connecting rods on either side transmit alternately the power through 90 deg., except for such spring of the parts as may cause the rods to work together for a brief interval. As this transfer of the power from one rod to the other takes place at about 45 deg. from the dead center, the pins, connecting rods and included frame will be subjected to the full strain of driving when the crank is at an angle of about 45 deg. If the two sides are not in even adjustment this angle may be even less.

Aside from centrifugal forces and the shock due to lost motion in the driving mechanism, the stress in the rods, pins and frame of a steam locomotive is limited and may be predetermined from the size of the cylinder and steam pressure. With a motor-driven crank the stress is dependent on the crank angle and is affected by the adjustment of the mechanism.

As an extreme illustration, one side of a steam locomotive may be stripped and with the other side on dead center the throttle may be opened wide without damage to the locomotive. Under the same conditions with a motor-driven crank, the resultant toggle action would set up enormous stress and undoubtedly wreck some part of the mechanism involved.

There is, further, an irregularity in the angular rotation of the crank with respect to the driving wheel which creates a superimposed stress on the driving mechanism, and may be the cause of very disagreeable vibration should the natural period of the rotating mass involved happen to synchronize with the nodal points of angular variation. The effect of this irregularity in relative uniformity of rotation of the crank and wheel are more in evidence in some forms of side-rod drive than others. The most severe case observed was on a direct-connected locomotive with a V arrangement of connecting



Above—Action of Side-Rod Drive and the Effect of Clearance in Bearings on the Relative Angular Position of the Crank and Wheels. Bottom, Left—Characteristic of the Change in Angular Position of the Crank with Respect to the Wheel. Bottom, Right—Characteristic of the Angular Velocity of the Crank with Respect to the Wheel.

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rods which ran with but little vibration, except at the critical speed, when a knock developed which sounded as if the crankshaft was broken or being struck by a steam hammer. As this irregularity is due to the play in the bearings and the spring in the parts, it cannot be entirely eliminated in practical operation, but it may be minimized by maintaining the alignment and close adjustment of the bearings. It is obviously desirable to diminish the shock by cushioning as much of the rotating mass as possible.

H. Parodi, chief electrical engineer of the Paris-Orleans Railway, in the *Revue Générale des Chemins de Fer* of March, 1922, has written of the vibratory characteristics of side-rod drive and described the method he employed to improve the operation by the introduction of springs, permitting angular movement between the mass of the motor armature and the crankshaft.

Action of Side-Rod Drive

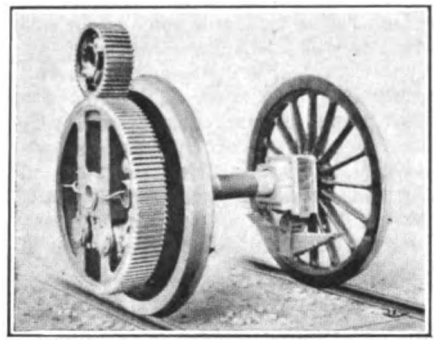
An accompanying drawing illustrates the action of side-rod drive. The mechanism is assumed to be inelastic, the pin bearings of the rods are shown with exaggerated clearance, and the ordinates of the characteristic curves are greatly out of proportion. In reality, the value of these ordinates is dependent upon the working clearance in the bearings together with the inertia of the rotating masses, and whatever may be their actual value the character of the action calls for its consideration in the design of motor-driven side-rod mechanism. Furthermore, the arc of action and the sharp angles of the characteristic curves as shown would be modified by the spring in the connecting parts.

There appears to be an increasing interest on the Continent in other methods of drive requiring less attention and maintenance. The Paris-Orleans Railway has been operating axle-geared locomotives in its Paris terminal for more than twenty years and has recently ordered 200 of this type for local passenger and freight service on its main line extension. More than 100 locomotives of similar type are being built for the Midi and the State Railways. Locomotives with the same type of drive are also being built for the Spanish Northern Railway.

The electric locomotives on the Italian Railways are mostly of the direct-connected and side-rod type. The workmanship and finish of these locomotives is exceptionally fine, so good in fact, from our point of view, that we might consider it an extravagance. They are well maintained, are giving good service and many additional locomotives have been built from the same design.

The electrification of the railways in Switzerland has been very well carried out and they may well take pride in their construction and equipment. The Swiss Railways have a variety of locomotives which are principally of the geared side-rod type. The finish and workmanship of these locomotives is excellent, and they are very fine examples of geared side-rod construction.

An interesting departure from side-rod drive is a Swiss locomotive having the very novel design of an outside geared drive which is being given a thorough service trial with a number of locomotives. These locomotives have an inside frame the same as a steam locomotive, the motor being carried on the frame directly over the driving wheel. The armature pinion is located beyond the outer face of the driver. The gearcase is attached to the locomotive frame and is a strong structure provided with a pin in the center on which the gear revolves. The gear is carried about 3 in. from the outer face of the driver and within the gear is a system of balanced links which engage with the two pins projecting from the driving wheel. These links are so designed as to provide for independent movement of the gear and driver in any direction while still maintaining their relative uniformity of rotation. This locomotive runs very smoothly without any characteristic vibration, and the more general use of this type of drive on the Swiss Railways may reasonably be expected. These railways have also in trial service a number of locomotives with geared quill drive.



Set of Driving Wheels with Outside Gearing

European motive power equipment is generally of more elaborate finish and gives the impression of being better maintained than is customary with us. An instance is recalled of two steam locomotives which were double heading on the London & North Western. One of these locomotives was built in 1897 and the other in 1867. They were polished and varnished with equal care and had every appearance of being of the same vintage until one observed the date label, and that the older locomotive had only one pair of drivers while the other had two. As an illustration of the greater attention given to details it is customary on many of the European railways to equip both steam and electric locomotives with a speed indicating and recording instrument. The record obtained is very complete, showing the speed at all times during the run, distance covered, time of the run and the location and duration of the stops.

The braking equipment of European trains is quite different from our almost universal practice. Their passenger trains are equipped with power brakes of either the vacuum or pressure type and usually with two brake-shoes per wheel. As there are several different braking systems in use, it is necessary in some instances to equip through cars, which run over different railways, with more than one system. In the trans-European service to Constantinople, it is said that each car has to be equipped with four different braking systems to conform with the regulations en route.

Power brakes are seldom used on the freight trains and some of the freight cars have no brakes whatever. In many of the freight yards there will be found wooden wedges, which are for the purpose of chocking the wheels to hold the cars in place. The hand-brake attachment to the braking system is usually through a screw and nut, instead of the chain and brake staff we commonly use. In some instances the brakes are applied only by a lever extending alongside. To handle freight trains on grades, where the brakes are necessary to control the speed, it is customary to provide a brakeman for every four cars. In ordinary freight movements the braking is done entirely with the locomotive.

The sliding contact for current collection from overhead lines is almost universal on the Continent for both tramcars and locomotives. Two triangular tubes of brass or copper are used for the contact on many of the Italian three-phase locomotives, and triangular blocks of carbon are used on some of the direct-current lines; but generally for tramcars and single-phase locomotives the collector is an aluminum bow of U-shaped section with a groove for lubricant.

In locomotive service it is the practice to use two of these bow collectors on each locomotive, and because of the soft material the pressure against the conductor is limited to about 8 lb. With this light pressure some arcing might reasonably be expected and is observable when collecting from a single wire. In some places two conducting wires with interspaced hangers are used, which is better for current collection than a single wire as it provides greater flexibility and doubles the collection contacts. Where the double wire construction had been used there was no observable arcing at the collector. While the aluminum bow serves its purpose well for collecting the 100 amp. or more for which it is used, it would not be suitable for collecting current of any great magnitude.

Four Contact Collectors Used on St. Paul Locomotives

Collectors of this type would by no means serve for the Chicago, Milwaukee & St. Paul locomotives, on which the current ranges from 800 to 1,200 amp. The collector used with these locomotives has two separate, flat, copper contact surfaces, while the overhead system has doubled wire conductors with interspaced hangers. This provides four independent contacts in parallel, each of which is 4½ in. long,

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so that theoretically the aggregate contact is a line 18 in. long. The pressure of the collector against the conductor is about 30 lb. The relatively large amount of current taken by these locomotives is collected with no observable arcing as the continuity of contact is well insured and the contact surface is of adequate capacity.

Any appreciable arcing at the contact between the collector and conductor is unquestionably more destructive to both than the wear that occurs from mechanical friction. Continuity of contact must be maintained if destructive arcing is to be avoided, and the design of the collecting system should be such as will best insure this continuity.

After investigating the various systems of railway electrification, a number of the European countries have established regulations in favor of a particular system for the electrification of their steam lines.

Systems of Electrification Favored

France, Belgium and Holland have decided in favor of 1,500 volts direct current. The overhead system of conductors will, presumably, be used in these countries with but few exceptions. There was some discussion in France as to whether 1,500 volts should be the generated or the average voltage of the system. It was finally ruled that 1,500 volts referred to the generated voltage, but that a maximum tolerance of 5 per cent would be allowed. There are no electrified railways of importance in Belgium and no projects under immediate consideration. In Holland an initial electrification is being undertaken between Leyden and The Hague, this being a portion of the main line that will ultimately be electrified between Amsterdam and Rotterdam.

England has also decided in favor of 1,500 volts direct current, except in special cases, of which the London, Brighton & South Coast Railway is an example. This railway is partially electrified with single phase and it is proposed to complete the electrification with this system.

It is presumable that a 1,500-volt third rail will be quite generally used in England. The Lancashire & Yorkshire Railway has been operating over 20 miles of third rail at 1,200 volts for some seven years. The North Eastern Railway has been operating 600 volts third rail for something over fifteen years, and has a more recent electrification with an overhead system at 1,500 volts. The London & South Western Railway has a 1,500-volt third rail under consideration. The South Eastern Railway, which runs near the Greenwich Observatory, is proposing to use two third rails with 3,000 volts potential between them, but with the generating and motive power equipment connected in three-wire relation to the track so that the voltage between each rail and ground will be only 1,500 volts. The purpose of this double rail arrangement is to eliminate currents in the earth which might affect the observatory instruments.

The principal railways in England, some twelve in number, radiating from London, have recently been consolidated in four groups, corresponding to the northern, eastern, southern and western portions of the country. The purpose of these consolidations is to better co-ordinate the service of the railways in each group, and to direct the transportation of the country more effectively and economically through four general boards of directors instead of through the large number representing the individual railways.

There has been no official decision in Spain as to the system of electrification for the steam railways. There is in operation a short line equipped with the three-phase system. An important electrification on the Spanish Northern Railway over a mountain division in the north of Spain will soon be in operation with 3,000 volts direct current.

Switzerland has standardized the single-phase system at 16⅔ cycles for the principal electrifications, and this system is being generally extended, although 1,500 volts direct current is being used on some of the smaller railways. For other than single-phase railways the standardized frequency is 50 cycles.

Three-Phase in Italy

The Italian electrifications are almost exclusively three phase, although there are several lines equipped with 600 volts and there is a recent installation of 4,000 volts direct current. Consideration is being given to a thorough trial of 3,000 volts direct current in the central portion of Italy south of the present zone of three-phase operation.

STEAM RAILWAY ELECTRIFICATION

	Route Miles	Number of Electric Locomotives
United States	1,607	375
Switzerland	661	156
France	602	338
Italy	650	309
Germany	550	49
Sweden	237	44
Cuba	180	18
Austria	340	42
Africa	174	77
Chile	154	42
England	129	12
Spain	48	17
Canada	49	9
Japan	39	42
Norway	39	37
Mexico	30	10
Brazil	26	16
China	25	13
Java	25	5
Total	5,565	1,611

Germany is continuing the use of single phase for steam railway electrification, although it was stated that 1,500 volts direct current would presumably be employed for heavy multiple unit and interurban service.

The subject of electric railway systems is under discussion in Sweden. The more important existing electrifications are equipped with the single-phase system at 16⅔ cycles. As the standard frequency for general purposes is 50 cycles, there appears to have arisen some question as to the expediency of generating and transmitting a particular frequency for the railways only. The more general utilization of natural resources and the better load factor resulting from diversity of use would seem to indicate an economic advantage in favor of generation at the standard frequency with substation conversion into whatever form of electrical power the railways may require.

The economy in fuel obtained by modern steam power stations and the many available sources of hydraulic power have contributed to stimulate greatly the electrification of the steam railways in Europe. Government indorsement of the projects has also been helpful in financing these enterprises.

The accompanying list, compiled from available records, will give an idea of the extent of railway electrification throughout the world. It includes the steam railways which have been electrified or are in process of electrification, but not the steam railways on which multiple-unit trains are being used exclusively, or electric railways which were not formerly operated by steam.

This is less than 1 per cent of the railway route mileage of the world. Conceding the efficacy of the steam locomotive for much of the world's service, there still remains a very large mileage which could be advantageously electrified. In the execution of this great undertaking we have many engineering and economic problems the solution of which demands the cordial co-operation of all who are engaged in the furtherance of railway transportation.

Electrified Road in Prospect

Col. L. A. May and a number of associates are planning the construction of a double-track electric railway from Muscle Shoals to Mobile, Ala.

For the past fifteen years Col. May has been working on this project. At first he planned to make this a steam road. Now that the government is building the Wilson dam at Muscle Shoals it is the plan of Col. May to electrify the road.

Several preliminary surveys of the road have been made in years past, but Col. May and associates expect to make another survey of the road at once, intending at the completion of this survey to offer the entire project to Henry Ford, when the Wilson dam at Muscle Shoals is finished.

The road is to be called the Mobile & West Alabama Railroad. The present officers of the road are: L. A. May, president; H. L. Brittain, Connecticut, vice-president; Jere Austell, Mobile, secretary; H. B. Urquhart, Birmingham, treasurer; George Clark, Birmingham, chief engineer. The directors are: A. L. Staples, Judge Robert T. Ervin, Jere Austell and H. H. Wefel, Mobile; L. H. DeFriese, London, Eng.; John J. Shannon and Dr. Wyatt Heflin, Birmingham, and L. A. May. The late ex-Governor Emmett O'Neal was one of the directors.

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Midwinter Meeting of A.I.E.E.

THE eleventh midwinter convention of the American Institute of Electrical Engineers was held in New York City from Wednesday, Feb. 14, to Saturday, Feb. 17. The first session, held on Wednesday afternoon, was taken up with technical papers on power transmission and distribution. In one of these Prof. V. Karapetoff of Cornell University described a kinematic device by means of which the characteristics of power transmission lines can be computed mechanically.

On Wednesday evening a joint meeting of the members in attendance in New York and Chicago was held by telephone. One of the papers at this session was on "Observations of Electric Railway Practice," by W. B. Potter, General Electric Company. It is abstracted elsewhere in this issue.

At the Thursday morning session papers on a variety of topics were read, including one on "Automatic Train Control Problems," by E. J. Blake, Gould Coupler Company; one on "Application and Economies of Automatic Railway Substations," by L. D. Bole, Cleveland Railway, and one on "Single-Phase Regeneration for Series Commutator Motors," by L. J. Hibbard, Westinghouse Electric & Manufacturing Company. Mr. Blake's paper covered the general principles of train control systems, which are attracting widespread attention in the steam railroad field due to the intention of the I. C. C. to require them under certain conditions as soon as their design is considered sufficiently well advanced. This paper was discussed by Frank J. Sprague, who compared the different systems available and explained what a control system ought and ought not to do. Mr. Bole's paper was the same one which he read before the Cleveland section on April 18, 1922. He will have one or more articles in an early issue of this paper which will cover this subject fully. There was no discussion of this paper at the New York meeting. Mr. Hibbard's paper covered the subject of single-phase regeneration with particular reference to the regeneration of power in the alternating-current locomotive. His conclusion was that any future regenerative application that may be desired can successfully be taken care of with one or more of the single-phase systems now available.

The papers at the remaining session of the convention were of a special nature, in general outside the field of interest of the electric railway engineer. In addition to the formal sessions a smoker and a dinner-dance served to develop good-fellowship. Visits of inspection were paid to points of interest in New York City.

Wood Testing to Be Standardized

THE American Engineering Standards Committee is furnishing the auspices for the standardization of methods of testing wood, recently undertaken by many interests involved. The United States Forestry Service and the American Society for Testing Materials have been appointed joint sponsors for this undertaking, and the American Electric Railway Association is among the sixteen other organizations represented on the sectional committee on this subject. Henry Gulick represents the American Association. This work has been undertaken because there are no generally accepted specifications and procedure in regard to testing of wood, such as exist in regard to steel, cement and other products.

Central Accountants to Meet

THE Central Electric Railway Accountants Association will hold its forty-fourth meeting at Hotel Barr, Lima, Ohio, on Feb. 23 and 24. There will be four interesting papers as follows: "General Accounting with the Aid of Bookkeeping Machines," by Robert R. Peery, chief clerk Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind.; "Light and Power Accounting with Aid of Machines," by J. B. Mahan, chief clerk Terre Haute, Indianapolis & Eastern Traction Company, Terre Haute, Ind.; "A Clearing House for Departmental Ideas," by A. R. Baxter, general superintendent Indianapolis & Cincinnati Traction Company, South Bend, Ind.; "Journal Entry of Agents' Station Accounts," by A. W. Heath, chief clerk Chicago, South Bend & Northern Indiana Railway, South Bend, Ind.

The accountants will gather at a dinner on the evening of Feb. 23, which will be followed by several other interesting features.

National Safety Code on Walkway Surfaces Proposed

THE American Electric Railway Association, the National Safety Council, the National Engineering Societies and a number of others have been invited to participate in a conference to consider the advisability and feasibility of formulating a national safety code on walkway surfaces. This will be held in the Engineering Societies Building, New York City, on Feb. 14 at 9:30 a.m.

The importance of the subject of this conference is emphasized in a letter from a group of representative manufacturers of safety-tread materials to the American Engineering Standards Committee, which points out that approximately 15,000 persons are killed in the United States each year by falls of various sorts and that nearly one-half of these falls occur on stairs and floor levels. Fatalities due to falls constitute about one-fifth of the total number of accidental deaths from all causes.

The American Engineering Standards Committee, which has issued the call for the conference, has listed the subjects to be discussed, among them being the applicability of the suggested specifications to railway cars, railway stations, ramps, runway floors, stair treads, etc.

Business Education Needed on Electric Railways

BECAUSE they are able to view the problems of the electric railway industry from a fresh angle as compared with technically trained men, recruits to the industry's staff who have had business training are greatly needed at present, declared Dean Wallace B. Donham of the Harvard Graduate School of Business Administration, before the New England Street Railway Club at Boston, Mass., Feb. 8. Dean Donham was introduced by President A. E. Potter as a financial doctor who had prescribed successfully for the ills of the former Bay State Street Railway, the Donham receivership having marked a transition period in the road's history from acute economic distress toward stability.

Referring to a recent report of the committee on education of the American Electric Railway Association, Dean Donham said that he was not in agreement with the statement therein that to technically trained men the industry must look for leaders in future. Without deprecating the importance of engineering or the usefulness of technical men as executives, the speaker felt that the industry needs men trained in business and competent to view the problems of this difficult period in the transportation art with detachment from the technically trained man's "slant." More non-technical men are needed, men who see things in a non-mathematical way, possessing a perspective taking in the "human" element. The economic ills of some street railways are beyond cure, but in many other cases, the application of business judgment will go far toward restoring them to financial health.

Dean Donham said that when he became receiver of the Bay State company, technical men advised him to restore the old 5-cent fare instead of retaining the 6-cent unit; but as a banker he was unable to see how a company that had been unable to succeed financially on a 5-cent unit could be expected to do so by going back to the old standard. Rather, a 10-cent fare appeared more hopeful, and so through the changing of zone limits, etc., the fare rate was increased and with good results.

From a recent statistical analysis of a large industry, the speaker was impressed with the decreasing percentage of engineers employed as the higher salaried positions were tabulated. In the lower grades of staff employment there were more engineering positions than there were opportunities for employing business-trained men, but this condition changed as the investigators approached the higher paid personnel. "Present-day technical training breeds a condition of mind that demands an antidote," said the speaker, "and the business-trained man offers this antidote to the industry. Where an engineer can rise above his technique and adopt a broad, detached view of affairs, he is invaluable, but such men are relatively few."

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Preservative Oils for Wood Preservation*

Scarcity of the Heavier Oils Has Retarded Wood Preservation Practices

ERNEST F. HARTMAN
President Protexol Corporation,
New York City

THE purpose of this paper is to develop information relative to the comparative values of distillates of coal tar for wood preservation in particular reference to surface treatments.

There is need for greater recognition of the differences in preservative values between creosote and oils containing light oils and naphthalenes and anthracene oils. For open-tank surface treatments in particular the measure of success in results obtained lies principally in the permanence of the antiseptic.

Since the days of the earliest investigations, the greater all-around value of the heavier oils or, in other words, those which may distinctly be classed as anthracenes, has been recognized. In this country, the somewhat higher cost and until recently the general scarcity of the anthracenes have prevented the full development of the use of these oils in our preservative practices.

It is also quite clear that the element of cost difference no longer should mitigate against the deliberate selection of the anthracenes for use in surface treatment work, since it is fairly well proved that when the relative volatility of the lighter or creosote oils as compared with the anthracenes is considered, the cost differences are practically wiped out. In some experiments it has been shown that 40 to 50 per cent more light oil is required to accomplish the same net treatment cost result in surface work that may be obtained with the heavier or anthracene oils.

A study has been made of the authorities in these subjects and it appears that for surface treatments those creosote oils which contain large proportions of light oils and naphthalenes of very fugitive character should not be used for surface treatments. All parts of the oil should be stable and the writer's belief is that the anthracene oils more nearly meet all of the required qualities of a preservative for surface treatments than any other. All experiments and data to which the author has had access bear out this view.

The presence of water in oils used for surface and spray treatments provides an element of danger, and with anthracenes this element is reduced to a minimum or practically eliminated. By its evaporation its presence in any oil increases the volatilization of the other oily constituents.

In wood preservation, the object is to put off decay to the most remote date possible, thus reducing the annual charge. It follows that, the more permanent the preservative, the more permanent the results will be. In surface treatments, their very nature and use is such that evaporation is greatest from the outside and it should follow that the materials used for such treatments should be of a character having the greatest degree of inherent permanence.

The author's conclusion is that the anthracene oils represent the most permanent distillates obtained from coal tar that are useful in wood preservation, and that for surface treatments in particular the value of the more permanent qualities of the anthracenes should be more fully recognized.

*Abstract of paper read at convention of American Wood Preservers' Association, New Orleans, La., Jan. 22, 1923. Full text of paper will later be made available by the association.

Regulation of Motor Buses and Trucks

A PAPER urging greater regulation and taxation of motor buses and trucks upon the highways in Iowa was read before the Iowa Engineering Society at Des Moines on Jan. 24, 1923, by C. W. Eby, assistant engineer Waterloo, Cedar Falls & Northern Railway.

After pointing out that the cost of highways in Iowa has been increasing each year until in 1922 nearly $12,000,000 was spent on the primary roads alone, the speaker said that many of the taxpayers and the abutting property owners now consider they are not getting the benefit from this expenditure. He pictured an Iowa farmer who pays one-fourth the cost of road improvements on the road passing his property, watching this road torn up by heavy trucks which pay less into the highway funds than he does. At the same time the use of the roads is being made inconvenient to private auto owners because of the high speed and weight of the commercial vehicles which are in use upon them.

The speaker criticised the proposed uniform vehicle law of several automobile associations which would permit a maximum gross weight of vehicles of 14 tons and length of 30 ft. for a single vehicle and 85 ft. for a combination of vehicles, and he sketched in an amusing way the quandary of a private automobile owner caught on the highway between an 85 ft. highway stock train loading at the side of the road and an 85 ft. highway express train operating in the other direction. He also quoted extensively from Iowa and other papers to indicate that a sentiment is growing that such highway service is wasteful and costly. He also quoted from the message of President Harding to Congress on Dec. 8 to somewhat the same effect.

Mr. Eby gave a summary of the proposed motor vehicle regulatory law drafted by the committee of motor transport of the American Electric Railway Association. In conclusion he said:

> In 1922 twenty-two states regulated motor carriers to a greater or lesser degree. Iowa did not. Twenty-two states, not the same ones just mentioned in every case, collected extra taxes from motor carriers, in addition to the rates levied on private automobiles. Iowa got no extra money from them. Regardless of the source of the suggested bill, I believe that it admirably meets the needs of the state of Iowa in the regulation and taxation of motor buses and motor trucks, and merits the attention of all people who are interested in the subject.

The Engineer as a Man of Public Affairs

THE colleges of the country are urged to "point engineers toward leadership in public affairs" in a report submitted to the Federated American Engineering Societies by its committee on industrial ideals, of which Prof. Joseph W. Roe, head of the Department of Industrial Engineering at New York University, is chairman.

The report stresses the need of the engineer in public life, asserting that he must aid in removing the difficulties of the material world which he has created. Carrying out the idea expressed by Edwin Ludlow, past-president of the American Institute of Mining and Metallurgical Engineers, that "this is an engineer's country but a lawyer's government," the report continues:

"For a century, engineers have directed their energy toward the utilization of the physical forces and the materials of nature. The developments which they have brought about have created an epoch in human history.

"While these developments have been of inestimable benefit, and modern society could not exist without them, they have introduced many public problems and social readjustments, so closely related to the engineer's activities that it is increasingly evident he must assume an active part in their solution.

"Recognizing this growing need, the engineers of the country formed the Federated American Engineering Societies, primarily to place their knowledge and training at the service of the engineering public on all public matters affecting engineering, or affected by it.

"Engineering education, reflecting closely the attitude of engineers heretofore, has confined its work almost exclusively to scientific and technical training, giving little, if any, attention to the social and human aspects of engineering enterprises.

"The Federated American Engineering Societies, therefore, speaking for the engineering profession, urges upon engineering colleges an increased attention to the social aspects of engineering activities, and a broadening of their technical training, in every way possible, to develop in engineering students the spirit of, and a capacity for, active leadership, not only in industry but in public affairs."

The other members of the committee, whose report has been adopted by the governing body of the federation, are: Mortimer E. Cooley, dean of the Engineering Schools of the University of Michigan and successor of Herbert Hoover as president of the federation; Prof. C. F. Scott of Yale University, New Haven, Conn., and J. C. Ralston of Spokane, Wash.

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The News of the Industry

Union Men Discuss Legislation

Buffalo Strike, One-Man Cars and Other Matters Considered by New York Men

The problems confronting electric railway employees in New York State over the one-man car, the Buffalo strike and other matters were the principal subjects of discussion at the legislative conference of the Amalgamated Association of Street and Electric Railway Employees of America held at Utica on Feb. 12.

Eighteen delegates registered at the conference. Michael Ward of the Schenectady local presided as president. Legislative reports were read by Joseph S. Droogan of Albany, secretary and legislative agent, and P. T. Noon, financial secretary.

The association expressed a vote of confidence in its officers and re-elected them all for the ensuing year.

It had been intended to take up at length certain decisions of the Public Service Commission affecting the general welfare of the trolley men and to discuss other legislation, but as the feature administration bills relating to public service commissions had not been introduced at the time of the meeting at Utica, such action was deferred until another meeting.

Neither was there any general discussion of a plan for concerted action during the coming spring and summer. The meeting adjourned, after electing officers and listening to reports, agreeing to mark time until legislative action is taken on the public service commission bills, the trade commission bill and the bill which is now pending to incorporate labor unions. The union trolley men have lost prestige in the state during the last two years, and it seems very unlikely that they will attempt any drastic action which will entail industrial disputes in the near future.

Franchise Proposals Include Use of Bus in Saginaw

Saginaw will not want this spring for transportation proposals. Recent action by the Saginaw United Transit Company, asking that the Council submit a three-year franchise to the electors at the spring election on April 2, brings three propositions before the voters.

At the primaries on March 7 a ten-year franchise for the Saginaw Motor Omnibus Company, a $500,000 corporation, will be submitted. If this does not carry there will be a street car-bus franchise and the one now proposed by the transit company, which is the outgrowth of the jitney bus men's association.

If the omnibus franchise passes naturally the other two will not be submitted. George R. Bidwell of New York, who is one of the men in the omnibus company, expects to carry on a campaign looking to the adoption of the grant. Otto Schupp, trustee in bankruptcy of the Saginaw-Bay City Railway, who was grantee under the street car-bus franchise that was defeated by seventy-two votes, announces that the proponents of the franchise will not appeal the case, but will let it remain as decided by the Circuit Judges, through whose ruling on one ward meant the loss of the election.

The Saginaw United Transit Company asks only a three-year franchise and guarantees an eight-minute schedule on all routes now being served by it. This company wants a 5-cent cash fare and 2 cents for transfers. It proposes to incorporate for $375,000 and will operate, if given the contract, sixty-five, twenty and thirty-passenger buses.

The omnibus company offers a 6-cent cash fare and universal transfers. Its smallest vehicle is to seat at least twenty-five and Mr. Bidwell says that the company will use only thirty-passenger conveyances, such as the Imperial Omnibus in use on some New York routes.

It is believed that both the jitney men and street car-bus folks will oppose the omnibus grant. Those sponsoring the omnibus franchise have had their first meeting. Mr. Bidwell is reported to have said his company "would give as good or better service in Saginaw than the Fifth Avenue Coach Company, New York," if awarded the franchise.

Transit Measure Introduced at Albany

New Bill Gives City of New York Full Control of Transit—Present Commission Abolished—City Empowered to Acquire, Build and Operate All Transit Facilities—State Supervision Barred

THE Democratic administration at Albany chose Lincoln's birthday as the time to introduce its feature transit legislation emancipating New York City from the shackles of state regulation in so far as transit is concerned. The measure was introduced in the Senate by Majority Leader James J. Walker and in the Assembly by Minority Leader Charles D. Donohue. It is entitled:

An act granting to the city of New York power to construct, acquire, own, operate and regulate transit facilities in such city, establishing the department of transportation of such city, transferring to such department and the Board of Estimate and Apportionment certain powers, duties and jurisdiction of the Public Service Commission and of the Transit Commission, and abolishing the transit commission.

Instead of writing the provisions of transit regulation into the Greater New York charter, a new department of the city government will be established by a special act known as the Department of Transportation, which is to exercise supervision over all transit facilities located wholly within such city.

The act is divided into five articles and into it have been written the salient provisions of the public service commission law and the provisions of the rapid transit act.

The feature provisions of the act are the broad grant of powers to the city, hereinafter more specifically stated; the provision that the commission shall not have power to increase any rate, fare or charge specified in any franchise heretofore or hereafter granted or contract entered into by or with the city; that the commission may prepare a plan or plans for municipal operation, which may be put into effect if approved by the Board of Estimate and Apportionment, and that any deficit in operation under any such plan or system shall be made up by appropriation out of funds of the city. The entire expense of the operation of such a commission is to be borne by the city of New York.

An official summary of the measure is as follows:

This act is a special city bill, applicable only to the city of New York, but is not an amendment to the charter.

Features of the Bill

THE bill deals exclusively with New York city, giving to it complete home rule in all transit matters.

The Board of Estimate is designated as the city authority to receive this power and to exercise it through a Department of Transportation, thereby created, or any other agency the board may choose.

The head of the department is to consist of three commissioners to be appointed by the Mayor, salary to be fixed by the Board of Estimate.

The city receives the following powers:

To construct, own and operate rapid transit lines (now contained in the rapid transit act).

To regulate transit operation in the city (now exercised by the Transit Commission, which is abolished).

To construct, own and operate other means of transportation for which franchises are usually required. This includes, of course, buses, for which Mayor Hylan wishes to spend $25,000,000. Freight may be carried by the municipally operated lines.

It is provided that in any municipal operation such activities and funds derived therefrom shall be kept separate from all other municipal activities and funds.

The act stipulates that fares shall not be increased to more than 5 cents, except by action of the Board of Estimate, which would have power also to reduce fares.

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By the terms of the bill the city is given the largest measure of home rule in planning, building, acquiring and operating or leasing for operation transit facilities of any and every kind. The Board of Estimate and Apportionment is designated as "the local authority" of the city in control of the streets for the purposes of exercising the broadest jurisdiction in all transportation matters.

Department of Transportation for New York City

The act creates in the city of New York a department of transportation, the head of which shall be a transportation commission composed of three commissioners to be appointed by the Mayor, and whose term of office shall end with the term of the Mayor; but the commissioners may be removed by the Mayor at his pleasure. The Mayor is also empowered to designate the chairman of the commission. The Board of Estimate and Apportionment is authorized to increase or decrease the number of commissioners at any time No salary is fixed for the commissioners nor for any employees of the commission. The Board of Estimate and Apportionment is authorized to fix all salaries.

The present Transit Commission is abolished. All powers to override the Board of Estimate and Apportionment vested in the present Transit Commission are repealed and the new Transportation Commission will be subject to the Board of Estimate and Apportionment in all financial particulars.

The introductory sections of the new act convey a grant of power to the city of New York, acting through the Board of Estimate and Apportionment or the Transportation Commission as specified, to establish, construct, install, own, acquire by purchase or condemnation, or control by lease, any railroads, street railroads, street surface railroads, rapid transit lines, moving platforms, omnibus or stage lines, trackless trolley lines, or any other transportation facility that would require a franchise to operate in the streets of the city. The city is also authorized to set up municipal operation of any or all such transportation facilities, or the Board of Estimate and Apportionment may lease any city owned transportation facility to a corporation to operate in behalf of the city. The act further empowers the Transportation Commission to supervise and regulate the rates, fares, charges and practices of all corporations or persons owning, obtaining or operating any transportation facility within the city.

The Board of Estimate and Apportionment is authorized to issue the obligations of the city for the purposes of ownership of transportation facilities, in the form of transportation facility bonds to be issued for a period not longer than the estimated duration and usefulness of the facility to be financed by such means.

The jurisdiction of the department extends to all transportation facilities lying exclusively within the city and to all transporation facilities partly inside and partly outside the city, so far as concerns the operation of those lines within the city.

The commission will have power to prescribe rules and regulations to be observed by all transportation corporations with respect to quantity or quality of service, rates, fares and charges for carrying passengers and property, methods of accounting, financial reports, and all other powers now vested in the Transit Commission or the Public Service Commission to enforce such regulations and orders.

City May Use Any Form of Transportation

The most important expansion of power occurs in broadening the field of municipal construction, acquisition and operation. Heretofore, by the terms of the rapid transit act, the city has been authorized to construct only rapid transit railroads. The new transportation act authorizes the city to establish, construct, equip and operate or to lease to another to operate, any form of transportation facility of the nature that would commonly require a franchise.

The article authorizing municipal construction and operation is developed in considerable detail. Parts of the rapid transit act are included, adapted to the needs of the city, including the prohibition against constructing elevated railroads on certain streets, the obtaining of consents of property owners along the route of a proposed railroad, the sections regarding the letting of construction contracts, public hearings on contracts, and the acquisition of railways partly completed.

A completely new portion of the municipal operation section of the new act is descriptive of financial control to be exercised by the Department of Transportation over various forms of municipal operation.

It is provided that the Department of Transportation may on its own initiative, and shall, at the direction of the Board of Estimate and Apportionment, make an investigation of the advisability of installing municipal operation of any form of transportation facility included in its jurisdiction, and that in reporting to the board it shall set up an estimate of the cost of construction, equipment or acquisition; an estimate of the cost of operation, including the personnel and organization that would be required; an estimate of the amount that will be required for maintenance and depreciation of the property and for interest and amortization of any city debt contracted to establish such transportation facility.

The act provides that under municipal operation the fare shall not be more than 5 cents, except by express authorization of the Board of Estimate and Apportionment.

It is provided that the commission shall prescribe the method of accounting and that the operating agency of every transportation facility shall be required to make monthly reports to the Mayor, the Comptroller, the Board of Estimate and Apportionment, and publish the same in the *City Record*.

Out of the operating fund created it is required that, after the close of operations each month, there shall be paid into the city sinking fund the monthly proportion of interest and amortization chargeable on account of the city debt, and there shall be paid into a special fund, to be in the custody of the Comptroller, a sum on account of depreciation of the property, to be used for renewal and replacement of worn out or obsolete parts.

Separate Accounting for Utilities

Another provision sets up a transportation contingent reserve fund in the custody of the Comptroller, into which will flow each month the surplus income remaining after all expenses and charges have been paid, except that the operating agency may retain an amount equivalent to the average expenses for one month as a working capital to meet the requirements and wages and supplies during the succeeding month.

It is provided that if the operating income in any month should be sufficient to pay all the expenses of operation and maintenance, but not be sufficient to pay the contributions to depreciation, interest and sinking fund, such contributions may be deferred until the first month, when there shall be a sufficient operating income to make up the deficit, but all accounts must be closed at the end of the year, and any deficit in the amounts due for interest and amortization must then be paid out of the contingent reserve fund, if there be enough balance in that fund, or else supplied by the Board of Estimate and Apportionment out of tax levy.

The intent and aim of the statute in respect to municipal operation is to require that such enterprises be maintained entirely separate and distinct from all other activities of the city; that the funds derived from the operation shall not be merged with other income of the city, and that the conditions of operations shall be such that the public shall be fully and completely informed at all times respecting the progress and results of any municipal operation that may be carried on.

Summarizing the bill as a whole, practically all of the powers conferred in respect to regulation are exercised at the present time by the Transit Commission, and formerly by the Public Service Commission of the First District. The powers in respect to construction and operation of rapid transit railroads are now vested in the Transit Commission and have descended from the old Board of Rapid Transit Commissioners. The new feature is the expansion of the power of the city in respect to municipal ownership and operation to include all other forms of transportation facilities in addition to rapid transit railroads.

No other acts are repealed. The Rapid Transit act remains, but the section of the Public Service Commission law establishing the Transit Commission will doubtless be amended and the provisions of this new act will supersede and take the place of any contradictory provision in any other act.

Preliminary Rapid Transit Plan

Downtown Subway Lines Are Proposed Under the Plan Recently Presented in Pittsburgh

Preliminary plans for a downtown subway in Pittsburgh, Pa., have been presented to Mayor Magee and Council by members of the sub-committee on transit of the Citizens' Committee on City Plan. The city authorities have $6,000,000 available for a subway system, as the result of the people's bond election of a few years ago, and its early application to the comprehensive plan is now urged.

The plans are not yet complete, but with the completion of the entire transit report they will be published in full and amplified with supporting data. The plan is sufficiently advanced, it was stated, to warrant the attention of the Mayor and Council at this time.

Among the arguments offered in favor of the scheme are that it would diffuse traffic, shorten time between points and practically eliminate serious surface traffic conditions.

Early Action Recommended

The committee urges that the whole problem be given constant attention as its solution is vital to the growth of the city. The new plans are the result of more than a year of intensive study.

The plans are for a scheme to be developed in four stages, the final stage removing practically all surface cars from the downtown streets, and providing two "through" rapid transit lines, the first from the lower north side to the East End via Fifth Avenue and Oakland, the second from the south side through the triangle and out Penn Avenue to East Liberty.

Early action was recommended, however, only on the first stage of this plan—a stage involving the construction of two subway loops which, taking off the surface approximately one-half the cars now making use of the downtown streets and thereby greatly relieving the serious traffic congestion in the triangle, will later fit perfectly into the ultimate scheme of rapid transit.

In the preparation of the transit plan, members of the citizens' committee declared that their aim had been to suggest a scheme which would meet these five requirements:

1. Afford the maximum relief from traffic congestion.
2. Facilitate and fit into a final rapid transit layout.
3. Spread the business district and thereby increase property values.
4. Improve transportation service.
5. Possess the maximum of flexibility in operation.

Preliminary Contract for Tokio Subway

The Foundation Company of New York, N. Y., has signed a preliminary contract for the construction of subways in Tokio, Japan, which on a cost-plus basis amounts to $15,000,000. The contract provides for the construction of the first of three subway systems to cost about $40,000,000.

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Motorize Short-Haul Trolley

Plan of Railway to Use Buses Approved by City Authorities and Now Before Utilities Commission

Olneyville, R. I., a part of the city of Providence, has a flourishing business center that compares favorably with similar centers in many small cities. Olneyville Square is the center of activity, and trolley service from this point to the center of Providence is performed over Westminster Street and over Broadway, there being five-minute service over each of these thoroughfares.

On Broadway, two lines operate express between the center of Providence and Olneyville Square, in addition to the local five-minute service. Beyond Olneyville Square seven different trolley routes spread out in a fan shape.

The United Electric Railways, in its efforts to speed up transportation to the sections lying beyond Olneyville Square, is planning to operate most of these seven routes over Broadway express between the civic center of Providence and Olneyville Square, stopping only to take on passengers on outbound trips, and to discharge passengers on inward-bound trips. This action would cause all of the trolleys on Broadway to be express cars.

Broadway is a 50-ft. thoroughfare between curbs. It is paved with asphalt. The car tracks are in the middle of the street. This particular highway extends practically into the civic center of Providence, and affords a fine opportunity for bus operation. The corner of Barton Street and Broadway is the last stopping place in an out-bound direction before reaching Olneyville Square.

With all the trolleys running express, the United Electric Railways is now planning to operate buses between Exchange Place, in the civic center of Providence, and the corner of Barton Street and Broadway on five-minute headway during the entire day and evening, and every 2½ minutes during the rush hour periods, if the travel supports it. This schedule will call for the operation of five buses during the normal periods and ten buses during the peak periods.

The distance between Barton Street and Exchange Place is 1.52 miles, and the trip will be made in twelve minutes. Thus, all the people within the area between Barton Street and the center of Providence will be served entirely by motor buses in lieu of trolley service.

The buses to be used will be of a seating capacity of twenty-four or twenty-five persons each. They will not be purchased until the Public Utilities Commission has approved of the plan to run them.

The method of fare collection will be pay-as-you-enter in-bound, and pay-as-you-leave out-bound. Operators will use the Rooke Automatic registers, which are capable of taking either the new metal fare tickets now in use, or a 5-cent piece accompanied by a cent paid into the hand of the operator. By the former method, there is a saving of 20 per cent over the latter procedure, the only requirement being the purchase of ten of these metal tickets for 50 cents. The same transfer privilege as prevails on the trolley cars, the purchase of one for 2 cents, will be in effect with the bus operation.

The plan was first presented by the United Electric Railways to the railroad committee of the Providence City Council and approved by it. Under the Rhode Island laws, it is necessary, before such changes can be put into operation, to have the approval and consent of the State Public Utilities Commission, and the plan is now in the hands of the commission. Providence, however, anticipates seeing motorized service in operation soon.

The United Electric Railways at the present time is operating five bus routes, four of them being to suburban points, and one being a cross-city line, operating between South Providence and Olneyville, across residential areas, and not through the civic center.

The present bus equipment of the company consists of seventeen units, as follows: Six Republic, six Mack and five White buses.

Fate of One-Man Cars Up

One-man cars in Clarksburg, W. Va., are doomed after Feb. 15 if an emergency ordinance passed by the City Council stands. The action by the Council followed quickly after announcement was made by the Monongahela Power & Railway Company that one-man cars would be placed on the Norwood line in addition to Adamston, Stealey and Despard runs.

The ordinance as passed declares that "one-man" cars are dangerous, provides that the city manager shall notify the company of the passage of the measure and establishes a penalty of not less than $50 and not more than $100 a car for each day it is violated after it takes effect Feb. 15.

In placing the ordinance before the Council for consideration, Councilman Bailey bemoaned the fact that there is a lack of competition among public utilities in Clarksburg and declared it was within the province of the Council to determine the nature and quantity of service which must be supplied by the utility companies.

District Commission Replies to Its Accusers

The Public Utilities Commission of the District of Columbia does not believe that a merger of the street railway companies, long advocated as a cure for Washington's traction problems, would of itself result in a reduction in fare. The commission voiced this belief in a voluminous letter mailed to Senator Phipps of Colorado, in which the Commissioners replied in detail to attacks made upon them recently on the floor of the Senate for the rates they have fixed for utilities. Even without a merger Congress could bring about a reduction in car fare, the letter declared, by changing the method of taxing the car lines, which legislation has been advocated by the commission for several years. The commission told Senator Phipps that with coal going up and no indication of a break in other operating expenses, there is little hope for a cut in fares without the long-pending legislation to change the form of taxation and to relieve the companies from paying the salaries of crossing policemen and paving track spaces.

Relief from Congestion Urgent in Detroit

Tentative plans for a system of down town dips or short subways to relieve congestion in the center of the city of Detroit will probably be ready within thirty days as a result of a meeting of the city's Rapid Transit Commission and the Street Railway Commission called by John C. Lodge, the city's acting Mayor. The meeting was attended by the full membership of both commissions. It was called at the suggestion of Ross Schram, assistant general manager of the Detroit Municipal Railway. The railway commission is at work on a program for immediate relief of congestion in the down town section which provides for submerging some of the lines and possibly leaving some on the surface. This plan according to Mr. Schram will be ready for consideration by the Council within thirty days.

The Rapid Transit Commission, on the other hand, has been working along a different line. It is considering a permanent rapid transit program to handle eventually a population of 3,000,000 people. The Rapid Transit Commission is of the opinion that construction of subways on the piecemeal plan may later prove very expensive to the city as some of the lines so built may possibly have to be rebuilt in the light of a more complete study of the city's transportation needs.

On its part, the Street Railway Commission contends that a program such as the Rapid Transit Commission proposes would require two years of planning. Meanwhile congestion in the down town section is becoming intolerable. Officials of the D. S. R. favor work being started at once on short down town dips, to be used later as a down town terminal and loading station for the unified rapid transit lines.

No detailed estimate of the cost of the dips has been made by the D. S. R. Although the Rapid Transit Commission favors delay, Sidney D. Waldron, chairman of that body, has signified willingness to co-operate with the street railway department in developing plans for relieving congestion as early as possible. A meeting of the members of the Rapid Transit Commission with the members of the Street Railway Commission and with D. L. Turner, consultant engineer for the Rapid Transit Commission, will probably be held within the next few days to endeavor to hit upon a common plan if possible.

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First Bus Application Allowed

Commission Having Jurisdiction in New York City Grants Operating Right to Far Rockaway Line

The New York Transit Commission has granted to the Nassau Bus Line, Inc., Paul M. Weidman president, a certificate of convenience and necessity permitting the operation of a bus line from Far Rockaway easterly to the New York city line at Central and McNeil Avenues, Lawrence. This company applied to the Board of Estimate and Apportionment for a franchise on Nov. 3 last. The franchise was granted with the subsequent approval of the Mayor on Jan. 9. It had previously secured from the Nassau County authorities the right to operate from the city line easterly to Lynbrook, so that the complete line now legalized and open to public use will be from Lynbrook to Far Rockaway.

This is the first application received by the Transit Commission for permismission to operate a bus line under a franchise legally granted by the city since its appointment nearly two years ago and the franchise is the first granted by the Board of Estimate since the decision of Justice Mullen of the Supreme Court, handed down in October, holding operation carried on merely under permits issued by the Commissioner of Plant and Structures to be invalid. The commission announced some time ago that it would be its policy to consider and determine every bus line application that would come to it, within the shortest possible time. It, accordingly, held a hearing on the Nassau application on Feb. 6 and issued its certificate within ten days of the granting of the franchise by the Board of Estimate. Under the law, the Board of Estimate, in granting a franchise, determines what route over city streets the operating company may use, and also what it shall pay to the city for its franchise privileges. The certificate of the Transit Commission, which cannot be given until the Board of Estimate has acted, but which is essential to complete the operating company's authority, covers the question of the public need for such a route.

The commission, at the time of the public hearings on the general subject which it held in October and November announced its readiness to grant certificates to practically all of the bus lines lacking franchises and held up by the court, but the Board of Estimate has not as yet acted finally in the case of any of these, other than the Nassau line. The action of that body in this case, however, apparently fixes a precedent upon which other lines still in operation without legal authority may be validated in similar manner.

The Nassau company now runs its buses only from Lynbrook to the city line, but formerly operated to Far Rockaway. Its use of the part of this route within the city was halted by injunction. It will now be able to resume operation over its full route, without interruption, and it is understood will do so within the next few days. It is to pay to the city by way of compensation for its franchise privileges 5 per cent of its gross receipts. Formerly it paid nothing.

Commission Asked to Make One-Man Car Decision

The Alabama Public Service Commission will be asked to decide whether or not the Birmingham Railway, Light & Power Company will be allowed to continue the operation of its one-man cars on the Norwood and Fountain Heights lines. This announcement was recently made by City Commissioner William L. Harrison.

Many citizens of Norwood and Fountain Heights filed objections to the one-man cars on the grounds that they had but one entrance for both whites and negroes. The matter was taken up and discussed thoroughly a few days ago by Lee Bradley, receiver of the street car company, and Judge W. I. Grubb, of the United States court, and their decision at the time was that the company was not financially able to make the change, which they estimated would cost the company approximately $180,000, including the loss on the sale of the one-man cars at second hand prices and the purchase of double entry cars.

Governor Refuses to Intervene in Strike

Any attempt on the part of State Industrial Commissioner Bernard L. Shientag to investigate the causes of the strike on the International Railway in effect since July 2 would be nothing more than an "empty gesture." This is the opinion of Governor Smith. He so stated on Feb. 14 to John M. Parker, president of the street railway men's union, who, with President James P. Holland of the State Federation of Labor and representatives of a dozen railway unions throughout the State, called on him in an effort to secure the services of the bureau of mediation and arbitration of the state industrial commission.

The Governor met the labor representatives in the executive chamber by appointment and listened while President Parker outlined their wishes as covered in resolutions which were handed the executive.

"Commissioner Shientag," said the Governor, "has been in office less than two weeks and during that time has been detained in New York in an effort to adjust the strike of the garment workers. Moreover, he found his department standing on its head and in need of thorough reorganization. He expects to apply himself to the task at once and for that purpose will be in Albany tomorrow.

"I expect to see him and will bring your matter to his attention, but it is only fair to you men to tell you I think any investigation he might make would be nothing more than an empty gesture.

"I've gone over this whole situation with the dominating powers in the International Railway and I know exactly how they feel. I don't mind telling you what they told me, and that was that before they would consent to arbitrate this question with your union they would turn the entire company over to the men who are now running it. That's how strong they feel about it. It's useless to talk about arbitration when one side or the other takes the stand that there is nothing to arbitrate. There is no law in this State which can force arbitration when one side or the other refuses to entertain it.

And then, warming up a bit, the Governor demanded:

"How in hell can you arbitrate something which one side won't admit exists? And these men mean what they tell me, I'm satisfied of that."

News Notes

Paving Bill in Indiana.—The Indiana House has adopted a committee report for a bill which would provide for paving between street car tracks. The bill provides that intertrack paving shall be paid for by the abutting property owners, but that if special paving be required, or if the paving costs more than the regular paving outside the tracks, the company shall pay the excess cost.

Could Not Be Financed.—In commenting on the city's suggestion that the Northern Ohio Traction & Light Company, Akron, Ohio, accept a ten-year franchise which provides for a capital expenditure during that time of $2,000,000, the *N. O. T. & L. News*, the official publication of the company, states under date of Feb. 2 that the suggestion cannot be accepted. The reason given is that it would be utterly impossible to obtain this amount of money in Akron or any financial center to be invested in new lines under a grant which only runs for ten years.

Municipal Ownership Bill Introduced.—The latest bill to be introduced in the Indiana General Assembly would curtail the authority of the Public Service Commission and permit municipal corporations to establish utilities where privately owned utilities already exist, without appealing to the Public Service Commission for permission. The bill does not mention the fixing of rates, leaving that to the Public Service Commission. A bill introduced previously included the same provision, but also would permit the municipalities to fix rates without interference from the commission. This was considered a serious blow to the authority of the commission, as it was said privately owned utilities could not compete with those owned by the public when the municipality fixed the rates.

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Foreign News

Renewal Work in Hand

Reductions in Cost of Material and in Wages Paid Spurs New Work—Many New Fares Put Into Effect on Jan. 1—Car Without Angles Ready for Service

OWING to the fall in the cost of labor and materials a large number of British tramway authorities are now putting in hand track renewals which are not merely urgently needed but are long overdue. Besides that, authorized extensions are soon to be constructed. The promises of a revival in trade are producing a certain feeling of optimism, anl if the trade prospects go on improving there will be a revival in tramway construction. Traffic receipts are showing a smaller reduction compared with corresponding weeks of twelve months ago, and in the case of the London County Council the corner has already been definitely turned, the receipts in the last few weeks showing substantial increases compared with those of the same weeks of a year ago.

Railway Fares Reduced

The promised reduction of railway fares all over Great Britain came into operation on Jan. 1. Third-class fares are 1½d. per mile instead of 1¾d., and first-class fares 2½d. instead of 3d. On the London underground electric railways, which are in a class by themselves and not bound by any arrangements for the railways of the country generally, the minimum fare for the shortest journey which can be taken remains at 1½d. For all longer distances, however, fares are so reduced as to average 1d. a mile and in some cases even less. Then, while general railways of the country have made no change in season ticket charges, "the Underground" has reduced season ticket rates also.

On the tramway lines and omnibuses associated with "the Underground" the penny stage has been increased from half a mile to a mile, with a penny a mile for longer distances. The object of retaining the 1½d. minimum on the railways is to induce passengers to use the buses for short distance travel. On the London County Tramways the fare for slightly over a mile was already a penny, and this has not been altered. The distance for a penny during the slack midday hours has, however, been increased from 1.2 to 1.8 miles. All the concessions which have been made in the line of reductions in fares are in hope of traffic responding sufficiently to prevent loss.

Power Plant Improvements Proposed

Large additions to electric generating plants were installed at Liverpool and Leicester during December. In the municipal power station of the former city a 12,500-kw. generator was started and an automatic substation, the first of the sort in this country, was opened. The new generator, if used for tramway power alone, could operate a tramway system three times the size of that in Liverpool, but the municipality supplies electricity for all purposes within the city. In Leicester a new municipal power station was opened, with one unit of 10,000 kw. installed. Extensions can be added on a uniform plan up to a total of 65,000 kw.

One of the five improved experimental cars ordered some time ago by the London Electric Railway from five British firms has now been completed or almost so. This has been built by Commell, Laird & Company. Angles have been avoided everywhere, and the wheels are surmounted by leather shrouds so as to deaden the noise in the tunnels. The lighting is elaborate. Those lamps which show have cut-glass globes, while the others are so concealed as to avoid a glare in the eyes. The internal fittings are luxurious, with royal blue and ivory as the principal decorative colors. The same blue and old gold characterizes the upholstery.

Car Speeds Attract Attention

In tramway circles a renewed interest is being taken in the question of car speeds, and it is claimed that present restrictions should be relaxed. When they were first instituted there were no automobile vehicles, and the enormous speed not permitted to the latter has accustomed the public to high-velocity road traffic. It is accordingly contended that the cast-iron rules relating to tramcars should be modified. They have often to compete with motor buses and they have to stop more frequently than the latter. That something can be done even within the present regulations is shown by a sensible speeding up of London tramcars on many routes. In fact, the acceleration and braking are so rapid as sometimes to be of inconvenience to passengers who are not seated at the moment.

The National Joint Council for the Tramway Industry entered on its fourth year of existence in December. At a meeting of the Council on Dec. 14 a special committee was appointed to report on the most suitable type or types of vestibule fronts on tramcars now in service and the measures that may be taken to secure their general adoption. During its existence the Council has been very successful in deciding disputes and preventing strikes.

The one-man car is, of course, a great institution in the United States, but in this country it has so far been experimented with on only a very small scale. The attention of the Ministry of Transport has, however, been directed to it and the Ministry has issued regulations to be observed. The regulations are substantially in accordance with American practice, as, for example that the car should be a single-decker, that the entrance and exit should be by a door at the front on the near side with folding step working in conjunction with the door, and the car should be incapable of being started until the door is shut.

In the middle of January "no accident week" was observed in Glasgow under the auspices of the Town Council Safety First Committee. All the ministers of religion in the city were asked to make reference on Sunday, Jan. 14, to the matter. Teachers were requested to address their scholars on the subject of "safety first," and the scholars got "safety first" buttons to wear. Safety first pennants were sent to drivers of vehicles for display during the week. Various organizations of juveniles took part in the general effort.

Rail Contract Awarded

Edinburgh Town Council, reversing a decision of its tramways committee, has awarded a contract for 2,500 tons of rails to Dorman, Long & Son, Middlesbrough, at £9 9s. per ton. The committee had proposed that an offer should be accepted from the Compagnie Anglo-Belge d'Importation & Export, Brussels, at £7 15s. per ton. The desire of the majority of the Council is to encourage home industry and to relieve unemployment.

The conjoint stations at Charing Cross of the Metropolitan District Railway, the Charing Cross & Hampstead Railway and the Baker Street & Waterloo Railway have established a new record. During the busy time of the day 1,232 cars (run of course in trains) pass through every hour, with seating accommodation for 61,600 passengers. Between 5 and 6 o'clock in the evening more than 200 trains pass through.

The London County Council has decided that in future the cost of renewing track shall be charged as renewals, and that all patch work in connection with paving and the making good of broken rails and castings shall be charged as repairs.

The Town Council of Croydon, a large borough on the southern outskirts of London, has for a few years been in financial trouble over its tramway system, largely owing to the competition of London motor buses. It has now been decided to undertake the reconstruction of the main road track by direct labor, instead of employing contractors. The estimated cost is £132,000.

The work of constructing a tramway across the high-level bridge between Newcastle-on-Tyne and Gateshead has now been completed, and a great convenience to the local public is assured. The scheme has been talked about for many years. Cars will be run over the structure at one-minute intervals in each direction.

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Financial and Corporate

Interurban Does Well

$10.91 a Share Earned by the Detroit United Railway Since Divested of City Lines

The report of the Detroit (Mich.) United Railway for the year ended Dec. 31, 1922, shows a net income of $1,677,875 after interest charges, federal taxes and contingent liability reserve. This is equivalent to $10.91 a share earned on $15,375,000 capital stock and compares with a net income of $865,444, or $5.62 earned in the previous year.

The consolidated income account of the company for the year 1922 compares as follows:

STATEMENT OF EARNINGS OF DETROIT UNITED RAILWAY

	1922	1921
Gross earnings	$13,184,771	$23,329,067
Operating expenses	10,098,489	19,428,779
Net earnings	$3,086,282	$3,900,288
Other income	1,064,574	716,225
Total income	$4,150,856	$4,616,513
Interest, taxes, etc.	2,472,981	3,601,060
Net income	$1,677,875	$1,015,453
Dividends and federal tax	356,464	*825,000
Surplus	$1,321,411	$190,444

*Includes $375,000 paid in stock.

The statement reflects, of course, the changed status of the company following the transfer by it of its city lines to the city of Detroit for municipal operation. The sale price to the city was $19,850,000, $2,770,000 of which was to be paid in cash. This price, after deducting the cash payment which was utilized for discharging other obligations of the company, was a little more than sufficient to provide for the company's bonds allocated to the city system.

ENTRANCE TO DOWNTOWN DETROIT ESSENTIAL

As to the prospects for the future, acting President Elliott Stevenson says that the company is still faced with problems of a serious character. The era of so-called good roads has resulted in the construction of many miles of so-called concrete pavement in Michigan paralleling the company's interurban system. This has resulted in intense competition by carriers of passengers and express and light freight for hire by individuals and companies putting into service buses and trucks. All this has tended to diminish the company's traffic. Another problem is to secure better means than now exist for providing more rapid delivery of suburban passengers to the center of Detroit.

The city of Detroit, Mr. Stevenson says, no doubt will at an early date take steps to establish rapid transit facilities for its own traffic and that these are likely to take the form of subways rather than an elevated. It will be a matter of vital importance to the Detroit United Railway to arrange to avail itself of the rapid transit facilities when provided, in order that the growing suburban traffic may be encouraged and properly served. He explained that a general survey of the situation has been undertaken by the city authorities and that his own company has independently undertaken a similar survey, as it is generally recognized that such facilities should be provided at an early date.

So far as the dividend record of the company goes, it resumed the payment of cash dividends by the declaration of 1¼ per cent on Dec. 1. Two stock dividends at the rate of 2½ per cent quarterly were voted by the directors, payable Sept. 1 and Dec. 1, 1921, subject to the approval of the Public Utilities Commission. The commission in both instances withheld approval so that the action of the directors proved ineffective, and as a result the resolutions were rescinded declaring the dividend referred to, payable Sept. 1 and Dec. 1.

Reorganization Terms Announced

Underlying Securities of Brooklyn Rapid Transit Will Remain Undisturbed—$26,000,000 of New Capital to Be Provided—Financial Structure Rearranged to Include Preferred Stock Issue

JUDGE JULIUS M. MAYER of the United States Circuit Court at New York late on Feb. 9 announced the terms of the reorganization plan prepared by the committee of stockholders and agreed to by a large majority of the other security holders of the company. This is the first legal step toward the reorganization of the company and its release from receivership. The proposed reorganization is intended to accomplish:

1. The early termination of the receivership.
2. The funding into long-term 6 per cent bonds of more than $60,000,000 of short-term obligations, most of which now carry 7 per cent interest.
3. The payment in part, and the adjustment of the balance, of the accumulated arrears of interest, amounting to more than $27,000,000, on the bonded debt of the system so as to permit the resumption of the payment of current interest.
4. The payment in cash of the principal amount of the tort claims for personal injuries, as allowed, estimated at approximately $2,200,000.
5. The adjustment of the claims of the general contract creditors, as allowed, estimated at approximately $1,500,000.
6. The payment of receiver's certificates and other claims against the properties aggregating more than $12,000,000.
7. The provision of $26,000,000 of new money by stockholders or underwriters for the purposes of the reorganization. This includes, in addition to the above cash requirements, the immediate provision of a fund of $5,000,000 for the requirements of the rapid transit lines, among which is the equipment of the lines still to be completed by the city under the existing contract, and the provision of working capital.

The plan as proposed does not include the surface lines of the Brooklyn City Railroad, but provision has been made for their inclusion later if an agreement on terms can be reached. Underlying bonds of the approximate value of $46,500,000 are not disturbed by the plan.

Announcement of the plan was made by Judge Mayer after application had been made by the receiver for permission to issue additional receiver's certificates. Judge Mayer said that he did not believe it would be necessary to pass upon this at present. Judge Mayer said:

> The task of working out a plan of such magnitude has been one of great difficulty in a very complicated situation in which there are many different kinds of securities and claims. After months of study and of conferences the negotiations have reached a point when it may be announced that the noteholders' committee, War Finance Corporation and the stockholders' committee, as well as substantially all of the other committees of security holders, have reached an agreement as to the main features, leaving only to be worked out the details, which are inherent in every important plan of reorganization.
>
> It is gratifying to state that the plan, among other things, contemplates and provides for the payment of 100 per cent of the principal of the tort claims in cash. It will be recalled that at the beginning of the receivership, when Lindley M. Garrison was appointed permanent receiver, the court expressed its purpose to do all within its power to accomplish this result and counsel for certain of the security holders, then present, assured the court of their co-operation in that regard. That co-operation has been faithfully tendered with the result indicated.
>
> In due course the receiver will present a report of the affairs of the receiverships. This will show, among other things, the completion during the receivership of the B. R. T.'s part of Contract No. 4 entered into with the city in 1913. During the receivership the new tunnel under the East River has been fully equipped and placed in operation in conjunction with the line running up Broadway, Manhattan and the Brighton Beach subway connection, and other new lines in the Borough of Brooklyn have also been placed in operation. During the same period 400 new steel passenger cars of the latest type have been provided for use in the subways, and in addition to other improved facilities on the rapid transit lines many miles of surface railway track have been reconstructed and new cars bought and put into service.
>
> Notwithstanding these and other desirable results, those familiar with legal procedure will appreciate that, under the limitations of a receivership, this great system of transportation cannot reach its fullest progress until the receiverships shall have been ended.

The court then explained that in accordance with the law it will be necessary to submit the plan to the Transit Commission for approval, but that the commission had been informed of the steps taken and that it was well disposed toward reaching a final settlement of the questions involved.

NEW SECURITIES

New securities proposed to be issued under the plan include the following:

1. New 6 per cent sinking fund bonds, to be secured by the pledge, at the rate of six for five, of 5 per cent bonds of the company or companies owning and operating the rapid transit subway and elevated lines and the power house properties. Pending the creation of these underlying bonds, the security will be all or substantially all of the capital stock and obligations of the companies at the time owning and operating the rapid transit subway and elevated lines and the power house properties. The new 6 per cent bonds are to mature in approx-

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imately forty-five years and are to carry cumulative sinking fund payments, beginning July 1, 1926.

2. New 6 per cent preferred stock, cumulative after three years.

3. New common stock, without par value.

PRIOR LIEN MORTGAGE PROPOSED ON RAPID TRANSIT LINES

The proposed plan also contemplates the authorization of a prior lien mortgage on the rapid transit lines and power house properties to such an authorized amount as may be later determined by agreement with the committee. Bonds are to be issuable hereafter under this mortgage for the purpose of providing additional equipment and for capital improvements for the rapid transit lines and for the power house properties after July 1, 1923, and after the exhaustion of the funds provided for such purpose in reorganization. The authorization of this prior lien mortgage is intended to make certain that the new company will at all times be in a position to finance the requirements of its contract with the city. None of these bonds will be issued under the plan. It is also contemplated that the entire investment of the new company in the surface railway companies will be available hereafter for the future financing of the surface railway properties.

Holders of the $74,422,959 par value of stock of the Brooklyn Rapid Transit Company outstanding will have the privilege of purchasing, for the aggregate purchase price of $26,048,015, $16,280,009 face amount of new 6 per cent bonds of the issue above described and $9,768,006 par value of new 6 per cent preferred stock and 744,229 shares of new common stock without nominal or par value. The payment by stockholders for this purpose amounts to $35 per share.

Under the proposed plan, each stockholder on the payment of $35 for each share of old stock deposited will be entitled to receive on consummation of the reorganization $21.875 face amount of new 6 per cent bonds, $13.125 par value of new 6 per cent preferred stock, and one share of new common stock of successor corporation organized to acquire under foreclosure properties of Brooklyn Rapid Transit Company.

Terms proposed to be offered for the readjustment of the notes and bonds of Brooklyn Rapid Transit Company outstanding in the hands of the public by the issuance of new 6 per cent bonds and new 6 per cent preferred stock, and the cash payments to be made, are as follows:

Three-year 7 per cent notes: $1,100 new 6 per cent bonds; $180 new 6 per cent preferred stock; $70 cash.

Six-year 5 per cent notes and New York Municipal Corporation 5 per cent bonds: $1,100 new 6 per cent bonds; $100 new 6 per cent preferred stock; $50 cash.

Fifty-year 5 per cent bonds, due 1945: $900 new 6 per cent bonds; $125 new 6 per cent preferred stock; 1,625 shares new common stock; $50 cash.

Refunding mortgage 4 per cent bonds: $720 new 6 per cent bonds; $100 new 6 per cent preferred stock; 3.2 shares new common stock; $40 cash.

Secured bank loans: 47 per cent of principal and arrears of interest to June 30, 1923, in cash, 47 per cent thereof in new 6 per cent bonds and the remaining 6 per cent thereof in new 6 per cent preferred stock. In each of these cases the amount of new securities or cash mentioned is the amount applicable to $1,000 face amount of obligations, every bond to carry all defaulted coupons.

As indicated previously the principal amount of claims arising out of the Malbone Street accident and other unpaid tort claims are to be paid in cash. General contract claims aggregating $1,500,000 are to be satisfied by receipt of 50 per cent of principal of claims in cash, and the balance, including interest, is to be satisfied by the receipt of new 6 per cent preferred stock. The *Wall Street Journal* has worked out the accompanying summary of the reorganization terms.

PLAN OF READJUSTMENT OF BROOKLYN RAPID TRANSIT COMPANY

Existing securities and claims to be readjusted:

	Amount Held by Public	Unpaid Interest to July 1, 1923	To Receive: New 6 per Cent Bonds	To Receive: 6 per Cent Preferred Stock	To Receive: Common Stock (Shares)	Cash Received
Brooklyn Rapid Transit Company:						
5 per cent fifty-year gold mortgage bonds	$6,963,000	$1,653,712	$6,266,700	$870,375	11,315	$348,150
Per $1,000 bonds	1,000	237	900	125	1.625	50
First refunding mortgage, 4 per cent gold bonds	3,433,000	617,940	2,471,760	343,300	10,986	137,320
Per $1,000 bonds	1,000	180	720	100	3.2	40
Three-year 7 per cent secured gold notes, due 1921	57,243,700	20,035,295	62,968,070	10,303,866	.....	4,007,059
Per $1,000 notes	1,000	350	1,100	180	.....	70
Six-year 5 per cent secured gold notes due 1918	475,000	118,750	522,500	47,500	.....	23,750
Per $1,000 notes	1,000	250	1,100	100	.....	50
New York Municipal Railway Corporation:						
First mortgage 5 per cent sinking fund gold bonds	2,055,000	513,750	2,260,500	205,500	.....	102,750
Per $1,000 bonds	1,000	250	1,100	100	.....	50
Brooklyn Heights Railroad Co.:						
First mortgage 5 per cent gold bonds	250,000	53,125	.....	250,000	.....	.....
Per $1,000 bonds	1,000	212	.....	1,000	.....	.....
Brooklyn Rapid Transit Co.:						
Bank loans secured by its 4 per cent refunding bonds	3,300,000	937,166	1,991,468 (47 per cent)	254,230 (6 per cent)	.....	1,991,468 (47 per cent)
*Tort claims for personal injuries (estimated)	2,200,000	.....	.....	.....	.....	2,200,000
*Claims of general contract creditors (estimated)	1,500,000	400,000	.....	1,150,000	.....	750,000
Receiver's certificate and car leases warrant	12,485,000	†	.....	.....	.....	12,485,000
B. R. T. stock on payment of $35 per share	74,422,959	.....	16,280,009	9,768,006	744,229	.....
Per 100 shares	.....	.....	2,187.50	1,312.50	100	.....
	$164,327,659	$24,329,737	$92,761,007	$23,192,777	(sh.)766,530	$22,045,497

Cash paid in by stockholders, $26,048,015, or $3,500 per 100 shares.

Underlying bonds to be reinstated: Brooklyn, Bath & West End Railroad Company:		Bonds of Issue ‡ Deposited	To Receive: 6 per Cent Preferred Stock		Cash
General mortgage 5 per cent gold bonds	118,928	23,796	118,928	.....	23,796
Per $1,000 bonds	1,000	200	1,000	.....	200
Atlantic Avenue Railroad Company of Brooklyn:					
Forty-year 5 per cent improved gold bonds	215,000	43,000	215,000	.....	43,000
Per $1,000 bonds	1,000	200	1,000	.....	200
Nassau Electric Railroad Company:					
First mortgage 5 per cent gold bonds	660,000	132,000	660,000	.....	132,000
Per $1,000 bonds	1,000	200	1,000	.....	200
Consolidated mortgage 4 per cent gold bonds	10,337,000	1,860,660	10,337,000	1,447,180	413,480
Per $1,000 bonds	1,000	180	1,000	140	40
Coney Island & Brooklyn Railroad Company:					
Consolidated mortgage fifty-year 4 per cent gold bonds	1,500,000	270,000	1,500,000	.....	270,000
Per $1,000 bonds	1,000	180	1,000	.....	180
*Brooklyn, Queens County & Suburban Railroad Company:					
First mortgage 5 per cent gold bonds	1,497,000	336,825	1,497,000	.....	336,825
Per $1,000 bonds	1,000	225	1,000	.....	225
First consolidated mortgage 5 per cent gold bonds	2,803,000	560,600	2,803,000	420,450	140,150
Per $1,000 bonds	1,000	200	1,000	150	50
	$17,130,958	$3,226,881	$17,130,928	$1,867,630	$1,359,251

*The right is expressly reserved to exclude from treatment under the plan or to postpone the readjustment of any bonds or other securities of or claims against Brooklyn, Queens County & Suburban Railroad Company in case an adjustment of existing controversies affecting the stock or bonds of said company is not reached with the Brooklyn City Railroad Company.

† Interest on these obligations is not here included, as same is paid currently by the receiver.

‡ Unpaid interest on underlying bonds is computed to July 1, 1923, if an interest date; otherwise to the nearest interest date preceding said date.

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P. R. T. Valuation Case Nearing Completion

At the hearing on Feb. 5 in connection with the proceedings to establish a valuation for the property of the Philadelphia Rapid Transit Company, in answer to a question by Commissioner Clement of the Public Service Commission, Attorney Coleman J. Joyce of the railway said he would require sixty hours in which to complete cross-examination of witnesses and finish the company's side. Assistant City Solicitor Rosenbaum agreed to this length of time and announced that he would need about three weeks to complete the city's side of the proceedings. Commissioner Clement announced that daily hearings would be held, except on Saturdays and Sundays, and allotted three hours a day to Attorney Joyce. Under this arrangement, the case is expected to be completed and all testimony submitted to the commission for its consideration by March 26.

Lima-Defiance Branch Sold

Agreement for sale of the Lima-Defiance branch of the Columbus, Indiana & Eastern Traction Company to C. G. Taylor, Norwalk, Ohio, was concluded on Jan. 31, according to an announcement by Receiver J. H. McClure. The price agreed on was the upset price of $125,000 fixed by Federal Judge Killits of Toledo, for the sale of the road as junk or as an operating concern. Because of this, confirmation of the sale was a mere matter of form.

Under the terms of the agreement, the purchaser paid $12,500 as a binder, the remainder to be paid by April 1. In the meantime, the I., C. & E. is to continue operation of the branch. Should the purchaser fail to carry out his part of the contract in paying over the remainder of the purchase price, the amount of the binder will be returned to him less any deficit incurred in the operation of the branch line between Feb. 1 and April 1. Any such deficit, if incurred, is also to be added to the balance due on the purchase price if the purchaser completes his agreement.

Mr. Taylor contemplates operation of the branch line with gasoline motor cars instead of electric power. The branch is one of three which the company was authorized to abandon, but on which operation was continued during negotiations between Mr. Taylor and the company for its purchase.

Mr. Taylor proposes to form a new corporation and issue $250,000 in stocks and bonds to finance his venture. This amount would be divided into $175,000 of first mortgage bonds and $75,000 preferred stock. There would be no common, the preferred stock having voting power. He proposes to sell the stock to farmers and residents of villages along the line, and is said to have received considerable encouragement from those who wish to keep the line in operation.

Continuation of operation on the Lima-Defiance line will have a beneficial effect on the Indiana, Columbus & Eastern line, inasmuch as connections between the two will still be maintained although it will be necessary for passengers to transfer at Lima.

Auction Sales in New York.—At the public auction rooms in New York there were no sales of electric railway securities this week.

Another Dividend Declared. — The board of directors of the Brooklyn (N. Y.) City Railroad has declared a regular quarterly dividend of 20 cents per share on the outstanding capital stock, payable March 1, 1923, to stockholders of record on Feb. 15, 1923.

Takes Mortgage for Bonds. — The Indianapolis, Columbus & Southern Traction Company, Columbus, Ind., has been mortgaged to the Fletcher American National Bank, Indianapolis, as trustee, to secure the issuance of $973,000 of first mortgage twenty-five-year bonds. According to the mortgage, the board of directors and stockholders decided to borrow money for corporate purchases.

Initial Common Dividend Declared.—The Georgia Railway & Power Company, Atlanta, Ga., has declared an initial dividend of 1 per cent on the common stock, payable on March 1, and an initial dividend of 4 per cent on the second preferred stock, payable in quarterly instalments of 1 per cent beginning March 1. The regular quarterly dividend of 2 per cent on the first preferred has been declared payable April 20.

Portions of Properties Transferred.—The Toronto & York Radial Railway and the Schomberg & Aurora Railway have been purchased by the city of Toronto and by agreement the portions of the railways outside the city of Toronto have been turned over to the Hydro-Electric Power Commission of Ontario to operate. The portion of these railways within the city are now being operated by the Toronto Transportation Commission.

Deficit Reported.—The income statement of the Springfield (Ohio) Street Railway for the entire year of 1922, filed recently, showed a deficit of $38,766, not including $30,000 accrued dividends on the preferred stock for which no provision was made. The annual report showed that in 1922 the company had carried a total of 9,131,974 passengers, with revenue from transportation aggregating $590,508 and non-transportation income of $5,209. Other income totaled $988.

Monthly Appears.—Nesbitt, Thomson & Company, Ltd., investment bankers of Montreal, Que., is issuing a monthly known as "Investments." The first issue presented a concise, easily read compilation of bond prices both in 1921 and 1922. Separate tables were also published, showing war loans, victory bonds, provincial, public utility and industrial bonds, giving the maturity date, interest date and yield, as well as the high and low and the net change during 1922. This publication will probably prove of real value to the investor.

Slight Decrease in Net.—The Reading Transit & Light Company, Reading, Pa., and subsidiary companies report a decrease in operating revenue, total operating expenses and net income for the year ended Dec. 31, 1922, compared with the year previous. The net income for the year just ended amounted to $240,748 against $247,285 for 1921. The provision for preferred stock dividend in 1922 was $117,115 which left a balance of net equaling $123,633 against $130,170 for the year ended Dec. 31, 1921.

Railroad to Acquire Lighting Properties.—The Annapolis Public Utilities has applied to the Public Service Commission of Maryland for permission to change its capitalization to pave the way for the acquisition of various electric lighting companies between Baltimore and Washington, and the new issues will be used in part, it is said, to pay for these properties. The properties to be acquired lie along the line of the Washington, Baltimore & Annapolis Railroad, which owns $172,700 of the $300,000 of common stock of the Annapolis Public Utilities Company.

Abandonment of Line Proposed.—Directors of the Buffalo & Lake Erie Traction Company, Buffalo, N. Y., have adopted a declaration of abandonment of that part of its line known as the Dunkirk & Point Gratiot line and operated between the city of Dunkirk and Point Gratiot. A special meeting of the stockholders of the company was called for Feb. 15 for the purpose of ratifying and voting upon the declaration of abandonment. Peter C. Schutrum is president of the Buffalo & Lake Erie Traction Company and M. J. Binkley is secretary. The directors of the railway say the line never has paid.

Reorganization Plan Declared Operative.—The plan for the reorganization of the Michigan United Railway, Jackson, Mich., referred to previously in the ELECTRIC RAILWAY JOURNAL has been declared operative. The holders of more than 90 per cent of the outstanding bonds gave their consent. There was some opposition to the plan on the part of the holders of the income debentures and the preferred capital stock, but the reorganization committee reports the deposit of a large amount of the outstanding capital stock and debentures. The reorganization plan provides that each debenture holder shall receive one share of common stock of the company to be organized for each $100 face amount of the debentures held by him, and that each holder of preferred stock shall receive one-half share of common stock of the new company to be organized for each share of preferred stock now held by him. It also grants to the holders of the debentures and preferred stock subscription rights which, if exercised, will give to them 60 per cent of the common stock of the new company. The chairman of the committee is G. R. Cottrelle.

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Traffic and Transportation

Bus Company Formed

Railway Lines in Los Angeles Will Install Bus Service—To Fight McAdoo Project

The Los Angeles Motor Bus Company has been organized by the Pacific Electric Railway and the Los Angeles Railway Corporation for the purpose of installing a bus service for the transportation of passengers within Los Angeles.

Application was filed on Feb. 5 with the Los Angeles Board of Public Utilities by the Los Angeles Motor Bus Company for a permit to operate bus service between Hollywood Boulevard and Santa Barbara Boulevard on Western Avenue. The service will be ten minutes during the rush hours and fifteen minutes during other hours of the day, commencing at 6 a.m. and operating until midnight, with a provision that more frequent service is to be operated to meet requirements of travel. The fare will be 10 cents, and free transfers will be issued between buses and cars of the two respective street railway lines to all of these companies' lines crossing Western Avenue. This involves four lines of the Pacific Electric Railway and the sixteen lines of the Los Angeles Railway crossing Western Avenue, according to the application.

Transfers Planned to Bus Line

A passenger paying a 10-cent fare on the Pacific Electric local street car lines within the 6-cent fare limit of Hollywood would be given a transfer to the Los Angeles motor bus line on Western Avenue, and the motor bus conductor would issue a transfer for any Los Angeles Railway or Pacific Electric Railway line crossing Western Avenue, it is also provided. This plan will permit a passenger to ride westbound within the local fare limits of Los Angeles and eastbound to the heart of the business district of the city, which is defined as the Temple blocks for the Los Angeles Railway and either the Sixth and Main Streets terminal or the Hill Street terminal for the Pacific Electric Railway.

If the application is granted it will provide a cross-town service for the western district of the city of Los Angeles, which has been urged by those who have been disadvantageously served under the existing street car service. Under the old arrangement passengers living on certain lines of the Pacific Electric have been obliged to pass around through the business district of Los Angeles in order to reach the Hollywood district, which has meant a loss of time and is claimed to be a detriment to the entire western district of the city. The installation of the bus line will correct that condition. The new motor bus company proposes to place in this service the highest type of motor buses that can be purchased, and each bus will cost approximately $8,000.

Officials of the railway lines interested have stated to the Board of Public Utilities that they will install a similar service on Vermont Avenue between Los Feliz Boulevard and Third Street, if it is desired by the city.

The application was signed by George J. Kuhrts, vice-president and general manager of the Los Angeles Railway Corporation, and by D. W. Pontius, vice-president and general manager of the Pacific Electric Railway. The Board of Public Utilities set Feb. 9 as the date for a hearing on the application. On Feb. 13 the board will hear the Los Angeles Railway's application regarding any improvements or additions to its service.

At a later date to be fixed by the board a hearing will be held on the proposed bus application now pending before the board and submitted by William G. McAdoo, as attorney for Eastern capitalists, who plan to install a huge bus system of 125 double-deck buses to serve all sections of the city of Los Angeles.

Just as the two local railway lines in Los Angeles opposed the application of the Eastern capitalists promoting a bus line, it is stated that the bus men in turn will be present to oppose the application of the railway lines. The Pacific Electric Railway at former hearings threatened to abandon the construction of its $3,000,000 subway out of its Hill Street terminal in Los Angeles to provide rapid transit to and from Hollywood, if the Eastern financiers were granted franchises to install their bus lines. The Eastern capitalists reply that with the granting of the bus franchises to them the subway will not be needed.

Richard W. Meade, who is conducting the fight for the Eastern capitalists, states that operation of bus lines as proposed by the company with which he is connected will not injure the present railway companies in Los Angeles. He states that his experience with the Fifth Avenue Coach Company in New York has taught him that the electric railways do not suffer any loss of patronage through the operation of a de luxe bus service such as he has proposed. The Easterners in opposing the bus lines as proposed by the railway contend that their application was filed first and they deserve first consideration.

Stage Temporarily Replaces Electric Car.—Auto stage service was employed by the North Coast Power Company, Vancouver, Wash., on its run between Chehalis and Centralia during a recent three-day shutdown of its electric railway. Suspension of service was due to the burning out of a generator in the power house.

Seven-Cent Fare Justified

Fight of Long Standing in Fort Worth Practically Terminated—City Wanted 5-Cent Rate

The Northern Texas Traction Company, which operates in Fort Worth, Tex., has won its fight to retain the 7-cent fare which has been charged in that city since soon after the signing of the armistice. N. A. Dodge, special master in chancery, who was appointed by the United States District Court for the Western District of Texas to conduct hearings and report on the company's earnings, investment, replacement values, percentage of return and fairness of return, has filed his report. He has found that the 7-cent fare now charged by the company is justified. The city sought to have the fare reduced to 6 cents, and if possible a return to the 5-cent fare was asked.

In his findings, Mr. Dodge reports that it has been shown that the company's net earnings under the 7-cent fare amount to $391,406, which on a valuation of $6,860,000 is less than 6 per cent. The company is entitled to this return or an even higher one, he says.

Controversy Started Under Former Administration

The fare fight in Fort Worth was begun during a former city administration, under Mayor W. D. Davis. When E. R. Cockrell was elected Mayor, his administration inherited this litigation, and with the change in administration the new city officials felt that they were called on not to push the fight as hard as had been done under the former Mayor. Accordingly the matter was permitted to rest. The appointment of Mr. Dodge as referee in the case was made while Mayor Davis was in office, and what is termed as the "first hearing" in the matter was held by the referee before Mayor Davis went out of office. Eighteen months later what is termed as the "second hearing" was held in August and September, 1922.

At the outset, the referee admits that the fixing of fares is a legislative right held by the City Commission as granted in the City Charter. At this point, however, he calls attention to the Fourteenth Amendment and holds that fixing a rate too low to give a reasonable income to the property holders would be depriving them of their property without due process of law and would be in violation of the Fourteenth Amendment.

In opening the hearing, the city of Fort Worth took the position that the city had ordered the 6-cent fare restored, whereupon the traction company had gone into Federal Court and secured an injunction restraining the city from enforcing the 6-cent fare ordinance, claiming the 6-cent fare would be confiscatory. It then devolved upon the company to present proof to show that the 6-cent fare would be in truth confiscatory. This placed the burden of proof on the company, and this position was accepted by the referee.

At the second hearing, last August and September, Halbert P. Gillette, for

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the company, qualified as an expert in traction company operations; G. F. Wells and R. G. Tabor qualified as appraisal engineers. Joseph McShane, for the city, qualified as a certified public accountant engaged in rate regulation of public utilities, but declined to qualify as an engineer, economist or railway operator.

Reviewing the testimony, the opinion cites that some lines of the city do not pay a reasonable income, while others pay a fair profit, and holds that for the company to abandon those lines which are not profitable and operate only those which are profitable would present a serious situation.

Additions to the company's property, as well as improvements, amounted to $300,000 annually for several years, the opinion points out. From Jan. 1, 1921, to June 30, 1922, the company spent $457,721 on additions, while for the period of Jan. 1, 1915, to June 30, 1922, the outlay was $1,807,850. Trackage mileage shows a 132 per cent increase for fifteen years.

The contention of Joseph M. McShane in the second hearing that the company is giving more service than is necessary is cited by the referee. He points out that the opinion of Mr. McShane was vigorously disputed by the company and that the city's expert modified his contention in cross-examination and that Mr. McShane did not suggest service reductions, but said they were matters to be worked out by the traffic department of the company.

One-Man Cars Praised

The report discusses the operation of Birney one-man cars in Fort Worth and praises them, agreeing with the city that their operation would cut down expenses. The reports say, in conclusion, that so far as the city is concerned in this inquiry the company has shown that a 7-cent fare is reasonable. The reports also said that the company was furnishing a dependable high-class street car service, which was in compliance with its obligation to the public in that respect, and appeared to have carried out a reasonable program of additions and extensions. On the question of extension the statement reads:

> With the matter of future additions and extensions to reach and serve outlying communities recently taken into the city, the master, of course, has nothing to do, but it may be observed that any such additions and extensions require new capital and add to the value of the property on which the company is entitled to receive fair return.

Passage of Act Will Mean Five-Cent Fare.—A flat 5-cent fare in the city of Providence on all trolleys and buses operating within the city limits will obtain if an act introduced in the House on Feb. 13 by Representative James H. Kiernan of Providence becomes a law. The act was referred to the judiciary committee. The measure directs the Public Utilities Commission to devise a uniform 5-cent fare within the city and to issue its order to all persons, firms or corporations operating trolleys or buses to put such rate of fare into effect not later than July 1.

New Jersey Fare Bill Introduced

Assemblyman William George, Democratic minority leader in the House, on Jan. 31 introduced the bill that aims to carry out the ideas of Governor Silzer of New Jersey along the line of lower fares by forcing the Public Service Railway either to agree to a lower valuation or give up its franchise.

Boiled down, the Silzer plan is to allow the Public Service Railway to earn profits on the reduced valuation at a rate to be adjusted on a sliding scale according to the rate of fare charged. In its preamble the bill says in part:

> Franchises granted to public utilities of the State by political subdivision thereof have been held by the courts of the State to be grants upon conditions, which may be altered by the exercise of the sovereign power of the State.
>
> Refusal of any public utility to observe and conform to such changes and alterations in the terms of the grants as may be imposed by the Legislature of the State, or any duly constituted agency thereof vested with authority to order such changes and alterations, makes voidable such grants. Therefore, to the end that as soon as is practicable, under the conditions imposed by this act, a basic fare of 5 cents may be established for street railway companies operating in this State.

Then follows a long series of provisions setting forth just how the new plan is to be worked out. The bills provide that if the traction company refuses to accept the new policy, the Public Service Railway franchise in the streets of New Jersey shall cease within three months after the passage of the bill, and within six months the poles, wires, tracks and other equipment of the company shall be removed, the idea apparently being that a system of buses could be used in the emergency and while the transportation system is being worked out along new lines.

Another "Pass" in San Diego

In addition to the city car line and suburban passes placed on sale when the San Diego (Calif.) Electric Railway adopted the weekly pass system of fare on Jan. 1, Manager Claus Spreckels has announced the addition of another pass, effective with the week beginning Feb. 5. This new member of San Diego's pass family is called the "Tourist System Pass," and is good over the company's entire system, including all suburban lines and beach lines and the San Diego-Coronado ferry.

The new pass sells for $1.50, and is aimed to encourage tourists to see San Diego by street car. The Tourist System Pass is transferable and in every other respect usable in the same manner as the other forms of weekly passes heretofore offered, but has this difference—it is sold only at the downtown ticket office of the company while the other forms of passes can be purchased from the conductors on the cars. The new passes went on sale Feb. 2 and the company reports a good demand for them.

The company is using publicity as well as display advertising space in the newspapers in marketing its transportation. The advertisements often list the various attractions and amusements which the company suggests to holders of the car passes.

One-Man Cars for Camden. — The Public Service Railway, Newark, N. J., will install one-man cars on all the Broadway lines on Feb. 18 at Camden, N. J. These routes include cars running to Camden, Gloucester, Woodbury, Mantua, Blackwood, Almonesson and National Park. Service will be increased 20 per cent on the line by the change. The number of cars will be increased from twenty-three to thirty.

Applies for Bus Privilege. — The Wheeling (W. Va.) Public Service Company has applied to the city for the right to operate buses in East and North Wheeling. The time has come, according to M. R. Stern, manager of the Wheeling Public Service Company, when electric cars and buses must supplement each other in the transportation of passengers. He said further that the car would remain the mainstay of urban and suburban transportation, but that the bus should be used as a feeder or an extension of the electric railway service.

Compromise on Fare Reached. — A compromise has been reached between the city of Waco, Tex., and the Texas Electric Railway, which owns and operates the street car lines in that city, whereby the 5-cent fare will be continued in force. The company had threatened to use only one-man cars and to operate these on an eighteen-minute schedule unless the city granted an increase in fares to 7 cents. Under the compromise agreement, the company will place one-man cars in service on the Baylor-Provident Heights line, with a ten-minute schedule.

Bill Authorizing Buses Passed.—A bill authorizing the city of Seattle to operate motor buses in connection with its municipally owned railway system has been passed by the Legislature. The bill will permit Seattle to operate buses in outlying districts, instead of extending the railway. At the same time it will also give the city the right to parallel and operate buses along the line of the Rainier Valley Railway, which did not become the property of the city when it took over the local lines of Stone & Webster. The bill expressly removes any jurisdiction which the State Department of Public Works might have over such buses and leaves their supervision entirely in the hands of the city.

Changes Introduced in Fare Ordinance.—Councilman Oliver T. Erickson has introduced in the Seattle Council a bill for a change in the 5-cent fare ordinance, passed by the Council and approved by the Mayor. The original bill provides for a 5-cent fare, with a token costing 1½ cents or 2 cents in addition for a transfer. Councilman Erickson's bill provides for a 5-cent fare, without transfer, and the issuance of transfers for an additional 2 cents or the presentation of a token sold at 6¼ cents, or four for 25 cents. The bill, which is understood to have the support of Mr. Henderson, superintendent of railways, as preferable to the sale of tokens for transfers alone, was referred to the city utilities and finance committee.

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Clamor for Five-Cent Fare Ill-Considered

Despite the fact that the Philadelphia Rapid Transit Company is building new cars and planning expensive crosstown lines, and that fares in Philadelphia are lower than elsewhere, considering kind and quality of service rendered, says *Service Talks*, published by the company, an ill-considered clamor for a 5-cent fare has been started. This agitation is futile, says the company, in that it cannot change the facts upon which the permanent fare will be fixed, and harmful in that it temporarily disturbs the company's credit and so prevents consideration of further improvements.

Says *Service Talks:*

P. R. T. men and management have, for several years past, created more than $16,000,000 a year, added income, by super-salesmanship and super-efficiency in operation, as compared with other cities. This added income has rebuilt P. R. T. property and has overcome more than 100 per cent increase in operating costs, with but 19 per cent increase in fares. This accomplishment of men and management enabled P. R. T. to take over the Frankford "L" and the Bustleton-Byberry line, thus relieving the city of a great burden which is now costing P. R. T. more than $1,000,000 a year net loss.

City and company engineers agree on the inventory of property used by P. R. T. in supplying service to the public. Unit values as presented by P. R. T., in accordance with Supreme Court rulings, are more than sufficient to justify continuance of present fare. P. R. T. is anxious to hasten the valuation hearings to a conclusion, but must retain its right to reveal inaccuracies in the city's figures by cross-examining the experts responsible therefor.

It is inconceivable that the accomplishments of P. R. T. men and management will be overthrown by an arbitrary reduction in the fare, rendering P. R. T. unable to proceed with its program of improvements, and impotent to undertake the operation of additional city-built lines.

Mayor Moore of Philadelphia issued a statement on Feb. 5 in which he said there is nothing in the Philadelphia Rapid Transit talks to discourage continued advocacy of a 5-cent fare. The company, he said, claims to have made super-efforts to increase service, but increase is not perceptible. Because of these super-efforts the company admits an increased income of $16,000,000 since the 7-cent fare started, the Mayor said, and continued:

If its income has thus been increased and it has been able to pay dividends and lay aside special funds, it justifies the public suggestion that it should return to the 5-cent fare as per the agreement of 1907.

City Will Plead in Memphis Case

The city of Memphis will be given a hearing in the circuit court to test whether a civil court has the power to review a public utility rate base set by the state commission.

The case, which will come up in Nashville, arose out of the dispute between the city of Memphis and the utilities commission when that body decided that the Memphis Street Railway was entitled to a return on an investment of $11,800,000. The city contended that this rate was too high by about $2,000,000.

The Public Utilities Commission decided for the company. The city took the matter into the Circuit Court of Davidson County, but could not secure a hearing on the question. Repeated efforts to obtain a hearing before a special judge proved futile.

The Memphis Street Railway was allowed a 7-cent fare largely because of the capital value fixed by the commission and protested by the city.

Passage of Bill May Bear Heavily on Treasury

A bill pending in the Legislature now in session at Olympia, Wash., provides for a day off in each seven for all conductors and motormen employed on Seattle street cars and has the backing of the street car men's union, represented by M. J. Murray, president. The passage of the bill will not bear upon the treasury of the Seattle Municipal Railway unless further action is taken to obtain pay for the day off, George W. Russell, superintendent of utilities, states.

If, however, the City Council changes the working arrangement of the men and agrees to pay them for the day off, it will add approximately $23,500 monthly to the operating cost of the lines. The men are now paid a monthly wage of $155, based on an eight-hour workday. If they work nine hours they receive time and a half for the extra hour. If they work less than eight hours they are paid according to the hours worked.

Rerouting Changes Recommended

The Technical Advisory Corporation of New York, consulting engineers for the City Planning Board of Springfield, presented its report to the Springfield City Council Feb. 12.

In its finding the corporation recommended that the lines of the Springfield (Mass.) Street Railway be rerouted through the business district in a manner to reduce by one-half the number of cars passing through Main Street, and effecting a substantial reduction of car mileage, without abridging service in any of the outlying districts. This would be effected by transferring more of the lines to Dwight Street and by establishing a loop at Vernon Street and Broadway for the cars crossing the Hampden County Memorial Bridge. The report also recommended the more direct routing of cars to the residential suburb of Longmeadow.

The view is expressed in the report that the only decided opposition to routing more of the car lines one block east of Main Street would come from retail merchants, and the opinion is given that the merchants would in reality gain as much through the increased velocity of car traffic as they would lose in the running of cars further from the stores.

In the same report the car company was advised to establish gradually a system of feeder motor bus lines, to be replaced eventually by trackless trolleys. A temporary service somewhat along these lines is now being given over the Memorial Bridge.

President Ham Replies to Critics of His Company

Noting that the Senators from Tennessee and Alabama were outspoken in their criticism of existing conditions on the lines of the Washington Railway & Electric Company, in the District of Columbia, William F. Ham, president of that company, in a letter has pointed out for the benefit of Senator Heflin of Alabama and Senator McKellar of Tennessee that in the four largest cities in Tennessee and the two largest cities in Alabama the fares are as follows: Nashville, 7 cents straight; Memphis, 7 cents straight; Chattanooga, 7 cents straight; Knoxville, 6 cents straight; Birmingham, 8 cents, fifteen tickets for $1; transfer charge, 2 cents; Mobile, 8 cents cash fare; ticket rate, 7 cents; transfer charge, 1 cent. Said Mr. Ham:

All of the above cities have overhead trolley construction, whereas we have underground construction, which, as you know, costs two or three times as much to construct and maintain, and besides have a wage scale for trainmen from 51 cents to 56 cents an hour.

In Mr. Ham's letter he called attention to the fact that the wages paid by the street railways in the six Southern cities which he mentioned ran from 38 cents to 50 cents an hour.

Mr. Ham said that the expenses of his company within the District, without any interest charges, or return upon investment, amounted during the year 1922 to 6.26 cents per pay passenger. In conclusion Mr. Ham said:

With an 8-cent fare and tickets at the rate of six for 40 cents in Washington the average fare per pay passenger is slightly less than 7 cents, leaving, as you see, a very small margin for return upon investment and, of course, establishing beyond peradventure that any reduction in fare, under existing conditions, is out of the question, much less a return to the pre-war rates of fare.

Senator McKellar announced he would reply to Mr. Ham's letter on the floor of the Senate. He said that he was familiar with the street railway conditions in Memphis and that the company there was in much the same position as the Washington Railway & Electric Company. He said he felt sure that the city authorities eventually would compel the company in Memphis to return to its old contract and charge a 5-cent fare.

Senator McKellar on Feb. 8 made good his threat to reply. He declared that the higher fares in Tennessee are due to the State Public Utilities Commission, and predicted that that commission will be abolished by the present Legislature, and the railways subsequently compelled to return to their contract rates. He favors abolition of the Tennessee Utilities Commission, declaring neither it nor the one in Washington had been created to raise railway fares above the contract rates. He is reported to have said:

There is a similarity between the Memphis situation and that of one of the Washington railways, namely, that in each place the company is undertaking to secure fares high enough to earn dividends on watered stock. During the time I have been in Memphis the company has been reorganized two or three times, and each time there is an enormous addition to the stock issued. Just now, even with 7-cent fares, that company is not able to make dividends on its watered stock.

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Legal Notes

CONNECTICUT—*No Appeal Lies from a Finding of a Public Service Commission As to Which of Several Applicants Should Receive a Certificate to Operate over a Specified Route.*

Notwithstanding various acts, providing for appeals to the superior court by persons aggrieved by an act or order of the public utilities commission, no appeal lies from a finding of that commission as to which of several applicants should receive a certificate to operate a jitney over a specified route, since this was a purely administrative question. The only points which can be raised in such a case is whether the action of the commission was beyond its statutory powers, or whether it had acted arbitrarily, as without due notice and due hearing. [Modeste vs. Connecticut Company, 117 Atlantic Rep., 494.]

CONNECTICUT—*Operator of Inherently Dangerous Amusement Device Not Insurer of Safety of Patrons.*

This was an action for injuries to the patron of amusement device, in which the only negligence claimed was the operation of a device in which the person using it rolls down an incline over a series of bumps. The court held that such a device is inherently dangerous, and the plaintiff must prove that the operation of the appliance in the usual way and for the intended purpose is in itself so dangerous that injury can reasonably be expected to occur. [Godfrey vs. Connecticut Com pany, et. al., 118 Atlantic Rep., 446.]

FEDERAL COURTS—*Extension of Contract With City, Which Permitted Operation After Expiration of Term, Held Not to Extend Fare Contract.*

Where a contract between a city and a street railroad company fixed the fare at 5 cents, and gave the company the right to continue permanently to operate after the expiration of the contract until the city elected to purchase the lines, the extensions of the company's charter and its right to occupy the streets by act of the Legislature did not require the company to operate at the contract rate after the expiration of the original contract, and before the city exercised its option to purchase the line. [City of Louisville vs. Louisville Railway, 281 Federal Rep., 353.]

FEDERAL COURTS—*Confiscation By Refusal of State Commission to Permit Increase of Rates May Be Enjoined.*

Whether a rate to be charged by a public service corporation was confiscatory when prescribed by a state commission, or whether, though reasonable when prescribed, it becomes confiscatory by reason of changed conditions, the power of the courts is equally ample, and its exercise is equally obligatory to enjoin confiscation effected by refusal to permit an increase. [Augusta-Aiken Railway & Electric Corporation vs. Railroad Commission of South Carolina, et al, 281 Federal Rep., 977.]

FEDERAL COURTS—*Property Covered By a Mortgage Defined.*

Where a street railway company which mortgaged its property, including the property thereafter constructed or acquired, had power under its charter to lay double tracks on specified routes, the lien of the mortgage covers the double track laid on such routes by the successor of the mortgagor though they were laid under new franchises obtained by the successor from the city. The mortgage also covers all new equipment, cars, poles, etc., acquired for use on those lines. The fact that part of this property was purchased from the proceeds of a subsequent mortgage, does not give the bondholders under the subsequent mortgage priority over the prior mortgages as to the equipment so purchased. Where, however, the successor company had placed in the power houses covered by the mortgage executed by its predecessor machinery for furnishing light and power, which the mortgagor was not authorized to furnish, and which was therefore not covered by its mortgage, the successor could remove such machinery before the foreclosure sale provided it was not so attached to the real property as to be a fixture. [Commercial Trust Co. vs. Chattanooga Railway & Light Company, et al. Maryland Trust Co. vs. same. 281 Federal Rep., 856.]

MARYLAND—*Change of Route Held to Constitute An Abandonment of Rights in Old Right-of-Way.*

Where a railway company, obeying an ordinance directing the removal of its tracks from one street to another, removed its tracks from a portion of a strip of land condemned and changed the route, the removal and change operated as an abandonment of its right of way in such portion of the land, and it had no right to construct a switch track thereon. [Hagerstown & Frederick Railway vs. Grove, et ux. 118 Atlantic Rep., 167.]

MASSACHUSETTS—*Department of Public Utilities Authorized to Grant Locations for Tracks on Particular Street.*

Under the public utilities act, the State department of public utilities, within rational limits, may order whatever approaches, tracks, and connections are found desirable for an inclosed area for the transfer of street car passengers, and has authority to grant a location for tracks on a particular street, though a fire house or other municipal buildings were on that street. [City of Cambridge vs. Boston Elevated Railway, 135 Northeast, Rep., 313.]

MASSACHUSETTS—*Violation of Speed Statute By Automobile Driver, Contributing to Injury, Is a Defense.*

If the driver of an automobile, as to speed and control, contrary to Gen. Laws, chap. 90, sec. 14, 17, contributed to the driver's injury in a collision with a street car, there could be no recovery. [Daris vs. Middlesex & Boston Street Railway, 136 Northeastern Rep., 68.]

MISSOURI—*Passenger Injured While Alighting From Moving Car Recovers.*

A passenger, injured while alighting from a moving car, may recover damages if the conductor opened the door and ordered him to get off before the car had stopped, and the car had its speed suddenly increased, while he was alighting, even if the conductor opened the door at the passenger's request. [Leonard vs. United Rys. of St. Louis, 239 Southwest. Rep., 892.]

NEW YORK—*Injury in Turnstile Because of Crowd.*

Where a passenger was about to use a turnstile gate at a subway station and was jostled by the crowd and to steady himself placed his hand on the arms of the turnstile and was cut or squeezed by a rough piece of exposed metal, the carrier was not liable. [Chakosky vs. Interborough Rapid Transit Company, 195 New York Sup., 79.]

NEW YORK—*Operation of Crosstown Bus Line by City Without Obtaining Revenue Therefrom Held Unconstitutional.*

The operation of a crosstown bus line by the city under agreement giving the owner of bus line the revenue therefrom—held violative of Const. art. 8, sec. 10, prohibiting a city from giving or loaning money to or in aid of any individual or corporation, and from incurring debts except for city purposes. In such case a taxpaying railroad, which was operating a competing line, had a right to maintain an action to restrain such illegal acts on the part of the city. [Belt Line Railway Corporation vs. City of New York, et al., 195 New York Sup., 203.]

UTAH — *Working on Car Which May Be Used Either Intrastate or Interstate Is Not Employment in "Interstate Commerce."*

An employee, who is engaged in repairing a car belonging to a company engaged in both interstate and intrastate commerce, and which car has been in the past used in either commerce is not employed in interstate commerce within the Federal Employers' Liability Act. [Utah Rapid Transit Co. et al. vs. Industrial Commission of Utah et al., 204 Pacific Rep. 87.]

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Personal Items

Mr. Engle Appointed New Youngstown Supervisor

New Commissioner Names A. W. Hartford, W. H. Muldoon and F. R. de Maree as Assistants

Harry Engle, recently appointed by the Mayor as the city's Street Railway Commissioner under the service-at-cost ordinance governing the operations of the Youngstown Municipal Railway, has been connected with railway and light and power utilities since youth. He was born in Dayton, Ohio, on Nov. 19, 1881, and was educated in the Dayton public schools. Upon the sudden death of his father, he was thrown upon his own resources, and in 1900 began work as a conductor on the lines of the City Railway, Dayton, which had been built and were controlled by his uncle, the late David B. Corson, who was one of the pioneer builders of electric railways in Ohio. After a short period Mr. Engle became connected with the Mulford-Petry street car advertising interest and was stationed for this company in Dayton, Indianapolis, Toledo, Saginaw and Youngstown. In the latter city he became identified in 1906 with the local railway and electric companies and was with them almost continuously until the time of his appointment as street railway commissioner of the city, serving as salesman, purchasing agent, commercial agent and in other capacities, and for a time being treasurer of the Mahoning County Light Company.

A. W. Hartford, appointed by Commissioner Engle as his assistant to have charge of the railway division of the commissioner's office, was formerly manager of the Youngstown & Suburban Railway, which position he resigned in October, 1921, to take a protracted rest in the South. Mr. Hartford is a native of Detroit, Mich., where he was born on Jan. 18, 1871. He was educated in the public schools there and entered the electric railway industry in 1900, when he became a motorman on the interurban line between Detroit and Jackson, now a part of the Detroit United Railway. He soon became a dispatcher for the line and at the end of five years went to Youngstown in a similar capacity for the Youngstown & Southern Railroad, now the Youngstown & Suburban Railway. Shortly afterward he was promoted to general superintendent, and in 1912 was made general manager, continuing in that position until his resignation in 1921.

William H. Muldoon has been appointed by Commissioner Engle as assistant in charge of motor bus operations for the commissioner's office. Mr. Muldoon was auditor for the commissioner during the four-year term of William L. Sause. The Youngstown Municipal Railway is operating two motor bus lines and has ordered eleven additional buses for operation of two additional lines, which will bring the total number of buses in operation up to eighteen.

Fred R. de Maree has been appointed auditor in the railway commissioner's office by Mr. Engle. He has been employed as deputy in the City Auditor's office for three years.

Mr. Richardson Vice-President of Chicago Surface Lines

G. A. Richardson, formerly vice-president in charge of operation of the Philadelphia Rapid Transit Company, has been elected vice-president of the Chicago Surface Lines in charge of operation. As previously noted in the ELECTRIC RAILWAY JOURNAL, he has already entered upon his new duties.

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G. A. Richardson

Before becoming connected with the Philadelphia Rapid Transit Company in April, 1919, as superintendent of transportation, his first office with the company, Mr. Richardson was general superintendent of the Puget Sound Traction, Light & Power Company, Seattle.

Mr. Richardson is recognized nationally as a transportation expert. So successful was his handling of transportation matters on the Pacific Coast and on other properties with which he has been connected that his advice and help have been solicited in connection with the solution of problems in a number of cases arising in other cities. It was Mr. Richardson who was called to help solve the transportation problem of the Hog Island shipyard. The system there comprised steam, electric and ferry service. Five months after Mr. Richarson's visit Hog Island had 80 miles of track and 18 miles of roadway within the confines of the yard. He assisted in connection with the affairs of the Rochester (N. Y.) Surface Lines, and in 1914 made an extensive investigation and report on the transportation facilities of the Chicago Elevated Railways. Mr. Richardson also reported on the facilities of the Brooklyn Rapid Transit Company following the appointment of a receiver for that company. Owing to demands upon his time, however, his work in Brooklyn was confined to the elevated and subway lines.

Mr. Richardson was born in Boston, Mass., in 1882. He was graduated from the Mechanic Arts High School in 1900. Later he took a post-graduate course there. In February, 1901, he entered the employ of the Boston Elevated Railway. He worked for this company in the shops, in the train service, in the mechanical department and in the power stations. In 1904 he became connected with the Boston & Northern Street Railway, and in May, 1905, went with the Stone & Webster forces, with which he continued until 1919.

W. B. Adams Appointed Assistant Director of Traffic

W. B. Adams has been appointed assistant director of traffic of the Los Angeles (Calif.) Railway. Mr. Adams has had several years' experience in the operating department of the city lines of Detroit before their purchase by the municipality. He was at one time assistant superintendent of the Woodward and Hamilton divisions, operating local and interurban cars.

In his new capacity with the Los Angeles Railway he will assist in the movement of cars as directed by the outside supervisors and the emergency telephone dispatching board.

Mr. Adams is largely responsible for the introduction of a new system on the Los Angeles Railway whereby each line is in charge of one supervisor, working in conjunction with the dispatchers' telephone board, in place of the former system of a supervisor at each end of a line. It has been found that the use of one man on a line eliminates duplication of orders and has been effective in cutting down the number of turnbacks due to delays.

Changes in Alabama Power Organization

The Alabama Power Company has transferred the headquarters of its Southern Division from Selma to Montgomery, the company having recently concluded arrangements by which it took over the property of the Montgomery Light & Traction Company. The removal of the Southern Division offices to Montgomery necessitated a number of important divisional changes, as announced by General Manager Yates. The Southern Division now includes the towns of Clanten, Selma, Marion, Marion Junction, Montgomery, Aubrey, Opelika, Auburn, Tuskegee and Notasulga.

J. M. Barry, for the past eighteen months assistant chief engineer of the

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company, has been made manager of the Southern Division. L. P. Sweatt has been transferred from manager of the Eastern Division to division superintendent at Montgomery.

In establishing a divisional office at Montgomery, General Manager Yates stated that it was necessary to make the following additional changes in the divisional organization:

W. M. Stanley who is manager of the Northern Division, will, under the new order of things, become manager of the Eastern Division.

O. K. Seyforth, who is manager of the Western Division, will become manager of the Northern Division.

C. B. McManus will be transferred from superintendent of the Muscle Shoals steam plant to manager of the Western Division.

E. C. Wilson will become district manager at Selma, Marion and Marion Junction.

H. L. Ames will become superintendent of the Muscle Shoals steam plant.

The personnel of the local utilities at Montgomery which were taken over will not be altered.

A. E. Myers Acting Superintendent at Lowell

Maurice E. McCormick, manager of the Lowell division of the Eastern Massachusetts Street Railway, Boston, Mass., has announced that Albert E. Myers, former superintendent of the Chelsea division of the Eastern Massachusetts Street Railway, has been appointed acting superintendent at Lowell to fill the place made vacant by the recent resignation of Charles E. Whelan.

The new acting superintendent was connected with the local railway for fifteen years, from 1890 to 1905. He served with the old Bay State Street Railway in many capacities, having acted as starter for a number of years and having handled many of the operating details now taken care of by the superintendent.

Since 1905 Mr. Myers has filled several supervisory positions with the Melrose-Woburn and Chelsea division. He has been superintendent of the Chelsea division for many years.

George LeBoutillier with Long Island Railroad

At a meeting of the board of directors of the Long Island Railroad on Jan. 18, the organization was changed to permit of the election of an additional vice-president, who shall assist the president in the general control of all affairs of the company, its property and business, and of all departments of its service, and in the absence or disability of the president, exercise and perform all the powers and duties of the latter.

George LeBoutillier was that day elected vice-president, and also a director, to fill the vacancy caused by the recent death of T. DeWitt Cuyler.

For twenty-seven years Mr. LeBoutillier has served the Pennsylvania system in various important capacities. Until very recently he was located at Harrisburg, Pa., where he occupied the position of general superintendent of the Eastern Pennsylvania Division.

Mr. LeBoutillier has been selected by President Ralph Peters, with the united approval of all his Pennsylvania Railroad associates, as the man to assist him, and gradually to take up his work of directing and managing the properties of the Long Island Railroad.

Mr. LeBoutillier is in his forty-seventh year. He was born in Cincinnati, Ohio, and after graduating from the University of Cincinnati he entered the service of the Pennsylvania Railroad Aug. 1, 1895, as rodman on the lines west of Pittsburgh. He has been consecutively assistant engineer, division engineer, engineer maintenance of way, division superintendent and general superintendent. His headquarters will be in the office of President Peters at the Pennsylvania Station.

J. R. Bibbins Resigns Chamber of Commerce Post

J. Rowland Bibbins, engineer, has resigned as manager, Transportation Department, United States Chamber of Commerce, to engage in consulting engineering practice in transportation and its related economic and civic problems, including district and traffic surveys, railway terminal and transit development, rapid transit service, routing and improvements, valuations and franchise arbitrations, and transportation aspects of the city plan.

During his two years in Washington, Mr. Bibbins devoted special study to the whole group of transport agencies—railway, traction, highway, waterway, airway, and marine—and their relative status and possibilities of co-ordinated development, all in connection with legislation and public policy. In this work he was closely associated with an advisory committee comprising prominent representative executives, bankers, engineers, and economists, under whose guidance the need of a national policy of co-ordination was visualized.

Mr. Bibbins was previously associated with the Bion J. Arnold engineering organization of Chicago, as supervising engineer, and in this consulting work studied intensively the transportation problems of some twenty cities of the United States and Canada, not only in rapid transit, but also in railroad and port terminals, civic development, valuations, and the economic policies involved therein. Much of this work involved arbitrations between public authorities and operating companies.

Educated in Baltimore and the University of Michigan, Mr. Bibbins early acquired direct experience in electric and railway utilities in Detroit, and with manufacturing and power development in the Westinghouse companies as commercial engineer. He has been honored by various engineering associations and civic bodies in whose activities he has been an ardent and intelligent worker.

Obituary

Alexander Rodger McCallum

American engineers who knew Alexander Rodger McCallum, London, will be shocked to learn that he was accidently killed on the Midland Railway near Chesterfield on Dec. 11 while traveling to transact business with steelmakers on behalf of his firm, C. P. Sandberg, consulting engineers.

Born in 1886, Mr. McCallum was the elder son of a London journalist who is the writer of the British monthly notes in this paper. He was educated at Mercers School, in the City of London, and afterward at the Central Technical College of the City and Guilds of London Institute, South Kensington. There in 1906 he graduated with honors as Bachelor of Science in the Faculty of Engineering and the University of London. A course of some two years as an engineering pupil in the electric manufacturing works of Messrs. Dick, Kerr & Company, Preston, followed, and then from 1908 to 1912 he held a succession of posts, both on the engineering and traffic sides, with the London United Tramways, thus acquiring an all-round practical knowledge of electric tramway operation and maintenance.

The next step was his appointment to be an assistant to the mechanical engineer of the London underground electric railways. Soon becoming chief assistant, Mr. McCallum had full control of the repair and maintenance of the rolling stock of these railways, and of the running of the repair shops connected with them. In 1919 he formed one of a delegation of heads of departments of the underground railways who visited the United States to examine city transportation methods there. On that occasion Mr. McCallum made the acquaintance of a number of leading electric traction men in America.

In February, 1921, he was promoted to be an officer of the companies with the title of superintendent of rolling stock, but in May following he accepted an offer from C. P. Sandberg, consulting engineers, well known in New York, to become one of their assistants. Among the chief duties which he afterward carried out was the superintending of the installation in numerous British steel works of a plant for the production of Sandberg's patent sorbitic steel as applied in the case of railway carriage wheel tires.

Anton H. Classen, sixty-one years old, builder of the first railway system in Oklahoma City, died at his home in that city recently. His health had been failing for several years. Mr. Classen was born in Pekin, Ill. He went to Oklahoma in 1899. He became associated with John W. Shartel in establishing the first railway system in Oklahoma city, and on completion of the line became its president, with Mr. Shartel as vice-president and general manager.

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Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Coal Hearings Soon

Commission Developing Facts in Advance—Chairman Hammond Favors as Little Legislation as Possible

Efficiency and productivity of labor under union and non-union conditions are to be studied carefully by the President's Coal Commission. Public announcement that this will be undertaken was made by Chairman Hammond. He emphasized that it must be established whether or not it costs more money to produce coal at mines employing union labor than at those which observe an open-shop policy. The efficiency of labor in union mines, he said, is alleged to be 50 or 60 per cent, as compared with an efficiency of 80 per cent in non-union mines.

At the Feb. 3 conference with the Washington correspondents Mr. Hammond reiterated the importance which the commission is attaching to storage. An engineer has been assigned to investigate minutely the matter of local storage at the coal mines. He also said that the commission is more convinced than ever that the railroads must store coal and abandon the policy of commandeering, without specific permission in each case. The commission regards the danger from spontaneous combustion as being so slight as to make unnecessary any considerable further study of that phase of storage. The investigation will be confined largely to the costs of storage, rather than to any danger involved.

Uniform Operation of Mines Essential

Mr. Hammond frowned upon any attempt to divert surplus mine labor to agricultural work during slack business at mines, by the establishment of third-class fares or other expendients. He declared that a way should be found to maintain uniform operation of coal mines throughout the year, thus allowing surplus labor to take permanent employment in other lines. By keeping up the bars against immigration only a few years will be required, he said, until this surplus is absorbed.

A further study of superpower will be recommended by the commission, it was revealed at the conference. While it was admitted that mine-mouth use of coal has a limited application only, due to the difficulty in securing condensing water, yet it is believed much transportation of coal can be avoided by well-located central stations.

The commission has given no formal consideration to any plan for facilitating the financing of coal storage or the securing of insurance for such coal. In reply to questions, both Mr. Hammond and Dr. George Otis Smith indicated that they see no reason why the commission should concern itself particularly with any plan to make paper covering coal in storage eligible for rediscount at Federal Reserve banks or to take up other details of financing the handling of coal. So far as insurance is concerned, it was suggested that the best insurance for a coal pile is the installation of a crane and a clamshell bucket.

When asked what the commission thought of a plan to pool coal to be handled through large selling agencies, Mr. Hammond declared that such a recommendation likely would lead to a charge of paternalism. He admitted that the commission is very anxious to ascertain why a 5 per cent shortage causes a 200 per cent price advance and he said that the interests making up the coal industry should stop making faces at each other. He would hate to think any branch of the industry is as bad as the others claim it is.

The commission as yet has no definite idea as to the legislation it will recommend. Every effort will be made, Mr. Hammond asserted, to suggest as little legislation as is possible, just enough to insure the untrammeled play of economic forces. Before public hearings are undertaken, an effort will be made to secure substantial agreement on as many as possible of the controversial points. By resorting to this process of elimination, he believes the public hearings can be confined to the comparatively few points on which no agreement within the industry is anticipated. By that time, the commission will have developed a great many facts for itself and will be in a position to know if witnesses have their facts.

Large Order Placed for Economy Meters

The Public Service Railway, Newark, N. J., has signed contracts with the Economy Electric Devices Company for the purchase of 1,720 Economy meters suitable for all passenger cars. These meters include the kilowatt-hour car inspection dial feature and 120 have already been delivered. The Public Service Railway began a test with Economy meters last summer by equipping the Bloomfield line with sixty meters with car inspection dials. This test was successful. The company next placed a rush order with the Economy Electric Devices Company for sixty more similar meters to equip another important line, and before the second sixty had been delivered negotiations were completed for the purchase of enough meters completely to equip all active cars, including Camden division.

Arrangements Made for Close Co-operation

The General Electric Company and the American Locomotive Company have made an agreement to co-ordinate more closely their effort in the design and manufacture of electric locomotives for use on steam or electric railways. A notice, under date of Feb. 15, was sent to railroad executives announcing the arrangement. It was signed jointly by Andrew Fletcher, president of the locomotive company, and Gerard Swope, president of the General Electric Company.

In making the arrangement at this time both companies have been influenced by the increased interest and business in railway electrification, both in the United States and abroad, which is manifesting itself and which indicates a considerable volume of work of this character in the near future. A recent survey of the locomotive department of the Erie works of the General Electric Company indicates that at present there are a larger number of orders from different customers than has been the case at any time since the beginning of the World War. Foreign business appears even more active than domestic. Spain, France, Chile, Japan, Mexico and South Africa are engaged in extensive projects, while other countries, including Italy and Great Britain, are seriously considering large scale electrifications.

For a number of years the American Locomotive Company and the General Electric Company have collaborated in the development of electric locomotives. The locomotive company has applied its knowledge and experience in the locomotive building art, particularly to the design of the mechanical elements, in the fabrication of which its manufacturing facilities were utilized, while the knowledge and experience of the General Electric Company were applied to the design of the electrical elements.

It is the satisfactory result of this collaboration which has led to the more formal relationship just announced, both companies believing that progress in the art can be most effectively assured by such means. The arrangement relates only to co-operation in design, development and manufacture and does not comprehend any financial relationships between the two companies.

Metal, Coal and Material Prices

Metals—New York	Feb. 13, 1923
Copper, electrolytic, cents per lb.	15.187
Copper wire base, cents per lb.	17.125
Lead, cents per lb.	8.05
Zinc, cents per lb.	7.30
Tin, Straits, cents per lb.	41.25
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$7.15
Somerset mine run, Boston, net tons	4 125
Pittsburgh mine run, Pittsburgh, net tons	2.75
Franklin, Ill., screenings, Chicago, net tons	2.55
Central, Ill., screenings, Chicago, net tons	1.625
Kansas screenings, Kansas City, net tons	2.50
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.	7.25
Weatherproof wire base, N.Y., cents per lb.	17.125
Cement, Chicago net prices, without bags.	$2.20
Linseed oil (5-bbl. lots), N.Y., cents per gal.	99.00
White lead, (100-lb. keg), N.Y., cents per lb.	13.125
Turpentine, (bbl. lots), N.Y., per gal.	$1.48

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$954,968 Net for Brill

Car Company Had Orders on Hand Feb. 1 for $11,000,000 as Compared with $2,223,000 a Year Ago

For the year 1922 the combined output of the four plants of the J. G. Brill Company amounted in sales value to $10,177,582. The combined output for each of the past six years follows:

1917	$7,706,099
1918	16,761,154
1919	14,210,622
1920	17,537,293
1921	7,647,898
1922	10,177,582

The report of the company for the year says that the business depression, which was reflected in the reduced output of the company's plants for the year 1921, continued during the first six months of the year just passed. However, the result of the year's operation indicates the marked improvement in business during the last six months of 1922.

After deducting from earnings the cost of all maintenance and repairs for the year amounting to $368,621 and after setting aside, out of earnings, a reserve for depreciation of plants and equipment amounting to $221,803, the result of the operation of all the plants shows a profit of $1,074,291, from which has been set aside a reserve for federal taxes of $119,322, leaving a net profit for the year, after all charges and reserves, of $954,968.

Operation of Separate Canadian Plant Abandoned

The Canadian Brill Company, Ltd., which was organized for the purpose of manufacturing Brill products in Canada, and for this purpose, on Sept. 1, 1921, leased a plant at Preston, Ontario, decided, upon the expiration of its lease, that business in Canada, available for the company did not warrant a renewal of the lease and, therefore, the plant was turned back to the owners on Nov. 1, 1922, and steps are now being taken to dissolve the company.

The amount of work on hand Feb. 1, 1923, is in excess of $11,000,000 as compared with $2,233,000 at this time last year.

SALES AND EXPENDITURES OF THE J. G. BRILL COMPANY FOR YEAR 1922

Total sales and other income		$10,177,582
Less materials and operating and general and administration expenses and depreciation for the year		9,103,291
Operating profit		$1,074,291
Less reserves for federal taxes		119,322
Net profit to surplus		$954,968
Surplus as of Dec. 31, 1921		$2,904,251
Add adjustments		44,350
		$2,948,602
Add profit as above		954,968
		$3,903,571
Less dividends paid		320,600
Net surplus earned as of Dec. 31, 1922		$3,582,971

Rolling Stock

Brooklyn (N. Y.) City Railroad is in the market for 500 new double-truck motor cars.

Georgia Railway & Power Company, Atlanta, Ga., will shortly add twenty cars to its equipment.

Louisville (Ky.) Railway lost eight double-truck and eleven single-truck cars in another carhouse fire on Feb. 16.

Springfield (Mass.) Street Railway, through President Wood, has announced its intention of buying ten or twelve cars of a large two-man type similar to those in use on the Boston Elevated lines. Each of these cars will carry fifty persons seated. No new open cars or one-man cars will be bought. About $150,000 will be invested in the new equipment.

International Railway, Buffalo, N. Y., for the present will not replace with new equipment the cars which were destroyed in the fire at the Cold Springs station of the International some weeks ago. Herbert G. Tulley, president of the International, says that the Walden Avenue station of the company will be used for the paint shops until such time as the company is able to reconstruct the Cold Springs paint shops.

Hydro-Electric Power Commission of Ontario, Toronto, Ont., has recently ordered four double-truck, one-man, two-man safety cars for use on the Hydro-Electric Railway in the Windsor City district. The bodies were ordered from the St. Louis Car Company, the trucks from the Taylor Electric Truck Company and the electrical equipment from the Canadian General Electric Company. Delivery is expected during the month of April.

Track and Roadway

Municipal Railway, Seattle, Wash., through superintendent Henderson, has asked the City Council for permission to reconstruct the tracks on Westlake Avenue North, to bridge the tracks to grade between Roy Street and the Fremont Avenue bridge, and to pave between tracks between Mercer and Roy Streets. The cost is estimated at $99,000.

Georgia Railway & Power Company, Atlanta, Ga., has removed old rails and has had the ground excavated from Fair Street to Glenn Street in preparation for rebuilding the tracks on Central Avenue from Fair Street to Dodd Avenue. Concrete foundations of beam construction will be laid at the same time as the paving. Ties will be spaced 5 ft. apart on which will be laid new 80-lb. A. S. C. E. rail.

Philadelphia (Pa.) Rapid Transit Company is planning the construction of three new crosstown routes connecting the Frankford district on the east with the Germantown and Nicetown districts on the west. First, the Erie Avenue route will be built, then the Wyoming Avenue routes and last the Olney Avenue route. They will be operated as early as possible in 1923 except those portions which must necessarily be delayed awaiting city street opening and bridging.

Trade Notes

Johnson Fare Box Company, Chicago, Ill., has opened an Eastern sales office and service station at 366 Madison Avenue, New York City.

Edwin L. Andrew has been appointed assistant to the manager of the department of publicity of the Westinghouse Electric & Manufacturing Company at East Pittsburgh, Pa. Mr. Andrew has been connected with the Westinghouse Company since 1916, for part of the time at East Pittsburgh, and also at the Cincinnati office of the Westinghouse Company.

National Railway Appliance Company, New York, N. Y., announces its appointment as agent for the Fort Pitt Spring & Manufacturing Company, Pittsburgh, Pa., for the States of New York and New Jersey. All inquiries on the products of this company which embrace coil, elliptic and volute springs for steam and electric railways and heavy duty springs for industrial concerns will receive prompt and careful attention at the company's office, Grand Central Terminal, 452 Lexington Avenue, New York.

New Advertising Literature

Railway Improvement Company, New York, N. Y., has issued an illustrated booklet on the Ransom vacuum oiler. It shows the oiler installed on motors on a large number of properties.

Power Specialty Company, New York, N. Y., has issued Bulletin EC-100, entitled "The Foster Economizer." This thirty-two page illustrated pamphlet gives a detailed description of the construction of the pressure parts and housing of the Foster economizer and its simplicity of operation.

United States Steel Corporation, New York, N. Y., has issued Bulletin No. 9, entitled Safety, Sanitation and Welfare. The pamphlet, containing some thirty or more pages, describes the company's organization, accident prevention activities and the first aid and rescue work, in which the employees have played conspicuous parts. The booklet is illustrated.

General Electric Company, Schenectady, N. Y., announces that the electrical manufacturing plant in Bloomfield, N. J., known as the Sprague Electric Works, will hereafter be known as the Bloomfield plant of the General Electric Company. This plant, formerly the Sprague Electric Company, was acquired by the G. E. Company in 1902 and is engaged in the manufacture of electric motors, generators, controllers, etc., employing about 1,600 at the present time.

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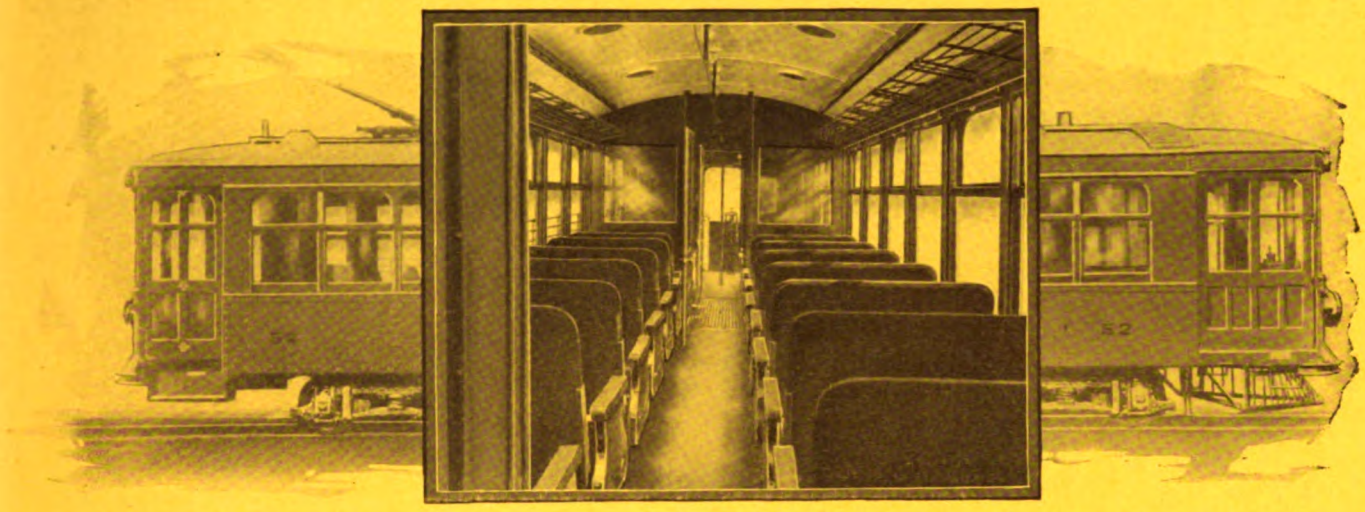
New Light-Weight High-Speed Cars Will Offset Interurbans' Competition



Saving in Power and Maintenance and Increased Receipts Improve Conditions

The Western Ohio Railway Company's experience with light-weight cars in interurban service should serve as a guide to other high-speed lines feeling the competition of other means of conveyance and the necessity for lower operating costs.

After four months' operation, available data indicates that reduced operating costs and increased receipts have resulted, and that this company will be able to successfully meet competition and provide a service which will appeal to the traveling public.

While weighing only 33,000 lbs. complete, these new cars built in our Kuhlman Plant have been satisfactorily operating as high as 53 m. p. h. and from recent reports "ride perfectly at any speed."

Also their quicker acceleration and deceleration due to light weight enables these cars to make schedules more easily than did the former heavy type cars.

Information in detail furnished upon request to

THE J. G. BRILL COMPANY
PHILADELPHIA, PA.

AMERICAN CAR CO. ST. LOUIS MO. — G.C. KUHLMAN CAR CO. CLEVELAND, OHIO. — WASON MANF'G CO. SPRINGFIELD, MASS.

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In 1923

More interurbans will adopt lighter cars

—and Down go Costs of Power and Maintenance

Light-weight cars on many interurban roads are effecting savings which prove the economies claimed for light-weight car operation.

On one property in the Middle West seven light-weight interurban cars, put in service 4-1/2 years ago, have saved that company $175,000—nearly $40,000 a year.

This was one of the first roads to see the advantages accruing from lighter weight. Many others have followed, and still others are considering the possibilities of reducing costs in this way.

Have you compared *your* operating costs with these records?

MEMBER AMERICAN ELECTRIC RAILWAY ASSOCIATION AERA

General Electric Company

General Office Schenectady, N.Y.

Sales Offices in all large cities

25-194

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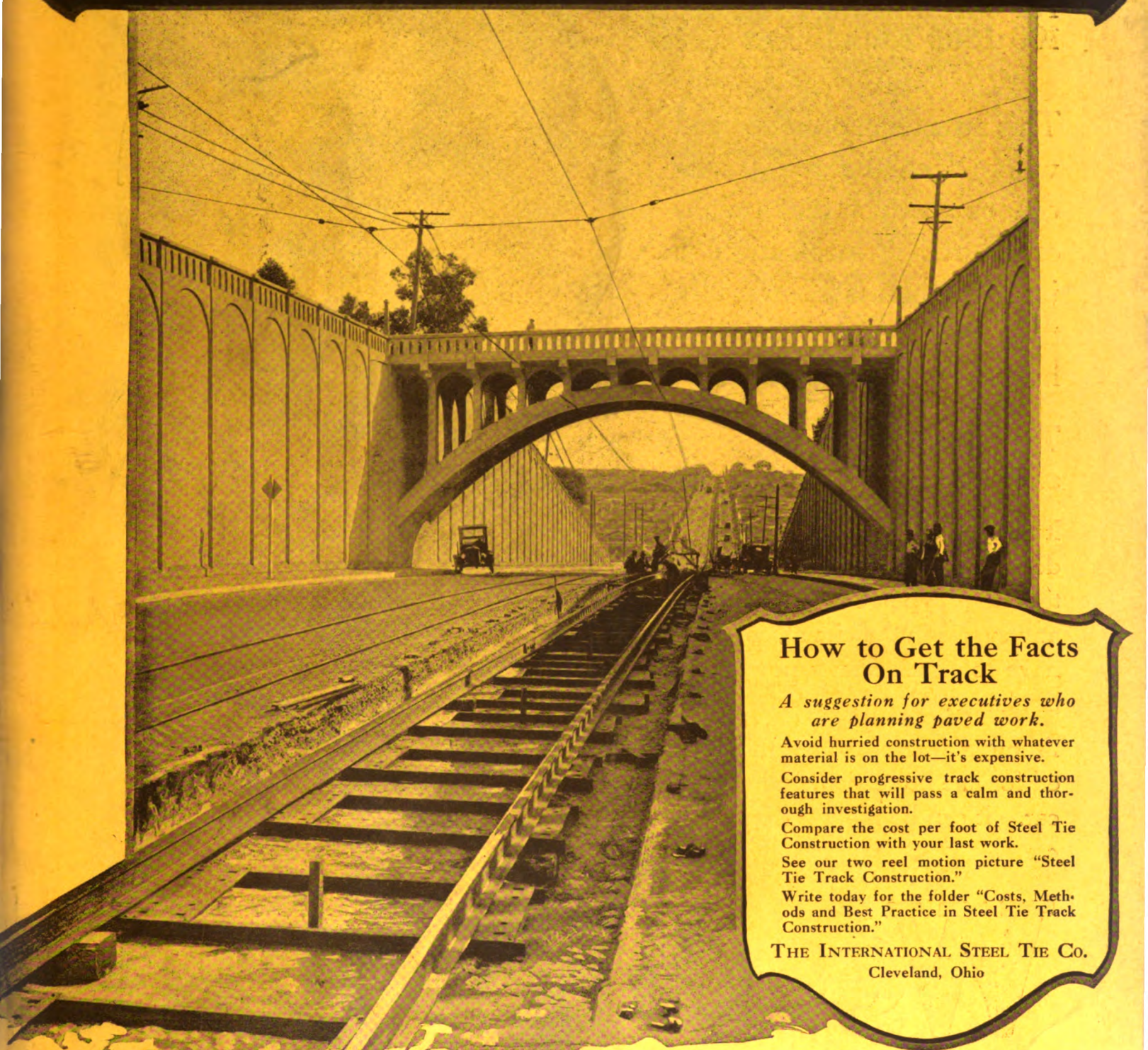
McGraw-Hill Co., Inc. February 24, 1923 Twenty Cents Per Copy

MONTHLY MAINTENANCE ISSUE

ELECTRIC RAILWAY JOURNAL



How to Get the Facts On Track

A suggestion for executives who are planning paved work.

Avoid hurried construction with whatever material is on the lot—it's expensive.

Consider progressive track construction features that will pass a calm and thorough investigation.

Compare the cost per foot of Steel Tie Construction with your last work.

See our two reel motion picture "Steel Tie Track Construction."

Write today for the folder "Costs, Methods and Best Practice in Steel Tie Track Construction."

THE INTERNATIONAL STEEL TIE CO.
Cleveland, Ohio

Steel Twin Tie Track

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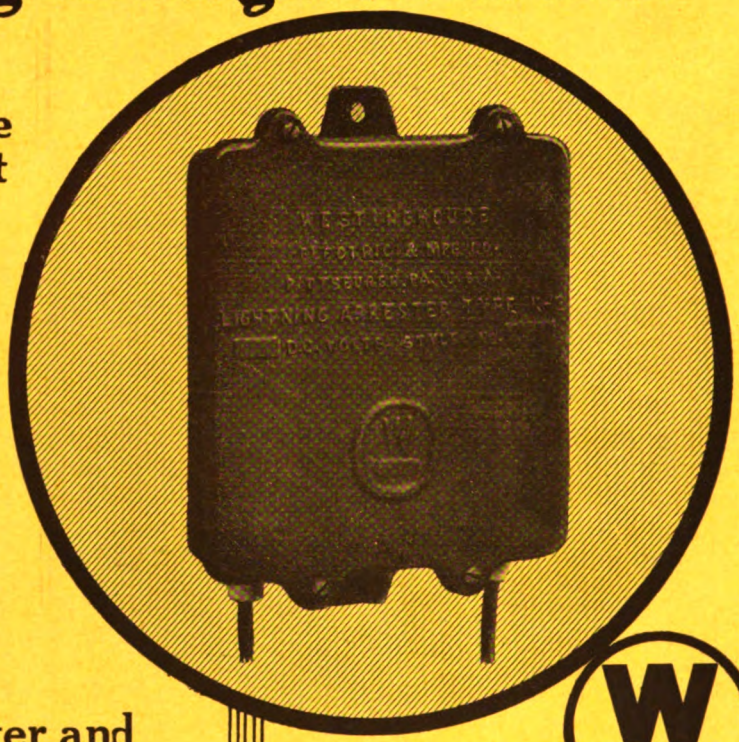
High-Grade Protection
Type K-3 Lightning Arresters

For Car, Line and Station Use
100-1500 Volts Direct Current



This arrester should be used where local lightning conditions are such that a higher degree of protection is justified than is afforded by the inexpensive Westinghouse Type MP Arrester.

Type K-3 is a dry-type arrester and stays on the cars the year round

It handles on transient energy on the line, and does not allow any power current to pass, thus the Type K-3 Arrester does not cause any surges in the circuit, as do arresters that have to break heavy power arcs after each discharge.

About five arresters per mile are recommended for line protection, and one or two to each car. It can be mounted on top or under the car.

Westinghouse Electric & Mfg. Co.,
East Pittsburgh, Pa.

Westinghouse

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ELECTRIC RAILWAY JOURNAL

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Company, Inc.

HENRY W. BLAKE and HARRY L. BROWN, *Editors*

Volume 61 New York, Saturday, February 24, 1923 *Number* 8

Spray Painting Produces a Satisfactory Economy

THE use of spray painting equipment is increasing rapidly and can no longer be considered as an experiment. There are many places in connection with the maintenance of electric railway equipment where this method of painting shows marked economies. Its economy and convenience for use in reaching inaccessible places can readily be realized. For painting the small car parts outside of the body, such as fenders, trucks, car screens and coupler and other fittings, it may be used to apply a satisfactory coating with economy in both time and labor. After rattan seat cushions have been scrubbed and cleaned, the usual coating of varnish can be applied with a spray gun, avoiding slow, fatiguing manual labor and greatly speeding up the process.

Many different types of spraying nozzles are now on the market. These are arranged so that the size of spray can be conveniently adjusted to either a concentrated flow or a wide fanlike spray as desired. Spraying nozzles are available that can be used with nearly all fluids, ranging from the thinnest shellac to the thickest enamel. No doubt the greatest lack of interest in this development comes from the old school of painters, who take particular pride in producing an artistic job and who appear to derive special pleasure from the wielding of a brush and the smoothing in of the various coatings. There also appears to be quite a general impression that spray painting is uneconomical in the use of material. This latter, however, has not proved to be the case where proper equipment is used with care.

Several companies which are using spray painting quite extensively report that they find it much more economical than the brush method in the amount of material used. This economy comes from the fact that there is no loss of paint by drops or "slop" of the brush and that spray painting is accomplished without any lap or brush mark which requires rebrushing and the use of additional material. Spray painting covers the surface smoothly and evenly without streaks, fatty edges or brush marks. Also, there is less likelihood of skimped places or thin edges at corners, as the points where these usually occur by the brush method can be handled with the spray gun without any particular skill or effort on the part of the painter.

The majority of electric railway painting requires that the painting outfit must be brought to the job, and in this connection many outfits have been developed which are readily portable. Provision has also been made for different sizes of paint containers, which can be installed in the larger receptacle so that where different colors are used a small amount may be mixed and applied without the necessity of filling a large container. Where the painting material is quite thick air agitators are provided to keep the solid matter in suspension.

Railways which are now using spray painting find that it produces good results where the men are convinced of its merits. When once introduced its extension to a large variety of operations is easy. This applies not only to rolling stock but to the painting of poles, fences, signals, shelter buildings, and other property out on the line.

Play with the Company that Wants You to Grow

IN ALL industries there is at present great activity with regard to the development of employees. Such work has been going on for many decades, but the modern tendency toward large aggregations of workers has forced more systematic attention to educational matters. This work naturally takes on two forms, one which fits the worker better to perform his every-day job, while the other prepares him for promotion. The first is vocational training; the second, education in the broad sense.

The test of virility in an industrial or public utility organization is the extent to which efforts are made along the lines of these two kinds of training, and the success of these efforts. Fortunate are the young men or women who tie up to a concern which has the right educational ideals. If they remain in its employ they are sure of deserved promotion; if they leave after a time they are better prepared for any appropriate line of activity elsewhere.

Permit Yourself to Develop

WRITING about the life of the great and revered Abraham Lincoln, John Hay said of him: "Lincoln permitted himself to develop."

That thought is one that every ambitious employee may well ponder and take unto himself. What Mr. Hay meant was that Lincoln kept an open mind. He sought the good in every new proposal that came to him. He was ready to listen to new ideas, to the views of others, and then build his knowledge upon the sound parts of these expressions. He used judgment, but he permitted himself to develop.

There is many a man, when a new proposal comes to him, who is very likely to think of all the reasons why it can't be done or shouldn't be. His attitude of mind is to develop resistance to the idea. If an order comes out from the main office he sees it as another curtailment of his personal prerogatives or as the academic notion of someone at a desk who doesn't know the real situation in the field. He is negative not positive, closed minded not receptive, to whatever newly confronts him with respect to his job.

Why not turn a new leaf and resolve to look for the good in an order, to see if a thing *can* be done, to aim

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to find a way to *do* what the boss directed rather than seek a good reason why it cannot be done; to have an open, receptive, positive attitude of mind. Your development is largely dependent on how you receive information and instructions. But with it all, think.

Lincoln permitted himself to develop.

An Old Competitor May Become Again Active

RECENT discussions on the subject of competition to electric railways have been confined to the inroads in traffic made by jitneys and other automobiles, and the oldest competitor of the electric road has been forgotten. This competitor is no other than shoe leather and plans are on foot, to use an appropriate simile, to promote its sale, despite the effect on electric roads. "Walk and be healthy" is the slogan under which this campaign will be waged, if a suggestion made at the convention last month of the National Boot & Shoe Manufacturers' Association is accepted. The jitney, private auto and electric railway, in this instance, are grouped among those against whom the campaign will be directed.

There might be more danger from this competition if the shoe dealers and manufacturers had not raised the price of their products during the last five or six years far more than electric railway companies have done. With present prices of footgear, walking may be a healthful exercise, but it is also an expensive one, as well as time consuming. When shoes cost $8 or more a pair, one has to be careful as to how he wears out the soles. That sum will pay for a good many car rides.

Modern Shop Tools Will Produce Better Work More Economically

THE principal reasons why railway executives purchase additional machine tools is either to provide for doing some work that cannot be carried out with present equipment or to reduce the costs of performing certain operations. Due to the lack of money during several years past railways have been unable to purchase the new equipment necessary for repair work. As a result most machine shops contain many antiquated, inefficient machines which are costly to operate, expensive to maintain, and turn out poor work. Most mechanical departments realize the savings that will result from new tools, and many executives are now considering the rearrangement of their shop tools and the addition of new equipment.

Machine tool manufacturers at the present time are devoting much attention to high production, single purpose machine tools of standard types. There is much to be said about the advantages of using standard equipment. If a breakdown occurs on one tool it is often desirable to transfer some fixtures to other machines. Where machines require special fixtures it will be necessary to carry an additional stock of them in excess of actual requirements. The taper of hole and threads on spindles, the form of tool holder, and the method of clamping tools are all considerations that have much to do with interchangeability. This leads to the problem of having the new tools standard with old. If records show that present machines in use are up to the average productivity a change to another make is not desirable, but if the present output is low, increased economies from machines not standard with the old may outweigh the need for interchangeability of parts.

Now is the time to make a survey of your present shop equipment and see what changes are needed and what new machines are desirable. Make out a constructive program that can be spread over several years and it will be easier to convince the management and secure the necessary appropriation for new equipment. Railways for years past have not even spent sufficient money for new shop tools to replace those worn out, not to mention what should have been installed to keep up with advances in tool design and shop methods.

Association Rail and Joint Standards Become A.E.S.C. Standards

UNDER the temporary provision by which existing standards of national industries can be approved by the American Engineering Standards Committee with a minimum of red tape, six proposals of the American Electric Railway Association have gone through with great promptness. This is partially due to the fact that the particular specifications involved affect practically none but the electric railway. Other proposals are held in abeyance because they do affect other industries and there has as yet not been time to insure unanimity regarding them. The action of the American Association in going into this matter thoroughly and promptly has caused favorable comment and it has helped the A.E.S.C. in getting its work inaugurated. The Engineering Association executive committee made a special point, in its assignments to technical committees, of urging that consideration be given to the selection of standards which are appropriate for submission to the A.E.S.C. this year. After this year, standards can be adopted only through the functioning of sectional committees, whose work will necessarily be more time-consuming.

Welding Strains Should Be Avoided

ONE of the most difficult welding problems that electric railway operators have to solve lies in the building up of axles and other large parts subjected to considerable strains. In building up axles, if the welded metal is laid on lengthwise, the top portion is heated by the action of the arc while the bottom remains cold. When the opposite side is reached the part just welded has again become comparatively cold. The metal in the axle is thus subjected to a repetition of expansions and contractions which cause cumulative strains and result in cracks.

Among the recent developments to overcome this trouble is the automatic welding machine. This applies the metal in a spiral around the axle, and results so far indicate that this method is quite satisfactory. Some shops without automatic welding machines are applying the metal by hand welding as the axle is rotated slowly. This method is certainly much to be preferred to that where the metal is laid on longitudinally.

Another method that has just been developed consists of heating the welded portion to an annealing heat and quenching it from that temperature. Water cooling keeps the rest of the shaft from material changes in its structure. The developments of these methods indicate that the seriousness of the problem is appreciated by manufacturers. Electric railways should instruct their welders in the serious results that may occur from internal welding stresses and insist on methods that will reduce the hazard.

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Careful and Systematic Maintenance Is a Paying Investment

The Results Obtained from the Practice Followed by the Washington Railway & Electric Company Are Outlined and the Figures Given Answer for Themselves — Maintenance Costs Have Taken a Decided Downward Course and Troubles in Service Have Decreased

By J. S. Dean
Renewal Parts Engineer, Westinghouse Electric & Manufacturing Company
Pittsburgh, Pa.

East Capital Carhouse. One of the Eight Carhouses Operated on This Property

THE question of systematic maintenance is one of considerable interest and of extreme importance, as all railway operating men are vitally concerned in the possibilities of making a commendable showing to their management by reducing the charges against the maintenance of their equipment. The superintendent of equipment of the Washington Railway & Electric Company has made a careful study of this operation and is convinced that it is a good paying investment to devote time, thought and careful study to the repair and upkeep of equipment. Some of the results obtained on this property are given in this article, for the benefit of other operators.

The Washington Railway & Electric Company, operating in Washington, D. C., has the Capital Traction Company as a competitor. The present population of Washington is 430,000 persons. The company operates 175 miles of track, 63 miles of which is underground trolley and 112 miles is overhead trolley. The total number of passengers carried during the year 1922 was 107,609,948. The main shops of this company are located at 2411 P Street. This company also has eight carhouses and employs 143 men in the shops and 139 in the carhouses. The rolling stock operated includes seventy one-man cars, fifty-three pay-as-you-enter cars, ninety-one pay-within cars, 141 open-platform cars, seventy-one center-entrance cars and thirty-nine open-type cars, making a total of 465. In addition to the above passenger cars, there are operated about forty-eight service cars, such as sand cars, sweepers, plows, line cars, work cars, wrecking cars, etc.

All passenger cars operated by this company are double-truck cars, of which 302 have two-motor equipments with maximum traction trucks, and 162 have quadruple equipments. Of the one-man cars sixty have been remodeled and equipped at the railway company's shops during the past two years, the other ten being new cars recently purchased. The various types of control used are K8, K27, K31-A, K40-A.R.2, K39-B, K-66-A. Seventy-five cars are equipped with line switches, or contactors, two per car.

The types of motors in use are G. E. 57, 200A, 200K, 210B, 201G and Westinghouse 101B, 306, 93A, 323A, there being a total of 1,409 motors in service. New bodies for thirty two-man cars are now on order. These are to be installed on maximum traction trucks equipped with two Westinghouse 93A motors and K-27 control and line switch.

In addition to the above equipment this company also operates nine gasoline-propelled motor buses on some of the crosstown streets, which act as feeders to the main line. These buses are maintained at the company garage, which also takes care of thirty-five motor vehicles for company use. This work is in charge of a foreman and six men and is under the supervision of the mechanical department.

Four years ago this company worked out a plan which was put into effect whereby all running repairs on these cars, except changing of pony wheels on the maximum traction trucks, are made at the main shops in a new building constructed and equipped especially for this repair work. This shop has three repair tracks with convenient connecting pits, and in addition for each track there is provided a "Columbia" motor-driven car

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hoist operating on channel beams that engage under the two sides of the car body and lift it off of the trucks for access in repairing. Also for convenience in handling motors in and out of trucks there are provided two Sprague 1½-ton electric hoists mounted on swinging jibs. The running repairs of all cars from the eight carhouses are made at this central repair shop. This scheme has worked out very successfully and has the following advantages: The work is done by specialists

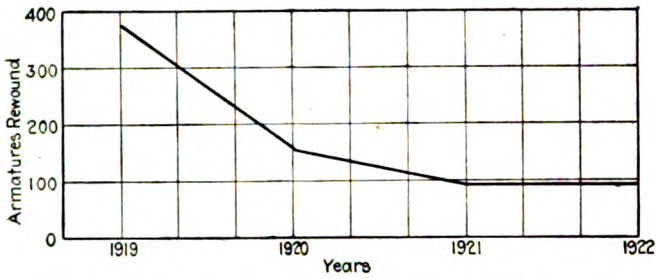


Fig. 1—Graph Showing Number of Armatures Rewound Over a Period of Four Years

under expert supervision, which results in better repair jobs. Careful and thorough tests are made on repaired cars before they are put back into service. By centralizing all repairs the stock of repair parts is simplified. Better inspection of cars is insured at the carhouses, as the men can devote all of their time to this class of work.

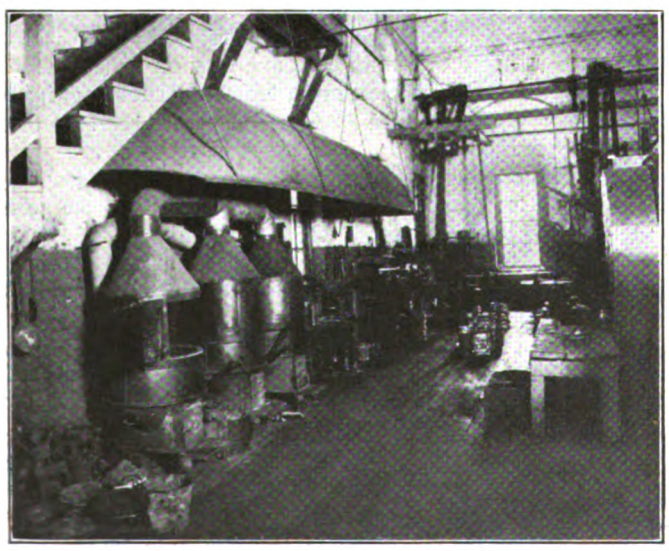
This procedure has been a good investment and the new repair shop and equipment costs were but $24,000. The shop force in charge of these repairs consists of eight men and a competent foreman. By the change made in the method of handling repair work the forces at the eight carhouses were reduced to forty-six men. In addition to the above saving of labor, the more efficient repairs on the equipment reduced the number of detentions and car pull-ins greatly, thus improving the service.

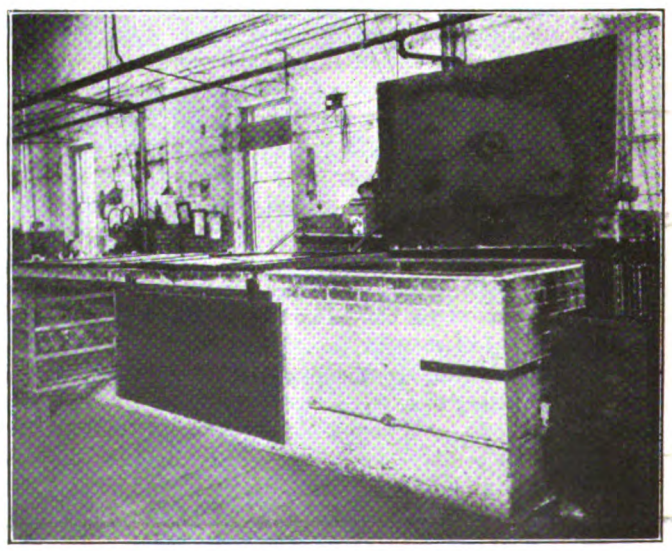
All cars sent in from the various carhouses for repairs are given a complete test to insure that all of the electrical equipment is in good operating condition. When repairs are completed the car is given a service operation test by spinning the individual motors in each direction to check the motor connections to the car wiring. While these motors, from which the commutator covers were removed, are being spun, careful observations are made of their operation to locate any defects that might show up which would develop trouble in service. High-voltage insulation breakdown tests are applied to the motors of all cars worked on in this shop, also the fields in all motors are opened up and carefully tested with a Kelvin bridge type ohmmeter.

At the various carhouses all cars are given a thorough inspection on a 1,000-mile basis to insure that they are kept in good operating condition. In addition all cars are given a general overhauling after they have made 50,000 miles. This work is done at the truck and motor overhauling shop, which is a unit of the general repair shop and is fitted with three hydraulic car hoists, which are similar in design and operation to the three electrical car hoists located in the new repair shop. To facilitate the overhauling of the motors a convenient work table 18 in. high, 4 ft. wide and 30 ft. long is provided to receive the motors to make them more accessible to the men while making the required repairs. The motors are handled to and from this table by a Sprague 1½-ton electric hoist mounted so as to travel the full length of the table.

The reclamation work is done in a separate room, well lighted and equipped with two electric welding machines and manned by three men who specialize in this class of work. Electric welding is done on steel, bronze, malleable iron and cast iron and on such parts as axles, armature shafts, truck frames, bearings, journal boxes, gear cases, motor frames, grids, etc. All repaired parts go back into their stock at 50 per cent of their original money value. Actual cost figures made up on the above basis show that the saving effected by reclaiming defective material has paid for the welding equipment within a period of six months. To facilitate welding repairs on parts of equipment that cannot readily be handled, the various departments of the general repair shop are conveniently wired with plugs or jacks connected to the welding machine to which the welder can attach his welding leads and do the job at hand, thus expediting the repairs and saving the expense and inconvenience of moving heavy parts to the welding room.

To test axles for cracks and defects, the axle is thoroughly cleaned and a thin coating of whiting mixed with alcohol is applied and left to dry. The axle is then suspended and struck a few blows on the end, and





At Left—Babbitting Room Showing Babbitt Pots and Equipment for Tinning and Relining Bronze and Malleable Iron Bearing Shells. At Right—Baking Oven and Dipping Tank for Treating Field Coils and Completely Wound Armatures

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if any cracks are present thin dark lines of oil will ooze out, showing plainly against the white background. This method of inspection helps materially to eliminate defective axles, as approximately 100 defective ones that would soon break in service have been detected by this method of testing and have been scrapped during the past two years. All bent axles are straightened on a special hydraulic machine designed and built for this purpose. The responsibility for wheel changes is placed upon the master mechanic at the shops, who receives wax impressions of the tread and flange of the wheels sent in by the foremen from the various carhouses. These casts are made by the foremen on the wheels which, in their judgment, are nearing a condition when they should be replaced. From these wax impressions final recommendations as to replacements are made to the master mechanic, who in turn advises the respective carhouse foremen of his decision. In pressing on wheels at the shop the hydraulic wheel press is fitted with a hydraulograph, which accurately records graphically the tonnage required to press on each individual wheel. These records, as well as the wax casts, are kept on file for a definite time for future reference, as they would be of considerable value in connection with evidence required for lawsuits. After new wheels have been pressed on the axle the treads are ground to a definite size by means of a special grinding machine equipped with two high-speed carborundum wheels.

In order to reduce possible accidents due to faulty brake rods, tests on these parts are made on the cars at carhouses once each month by increasing the air pressure from 70 lb. to 120 lb., and with brakes rigidly applied, the rods are tested by rapping sharply with a 2-lb. hammer. As a result of these tests the carhouse men have broken a great many defective brake rods which would have broken in service with the possibility of an accident resulting. This test led to the development of a special machine to give all repaired and new brake rods a severe tension test equivalent to three times the pull that the rods get in service. Details of this method were published in the ELECTRIC RAILWAY JOURNAL for June 18, 1921. While under this strain the brake rod is rapped sharply by a hand hammer so as to show up any weak parts. In addition to subjecting all rods to this test the material from which these rods are made was changed from machine or soft steel to electric furnace steel, which has been found to be superior, as it is tough, ductile and readily welded.

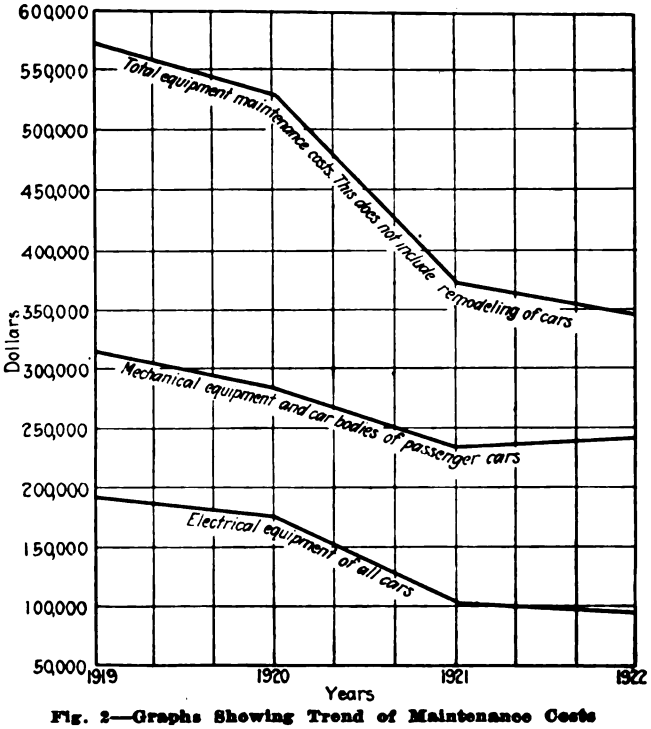
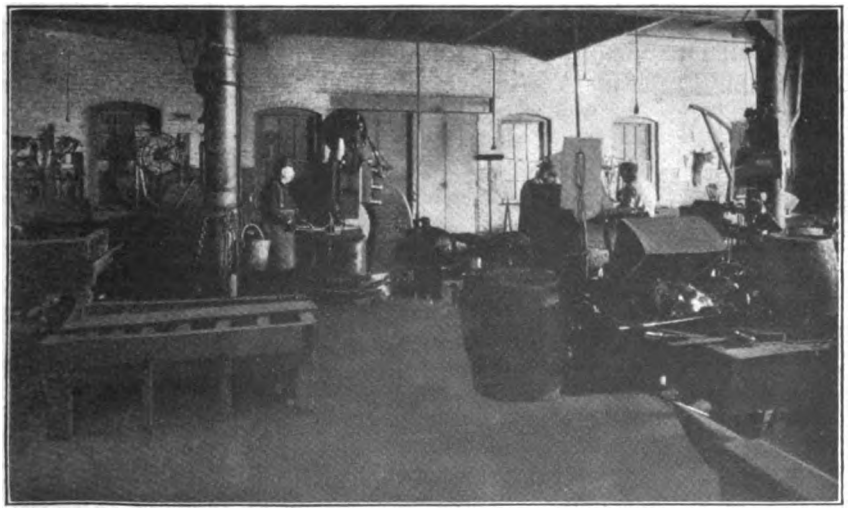
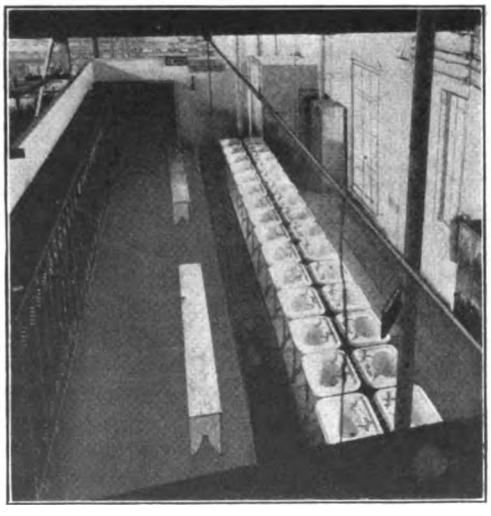


Fig. 2—Graphs Showing Trend of Maintenance Costs on Various Items of Equipment

On this property all rewound and repaired armatures are dipped and baked to protect the windings from dirt and moisture and to improve the insulation, thus increasing the life in service. The superintendent of equipment is an enthusiast on this subject and estimates that this procedure has reduced his armature repairs approximately 75 per cent. The graph in Fig. 1 shows the number of armatures rewound on this property over a period of four years and gives sufficient evidence to confirm the above statement. All repaired armatures are tested with 1,100 volts alternating current for three minutes and rewound armatures with 2,400 volts alternating current for the same length of time. Originally the armatures were tested on the above voltage momentarily, but experience has indicated that this time element should be increased in order to weed out defective windings that otherwise would have been passed as O.K. on the shorter time test.

A special testing outfit has been rigged up in the shop to calibrate circuit breakers and to give current-collector plows an overload current test. This apparatus





At Left—The Forge Shop Is Equipped with Five Down-Draft Forges and a Large Power Hammer. At Right—A Washroom Is Fitted with Washbowls and Shower Baths for the Workmen

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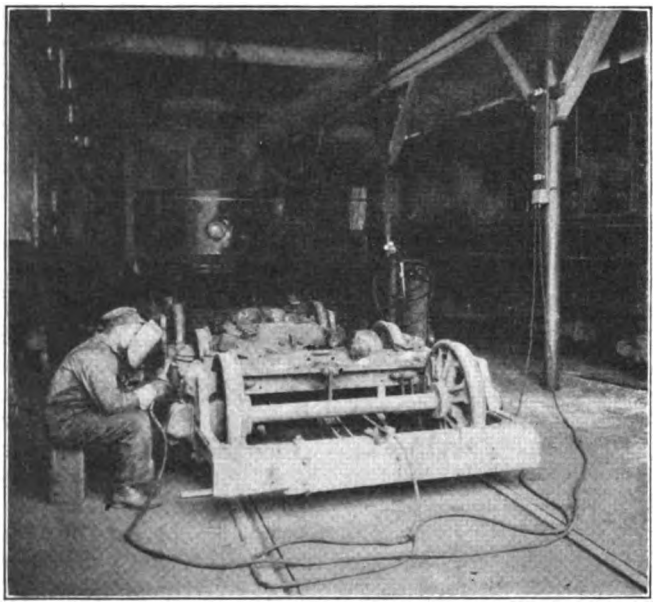
is conveniently located near where the plow and circuit-breaker repairs are made and consists of a switchboard fitted with the necessary switches, a circuit-breaker set for 800 amp. and an ammeter of the same capacity. Outside of the shop is located a specially designed water rheostat, which is operated and adjusted by a wheel mounted on the switchboard. The equipment used in connection with this test was described in the ELECTRIC RAILWAY JOURNAL for July 23, 1920. Experience has shown that these tests weed out defects on these parts, which reduces the number of failures in service.

Field coils are tested by means of a Kelvin bridge type ohmmeter, which enables the operator to locate any defective coils. These are then repaired or replaced by new coils. All field coils on this property are fitted with flexible leads rather than brass terminals, as this method of making connections has been found to work out more efficiently and to give less trouble in service.



Electric Welder Repairing Side Frame of a Truck Using Current Relayed from the Welding Room

The coils after being assembled in the motor frame are given a polarity test to insure that the proper connections have been made. Very few new field coils are bought on this property, as all old and defective ones are stripped and rewound, insulated, dipped and baked and returned to service.

The Flexway woodworking machine installed in the woodworking shops is a very handy and convenient machine, with which the operator is able practically to duplicate all hand operations done by the average carpenter. This machine not only does this work better than hand methods but is highly efficient, as it replaces the labor of three or four men working under ordinary conditions with the customary hand tools. This shop is also equipped with all the various woodworking machinery to be found in any well-equipped shop of a similar size.

The forge room of the average blacksmith shop is ordinarily considered the dirtiest and most unsanitary place in which to work on account of the smoke and dirt of the fires when in action. This problem has been successfully solved on this property by the use of downdraft forges, which, since being installed, have transformed this room so that it conforms favorably with the other shop sections and in addition has greatly improved the sanitary conditions for the workmen. This shop is equipped with five forges and a large power hammer. It was described in the ELECTRIC RAILWAY JOURNAL for Oct. 23, 1920.

In addition to the regular babbitting pots, jigs, fixtures, etc., the babbitting department has the necessary equipment to tin malleable iron bearing shells before they are relined with babbitt. This extra operation on the malleable iron bearing shells has made it possible to obtain babbitted bearings of this type in which the lining holds more securely than when depending only upon the customary anchor holes. A further improvement contemplated in connection with the babbitting work is the installation of a device for indicating the exact temperature of the metal in the babbitting pots, which will insure more dependable relined bearings.

In order to show that careful and systematic maintenance as practiced on this property does pay and is a good investment, note the general downward trend of the curves shown in Fig. 2. These three curves show the maintenance cost over a period of the past four years on this property, as follows: Upper curve, total equipment maintenance cost not including cost for remodeling cars; middle curve, mechanical equipment and car bodies of the passenger cars; lower curve, the electrical equipment of all cars. During this same period of time the maintenance cost per car-mile was reduced from $0.045 to $0.031, a very creditable showing.

While many improvements have been made in connection with the upkeep of the equipment and in maintenance methods, at the same time some thought has been given to the question of bettering the working conditions in and about the shop and to the improvement of the general welfare of the workmen. To this end a general campaign of safety and fire prevention has been inaugurated to protect the men and the company's property. A large washroom has been provided in the main shops, which is equipped with lockers, washbowls and shower baths and is plentifully supplied with hot water for the use of the workmen, who have shown that it is greatly appreciated.

Another very important activity to be found on this property is the holding of regular meetings to discuss the maintenance problems. These meetings, which are held periodically, are attended by all employees who are in a supervisory capacity, such as shop and carhouse foremen and assistant foremen. The following gives an outline of a recent meeting of this character held in the Potomac Electric Power Company's general office building. At this meeting the superintendent of equipment, acting as chairman, introduced the various men present, after which two charts, one showing detentions charged to the various carhouses for the past three years and the other showing rewound and repaired railway motor armatures for the past three years, were shown and discussed by the men present. The chairman then read a number of written questions from the various men pertaining to the details in connection with their daily work. Some of the subjects actively discussed by the men at this time were:

1. Strengthening trucks
2. Keeping bolts tight
3. Lubrication of bearings
4. Bearings and babbitting
5. Brake rods
6. Freezing of the air system
7. Lubrication of control
8. Lubrication of engineer's valve
9. Detentions and pull-ins
10. Armature repairs
11. Trigger lock control fingers
12. Motor lead connections
13. Heat treated bolts
14. Carhouse supplies
15. Motor housings
16. Axle bearings
17. Brushholders
18. Fire hazards

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After this discussion one reel of moving pictures entitled "Romance of Rails and Power" was shown and received with considerable interest. This was followed by an illustrated talk on maintenance of railway equipment, given by an engineer of the Westinghouse Electric & Manufacturing Company. The meeting then adjourned and every one was invited to the dining room, where a lunch, served by the company, was shared and enjoyed by everybody present.

Such meetings are very interesting and instructive and give the men a chance to get better acquainted with each other. An opportunity is afforded to present troubles and have them openly discussed and it helps the men in public speaking, as they take an active part in the discussions, and, finally, these meetings develop a spirit of co-operation within the organization which results in better team work, which is essential to the success and efficient operation of any railway property.

The Science of Babbitting Bearings

By Use of Mechanical Devices and the Exercise of Scrupulous and Continuous Care in Preparing Babbitt Metal, Highly Satisfactory Procedure for This Work Has Been Developed

THE babbitting of journal and axle bearings is one of the routine maintenance shop jobs to which master mechanics have devoted a great deal of careful attention. Each man has developed his own methods, but each is glad to learn of the plans that have been used effectively by others. One of the shops where this work has been brought to a high degree of perfection is that of the United Electric Railways, formerly the Rhode Island Company, the headquarters of which are at Providence, R. I. While the methods used there are not new, they represent the result of a gradual evolution and are well worthy of study. The babbitting work on this property, for a total of 1,200 cars more or less, is done by two men, one of whom is an expert on handling the molds, while the other devotes his attention principally to the broaching or finishing.

Contrary to the practice in some shops, the babbitt pots are heated right out on the main floor of the machine shop, where they are conveniently located with respect to a pneumatically-operated molding machine, a pneumatically-operated broaching machine and iron-top benches where the molds used for lining split bearings are manipulated.

Axle bearings are babbitted in one part of the shop and journal bearings, which are babbitted by hand, in another.

For the work on axle and armature bearings, two babbitt pots are used, each containing a different composition of metal. These pots set in the top of cylindrical furnaces in which soft coal is burned.

Draft for the fires is furnished by a belt-driven fan conveniently located, with suitable piping to the furnaces, and removal of the products of combustion is accomplished by the suction fans used for the down-draft forges located in another part of the shop. They are drawn into a flue pipe which passes vertically downward into the basement where the connection is made with the main suction pipe.

There are suction connections also from above the pots so as to draw off the fumes and keep down the surrounding temperature.

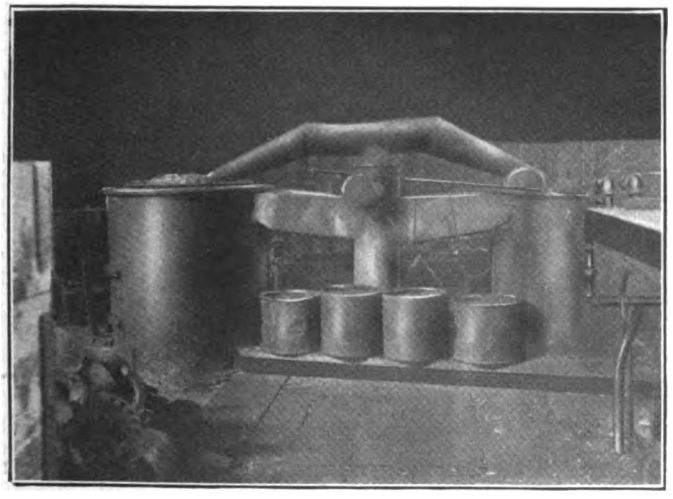
Molding Machine Has Water-Cooled Arbor

The molding machine, for solid bearings, consists of an iron table through which projects a water-cooled arbor. This is raised and lowered by means of a pneumatically operated piston, working in a 16-in. cylinder and having about a 1-ft. stroke.

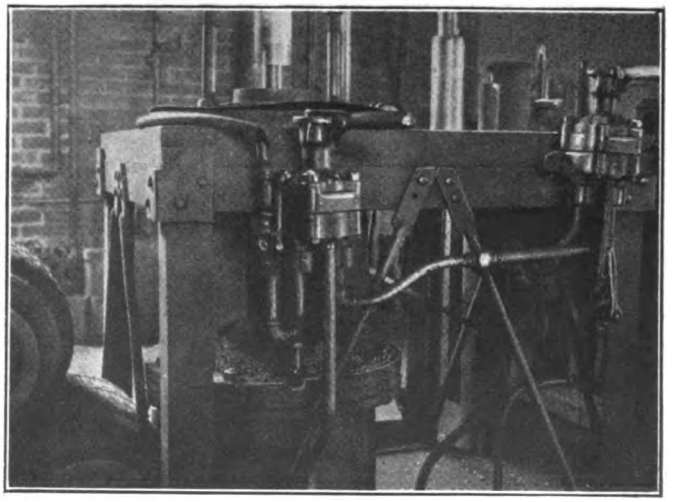
Water from the shop piping system circulates through the arbor, which can be easily changed to suit the different styles of bearings to be babbitted.

In operation the arbor is elevated to the proper position by manipulation of two three-way valves, the mold is placed over and around it, and the babbitt is poured and cooled all within the space of about one minute. A test made with a Westinghouse sixty-eight pinion-end bearing showed that the time required from the instant of pouring until the babbitt was hard enough to permit the bearing to be removed was twenty-five seconds.

The mold consists of a flanged cylinder, which is clamped down to the table top of the molding machine



Pair of Babbitting Metal Furnaces Used in Babbitting Axle and Motor Bearings in Shops of Providence Company



Broaching Machine Showing Upper Part of Cylinder, Piping and Control Valve—Tool in Motion Due to Air Leakage

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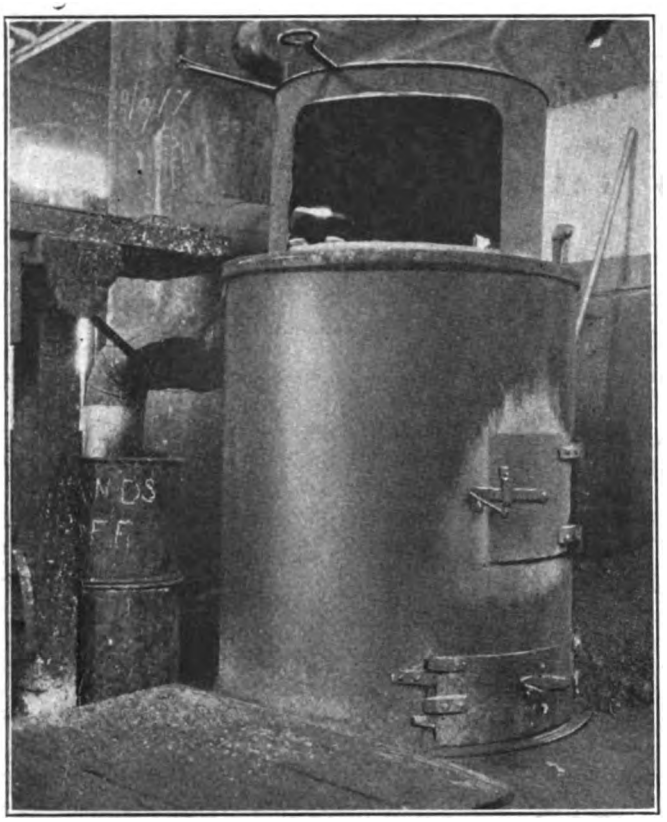


Babbitt Furnace Used in Babbitting Journal Bearings

in a position concentric with the arbor. The bearing is dropped into this mold over the arbor, its flange holding it in a concentric position resting on a shoulder inside the mold which determines the thickness of the flange. Curved iron filler pieces are then dropped into place between the mold and the bearing. A cast-iron gate, to facilitate the pouring operation, is then slipped over the top and the mold is ready for pouring.

Where it is desired to cast the babbitt metal over the end of commutator-end bearings to serve as a dust cap, this can be done by having arbors for such bearings short enough to permit a ring to be placed inside the mold and over the bearing so as to flow the babbitt over the arbor about ¼ in. thick.

Some Details of the Broaching Machine

The broaching machine consists of a cast-iron table supported on an angle-iron framing with suitable bracing, below which is a 14-in. pneumatic cylinder, by means of which a 1½-in. piston rod is raised and lowered. This is threaded on the upper end on which a tapered broaching tool is screwed. Two standard sizes of broaching tools are used, one being ½ in. smaller in diameter than the other.

A steel crosspiece is mounted on the table above the cylinder to serve as a stop against which the bearing is held while the broaching tool is being forced through it.

In operation the bearing is held over the broaching tool, which has been retracted to a position below the level of the table, and the air is turned on. The piston carrying the broaching tool rises, raising the bearing against the top, and the tool is forced slowly through the bearing. The air is then reversed and the tool is retracted.

This practice of broaching, which is in accordance with the recommendation of manufacturers, gives a smooth hard surface to the babbitt, increasing its resistance to wear.

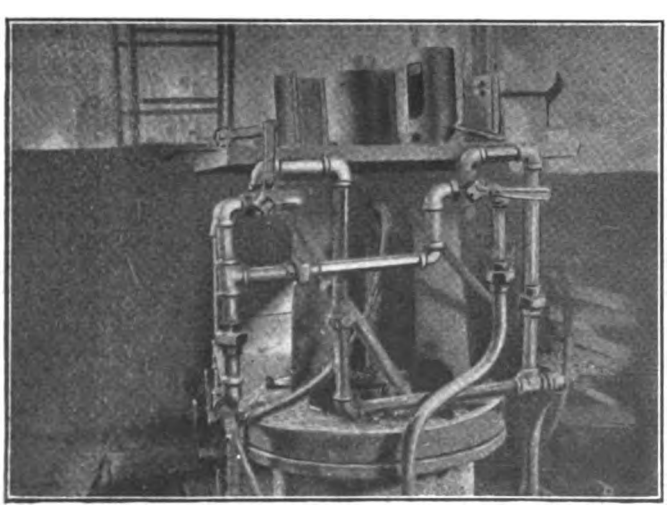
For the various types of split bearings, an assortment of Weld babbitting devices are used.

What has been said in the foregoing refers to the axle and armature bearing babbitting plant. The journal bearing work is done with one furnace equipped in general like the double furnace already described but having a hood, as shown in an accompanying illustration.

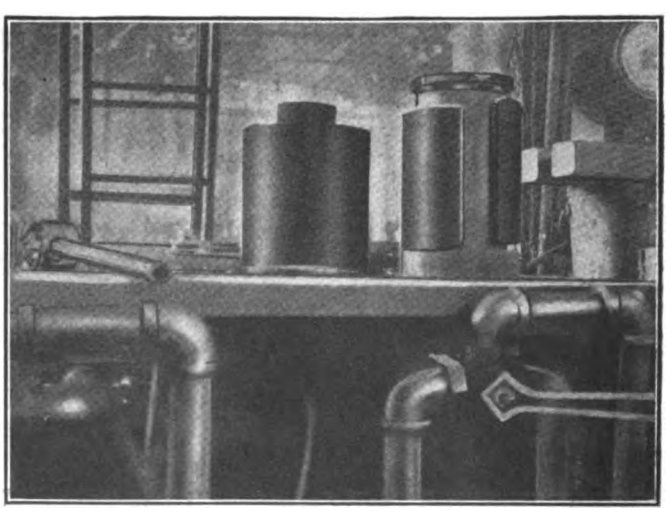
The usual hand molds are used in babbitting journal bearings. In general these bearings are used as they come from the molds, but recently, at the request of the car maintainers, bearings of one type have been given two or three finishing cuts in a planer. The planer tool for this work consists of a circular cutter bolted to a shank.

Three kinds of babbitt metal are used in babbitting bearings on this property, the compositions having been worked out carefully on the basis of experience. Analyses of the metal are made occasionally to insure compliance with the specifications. The company mixes its own metal.

The composition for pinion-end armature bearings only is a tin base alloy made of eighty parts tin, five parts copper, five parts lead, and ten parts antimony. For axle and other motor bearings a lead base alloy is used, consisting of forty-four parts lead, forty-four parts tin, eleven parts antimony and one part copper. For journal bearings the composition is 96 per cent lead, 3 per cent tin and 1 per cent antimony.



Molding Machine with Water-Cooled Air Operated Arbor



Parts of Mold Used with Molding Machine

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Painting Methods for Electric Railway Rolling Stock

Analysis of the Various Painting Methods Used by Electric Railways—All Companies Are Trying to Reduce the Time and Cost of Painting Cars—Use of Enamel System and of Spray Painting Are Increasing

THE two fundamental reasons for painting cars are to protect the equipment from the deteriorating effects of the elements and to effect a pleasing appearance. The latter one has a far-reaching effect in connection with passenger cars which is very often overlooked. Paint frequently forms the basis of the public's judgment as to the condition of rolling stock. Gears may be noiseless, flat wheels unknown, and detentions may be few, but if the cars need a coat of paint the property looks neglected and the traveling public forms its opinions accordingly.

Electric railways should consider the question of painting rolling stock not alone from the economic standpoint, but also from the standpoint of good-will and salesmanship. In reply to a question as to the advertising value of paint on rolling stock, the chief engineer of a prominent electric railway system recently remarked: "We believe that a well-painted car, kept in good condition to eliminate noise, is such a good advertisement that it increases the riding sufficiently to pay for the added expense of keeping the equipment in this good condition."

The painting methods and the problems which confront those responsible for the appearance of rolling stock are quite varied. In discussing this question with men closely connected with the work, it appeared that there is apparently a lack of information as to just what various roads are doing and the results that they are obtaining.

Electric railways are endeavoring to introduce economies in all maintenance departments, but the problems relating to economy in car painting are quite varied. The three principal systems most generally used are the flat color and varnish system, the color varnish system and the straight enamel system. The question of the relative value of these is still open to considerable discussion. Different railways have varying ideas regarding the relative value of appearance, and the amount of striping and lettering that is done on a car is a matter of personal taste. Painting problems have been increased with the use of modern thin metal sides and light pressed posts for rolling stock, and methods of painting to take care of these are quite different from those used with the old wooden equipment. It is evident that results obtained from any particular system must vary, due to climatic conditions and to the type of roadway over which the cars operate. Everyone knows that the effect of salt atmosphere, dirt from unpaved streets, and severe weather conditions will influence greatly the life obtained from painting.

In order to obtain information which would show results and methods employed, the editors of this paper sent out a questionnaire to 100 electric railways which were considered representative. Answers were received from forty. This information has been analyzed and the results of this investigation are given herewith. In addition to this, a survey of the paint requirements of electric railways was made and reports were received from eighty-three properties. This information has been supplemented by data obtained by several paint manufacturers who were good enough to submit their records for examination.

In order to get an idea as to the frequency with which it is necessary to repaint the rolling stock, the various railways were asked to state at what intervals they paint their cars. An accompanying table gives the answers received to this question. The answers are listed according to the painting system employed. From the answers received it appears that nearly 50 per cent of the railways paint their rolling stock at intervals of from two to three years, and apparently this is not influenced by the system employed.

	Number of Companies Answering			
Answers Received	Enamel System	Color Varnish and Finishing Varnish	Flat Color and Finishing Varnish	Special Systems
One to one and one-half years	1	1	..	..
One and one-half years	1	1	2	1
One and one-half to two years	..	..	1	..
Two years	2	2	3	1
Two to two and one-half years	3	2	..	..
Three years	2	2	..	1
Five to nine years	..	1	..	..
Six years	1	1	..	..
Six to eight years	..	..	1	..
Eight to twelve years	..	1	..	..
Revarnish and touch up generally every year	..	..	1	..
Wooden cars fifteen months, steel cars eighteen months	1	..	1	..
Varnish every sixteen to eighteen months, paint about every ten years	..	..	1	..
Revarnish and touch up every one to one and one-half years, repaint every two to three years	..	..	..	1
Do all painting necessary every one and one-half years	1	..	..	..
60,000 to 100,000 miles	1	..	..	..

The nature of the answers regarding intervals for painting indicates that the periods are rather indefinite and are influenced in many respects by overhauling periods necessary for other equipment. As examples of conditions which govern painting periods, the following representative answers are given:

"All of our cars are brought into the shop once each year for revarnishing. With this practice we have very few cars that are entirely repainted during the year. When the cars are brought in for revarnishing, the panels are repainted and the other painting is touched up generally, so that the period for repainting is rather indefinite."

"Cars are repainted and revarnished at the time they are in the shop for general overhauling. Revenue cars in general service come to the shop for intermediate inspection when they have made 20,000 and 40,000 miles, and at the 60,000-mile interval they are brought to the shop for general overhauling. Trains and trail cars used only in rush hours or special service are brought to the shop for inspection and overhauling on regular time interval periods, instead of on a mileage basis. The first and second eight-month periods are those of intermediate inspection, while on the third and fourth-month periods the trains are given a general shop overhauling and revarnished or repainted as necessary."

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"The routine interval is eighteen months. This period is in step with our equipment overhaul. Repainting is sometimes necessary on account of physical damage at shorter periods. It would average about two years if based on undamaged surfaces."

"We endeavor to put our cars into the shop for a general overhauling on a 75,000-mile basis, or at an average interval of eighteen months. If the condition of the paint on the cars demands a total repainting at this time, the job is done. In other words, we endeavor at this time to put the car body in such condition that it will come back to us at the next overhauling period in a reasonably good condition."

In regard to the time that it is necessary to remove cars from service for painting, replies indicate that the average is about ten days. The average for the various painting systems is about the same. The accompanying table gives a summary of the answers received and shows a variation of from five to fifteen days. In some cases the time in the shop is governed to a large

Answers Received	Number of Companies Answering: Enamel System	Color Varnish and Finishing Varnish	Flat Color and Finishing Varnish	Special Systems
Five to eight days	..	1	..	..
Five to fourteen days	1	..	..	..
Six days	2	..	..	..
Seven days	2	1	2	2
Eight days	..	1	..	..
Nine days	..	..	1	..
Nine to eleven days	..	..	1	..
Ten days	4	1	4	..
Ten to twelve days	1	..	..	..
Ten to fifteen days	1	..	..	..
Ten to twenty-five days	1	..	..	..
Eleven days	..	..	1	..
Twelve days	1	..	..	1
Twelve to fourteen days	..	..	1	..
Twelve to fifteen days	..	1	..	..
Fourteen days	..	3	..	..
Fourteen to twenty-one days	..	1	..	..
Fifteen days	..	1	..	1
Varies according to condition of car	..	1	..	..

extent by other work which is done on cars at the same time that the painting is being taken care of.

Some of the factors which enter into the time that is necessary to withhold cars from service for painting are indicated by the following answers:

"We require five days for painting safety cars and fourteen days for large interurban cars."

"Our cars are repainted at the same time they are overhauled, and they will average about thirty days in the shops for overhauling and repainting."

"Cars are removed from service from ten to twenty-five days, depending on the amount of work required for painting. Our first step when a car is brought in for painting is to strip it. It is then scrubbed, after which the carpenters and metal workers do the necessary work for putting it into condition for painting."

"The time varies according to the condition of the cars. The bodies are generally overhauled before painting."

"Cars are in the paint shop for an average of about eight days, and in the carpenter shop prior to going into the paint shop an average of ten days, making a total of eighteen working days or about three weeks."

"The length of time required depends on the amount of work necessary. Ordinary repainting requires seven days in the shop."

"The routine process for complete repainting requires eleven days. This includes twenty-four hours drying after the final coat."

"The painting process on our cars requires about one week's time. However, we always overhaul all the equipment and car bodies prior to painting. This usually requires three weeks before the car is painted."

"As we have a comparatively small system we employ but one painter. The time required is twelve days for one painter, but this could be materially reduced if two painters were used."

In order to obtain an idea of the general practice as to removing or not removing old paint before repainting, a question regarding this was asked. Of the forty answers received, eleven answered that they did not remove old paint and five answered that old paint was always removed. One answered, "We remove old paint if necessary." Of the other replies received seven answered that the removal of old paint depends on its condition. Six replied that old paint is removed only from cars with very rough or cracked surfaces. Three answered that old paint is removed when it is found loose or peeling off. Three answered, "We do not remove old paint when the foundation is good," and one each answered "We remove old paint about every seven years," "We remove old paint at alternate general paintings," and "We remove loose paint and burn off about every twelve to fifteen years."

It appears from the replies received that the condition of the paint and its body governs to a large extent the removal of paint before repainting. One answered: "At the present time we are changing our color from a dark green to red color for the panels and cream superstructure combination, and consequently we are removing all the old paint."

How Old Paint Is Removed

It appears to be pretty general practice to burn off paint from wooden cars and to use a paint remover on steel cars. In regard to a question on this subject, sixteen companies reported that they followed this practice. Ten others reported that they burned paint off, and seven replied that they used a paint remover. Other replies stated that the outside paint is burnt off and a paint remover is used on the inside, that a sand blast, together with a paint remover is used, that the wood is burned off and that the metal parts are sand blasted and that the panels are burned off and a paint remover is used on other parts.

Answers to a question regarding the work done between general paintings indicate that most railways touch up and revarnish their cars between what they consider general paintings without removing the old paint. Of the forty answers received thirty companies replied that they did touch up and varnish between general painting. Six replied that they did not. Three replies stated that their practice was to touch up and revarnish only after accidents, and one replied that their company did very little touching up.

In regard to the difference in painting practice with steel and wooden cars, replies indicated that on the majority of roads, the only difference is in the priming coat. Thirty-eight companies which had both wooden and steel cars reported on this. Twenty-eight replied that the priming coat constituted the only difference and ten replied that they used practically the same process for both steel and wooden cars.

An attempt was made to obtain information as to the extent that spray painting was being used and the various parts that were being painted by the spray system. Replies indicated that two-thirds of the railways were not employing the spray painting system. Of the remaining one-third that were using it seven companies replied that they were spraying the trucks and underbodies of cars. Two replied that they sprayed trucks only, two that they sprayed platforms, hoods and trucks, two more that they sprayed box and flat cars, and an additional two that they were spraying trucks and work cars. Of the remaining replies indicating the extent to which the spray process was used, one company reported using the spray method for the entire outside of the car. Another stated that of the seven

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coats which were applied on the car, five of them were applied by the spray method and in addition the roof, truck, pilot, steps and bumpers were painted by the spray method.

A personal investigation at the shops of some of the companies which are employing the spray method quite extensively indicates that the economies resulting from the use of this system are quite pronounced, and that manufacturers are co-operating toward supplying paints and varnishes which can be used and applied readily by the spray method. Spray painting is particularly adapted for work in restricted places and is economical

Criticisms and Commendations of Various Painting Systems

From Railways Using the Flat Color and Finishing Varnish System

"We prefer the flat color and finishing varnish, as the varnish has less of a tendency to crack than when the color varnish system is used. We are required to bring the cars in for revarnishing once each year, and if enamel finish were used it would be necessary to varnish the enameled cars at the end of the year's run, as the enamel would have lost its luster in that time."

"We believe the flat color and varnish system to be the best. Otherwise we would change. I am under the impression that all other companies are of the same opinion that the method they use is the best. We have not been successful with the enamel system."

"We find the flat color and varnish system superior to enamel for the following reasons: We wash our cars so often that the rubbing would wear off the stripes, numbers and letters without varnish on top of the coats to preserve them."

"We prefer the flat color and varnish system because of lower cost and better appearance since cars are thoroughly finished and primed. The time required for painting is also much less. Regarding the other methods referred to, we have not tried them. The enamel system seems to be worth further consideration, as it retains its luster longer than varnish, but it is not as good when first applied. We are following the records of a few cars which have been done experimentally with enamel."

"We find the flat color and varnish system requires the least possible number of coats and gives the maximum possible wear. We prefer it to all other systems on account of its economy."

"We believe that the high grade of coach finish that can only be obtained with the flat color and varnish system is unnecessary for electric cars, and we are now contemplating a change. Greater durability of the enamel system appears to make it preferable to the color varnish method, although the latter is somewhat cheaper."

From Railways Using the Color Varnish and Finishing Varnish System

"We find the color varnish system satisfactory in that it produces a good finish, the various coats dry fairly fast and in general they do not crack, blister or peel to any extent, thus eliminating the necessity of removing old paint upon next repainting period. The objection to using a system in which a quick-drying varnish is used is that the resulting coat will crack after a short lapse of time, while if a slow-drying varnish is used, the cars are removed from service for too long a period for repainting. Similarly, the objections to a system giving an enamel finish are that good enamel dries too slowly and often one coating does not give a satisfactory finish. Where two coats are necessary, this doubles the time and cost."

"We use one coat of color varnish and two coats of finishing varnish because it has been giving the best results. We do not use rough stuff as we get a good enough finish and save the cost. We have been trying enamel for some time, but until lately we were unable to get a dark red color which would hold up and have any gloss, but the material used in the last six months has been greatly improved so as to overcome this difficulty, and we have quite a number of cars finished in enamel."

"We have obtained the best results with the color varnish system for the past twelve years. Our method carries more varnish and decreases the time that cars are kept in the paint shop. Most enamel checks and decorations do not stand up."

"Flat colors sometimes change in shade due to the chemical combination when a coat of varnish is applied on top of the flat color. This usually occurs when the car has been in service from eight to ten months. We consider the color varnish system to be the best, as we find the coats stand up longer and give better luster. Enamels do not retain the luster that good wearing body varnishes do, and cars which have been enameled do not clean up as readily as do varnished cars. The enamel is not good in appearance after two years of wear."

"We get better results at less cost from the color varnish system than we did with other systems. The flat color system costs more and takes more varnish and flat color. This also fades more than the color varnish. We have never used the enamel system, but observations of other companies using this indicates that it never gives the results claimed for it."

"We prefer the color varnish system as we can work two coats of color in a day, and this cannot be done with enamel finish."

"We use a combination of the flat color and color varnish system. The enamel finish does not make as good a looking job as the varnish finish, does not last any longer and is harder to clean."

"Our standard practice is to use color varnish and one coat of finishing varnish. We have found this amount of covering material to be sufficient to protect the wood in a satisfactory manner for a period of thirty months."

From Railways Using the Enamel System

"We find the enamel finish saves time, stock and labor. The durability is greater with the best grade of enamel."

"Cars are not out of service with the namel system as long, and they do not look as shabby after two and one-half years."

"We use the enamel system because of its lower expense, longer durability and because it can be finished more rapidly."

"We have found that cars done in enamel will look better for a longer period of time than the lead and oil jobs. It is also much quicker."

"We believe the enamel system to be durable and cars finished with it look good, so we have eliminated the building up of a fine surface with rough stuff just for looks. Our system will wear as long as a finer surfaced job."

"We find the flat color and finishing varnish system slower and more costly than the enamel system. It does not stand up as well and does not look good. The same objections apply to the color varnish and finishing varnish system. The enamel method is cheaper, requires less time, gives a better finish and lasts longer than the other methods."

"We find that the enamel system wears equally as well as the flat color and varnish system and cuts our shopping period about one-half. In other words, under the flat color and varnish system it requires approximately fifteen days before the car is ready for service. Under the enamel system it requires only seven days, and the operation is considerably cheaper. The enamel wears as well as the color varnish and the finishing varnish system and is about one-third quicker through the shop, although the color varnish and finishing varnish system is preferable to the flat color and finish varnish system."

"Experience has shown us that the enamel job looks better at the end of two years than a flat color and varnish job at the end of one year in this climate."

"After trying out three varnish and five enamel systems over a period of three years, we found one particular type of enamel system to be far superior in point of durability. Generally the enamels, and particularly the one we use, do not check and crack as do the varnish jobs. Varnish will check and crack. It also loses its luster at the end of about eighteen months, whereas the enamel we now use has withstood service for over five years without showing any indication of cracking."

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in the quantity of material needed. The greatest objection appears to come from the lack of interest shown by practical painters. Most of those from the old-time school follow the trade because of the pleasure derived from the wielding of the brush and the spreading of the film of color. The objections from these men are invariably that they like to have their paint brushed in. Several painter labor organizations are arguing against the use of paint-spraying equipment as being detrimental to health. The root of the matter seems to rest in a fear that the use of labor-saving methods will reduce the demand for painters.

Painting System Used

Outside of the special systems, which are used by some electric railways, the various painting systems can be classified in general into three classes. These are the flat color and finishing varnish system, the color varnish and finishing varnish system, and the enamel system.

After removing the paint or where this is not entirely removed, after the loose paint and that which shows signs of cracking has been removed, those using the flat color and finishing varnish system apply a priming coat. This is followed by a glazing or knifing coat when holes and nailheads are puttied and spotted. In general this is next followed by two rough coats or surface coats. The number, however, varies with different properties; some apply but one coat and others three. Next follow two or three color coats, and after the lettering and striping usually two coats of finishing varnish is applied. Some roads, however, use only one coat of finishing varnish. Of course, variations from this will be found on nearly every system, as frequently when cars are in fairly good condition some of the various coats may not be necessary.

Where the color varnish and finishing varnish system is used, the color varnish coats replace the flat color coats. Some roads use but one coat of color varnish; others two, and some use a combination, applying first a flat color coat followed by a color varnish coat. After the striping and lettering, the cars are finished by the application of either one or two finishing varnish coats.

Where the enamel system is used, the enamel coats replace the flat color or colored varnish coat. From the information received it appears that the most general practice is to apply two enamel coats. Some roads add a coat of finishing varnish over the enamel, and in the replies received two roads reported the use of a clear enamel coat over the colored enamel coat. A large number of railways do not use finishing varnish with the enamel system. Of course there are various combinations of these systems, as some roads use a flat body coat before applying the enamel coat, and other combinations are also possible depending upon conditions. Of the forty replies received in answer to the questionnaire, fourteen railways reported as using the enamel system, thirteen used the colored varnish and finishing varnish system, seven used the flat color and finishing varnish system, two reported using both the flat color and finishing varnish and the enamel systems, and four reported the use of special systems. The special systems reported include the Flood & Conklin's Simplex system, Murphy's A B C system, the Krakno system, and the Filkote system.

In order to obtain the opinions of a large number of users as to relative values of the various systems, the different railway companies were asked why they preferred the particular system that they are now using, and what objections they had to other systems. Some of the replies received are given on page 325. These are arranged to show the present systems which the companies are now using.

Preservation Is Not the Only Reason for Using Paint

As cars constitute the point of contact between the traveling public and the railway company, it is most essential that the general appearance of the interior and exterior be kept in a condition pleasing to the eye. The use of paint to improve the appearance of rolling stock is then a most important consideration. One of the best mediums for selling transportation is to adopt bright, pleasing colors.

Another reason for using brightly-colored cars is that of safety, and many companies are adopting a combination of colors to give the cars the greatest possible visibility. In order to give the service demanded by the public, high scheduled speeds are quite essential. In order to operate cars at hight speed and at the same time to promote the safety of the public, it is desirable that an approaching car should be distinguished as far as the eye can see.

Other reasons for keeping rolling stock properly painted are for sanitary effect and to improve lighting conditions. In order to ascertain how far paints are used by electric railways for these two purposes, companies were asked specifically if they used paint to improve lighting conditions and for sanitary reasons. Eighty-three companies replied to this question and 51 or 61 per cent said that they were important considerations in their use of paint.

An attempt was also made to find out how companies buy their paint. The majority of electric railways choose their paint by the manufacturer's make rather than from their own specifications. Sixty-five out of a total of seventy companies furnishing information on this point, or 93 per cent, buy all or some of their paint by specifying the manufacturer. Only five companies said that they write their own specifications.

Some of the reasons given for the use of ready-mixed paint are:

"Manufacturers know more about paint than we do."

"We cannot compete with manufacturers."

"We find that manufacturers' mixture is most reliable and economical."

"We consider manufacturers' paint more uniformly mixed than otherwise."

"We have not the proper equipment for mixing paint."

Twenty companies who buy part of their paint ready-made and mix part on the job reported using an increased amount of ready-mixed paint due to the convenience, economy and uniformity of colors afforded by manufacturers' products.

In considering some of the outstanding points resulting from the information received from electric railways, it appears that serviceability is the chief consideration in deciding upon the system or paint to be used. Operators judge results by the appearance of their cars when they come in for repainting after from two to three years of service rather than by their appearance after being repainted. Under present conditions railways cannot afford to spend money lavishly, and with the present labor and material conditions it is a self-evident fact that satisfactory paint cannot be purchased today at a less or even the same cost as three or four years ago.

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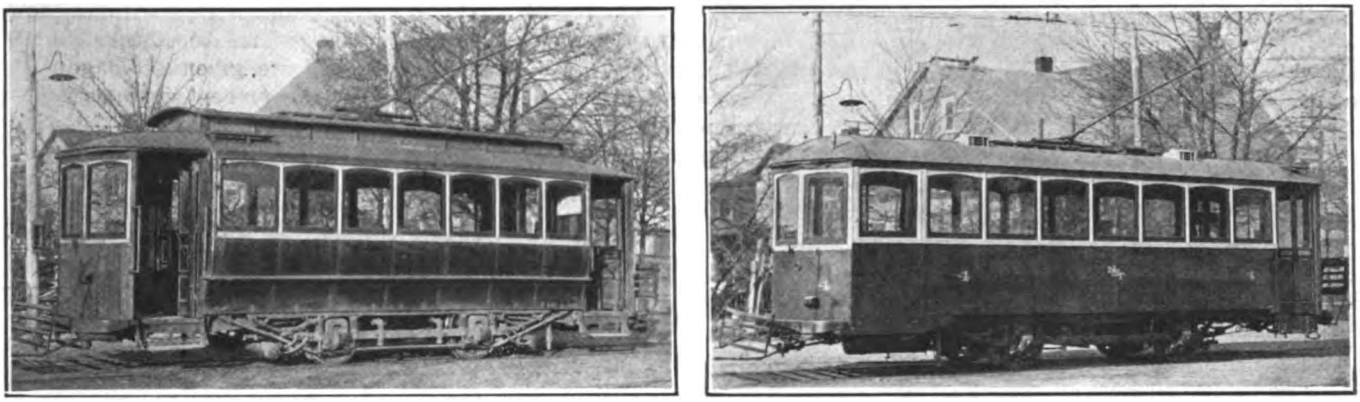


North Branch Transit Car Before and After Reconstruction

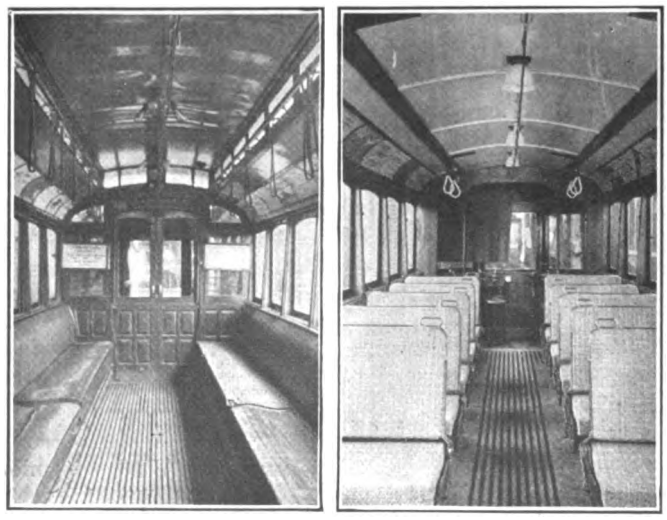
North Branch Transit Company Rebuilds Cars

Ten Cars Are Being Reconstructed for One-Man Operation—Trucks Are Rebuilt, Wheelbase Lengthened, and the Car Bodies Are Provided with Arch Roofs and Are Otherwise Rebuilt on Modern Lines

THE rebuilding of cars by small railways with few wood-working machines or machine tools often presents quite a problem, and many such roads lack the courage to undertake it. The North Branch Transit Company, Bloomsburg, Pa., however, is not one of these, for work has been started to rebuild ten of the company's old cars for one-man operation. Accompanying illustrations show details of the first car completed. The work of reconstruction was carried out under the direction of Douglass Ford, superintendent, and Norman Fry, master mechanic, and each of the nine men who constitute the shop force had something to do with the reconstruction.

The cars being rebuilt were some purchased from the J. G. Brill Company twenty-one years ago, and the exterior and interior views show the condition of the first of these cars before remodeling. In their original state the cars had semi-inclosed platforms with permanent steps, a car body with bulkheads and two sliding doors, longitudinal seats throughout and a monitor type roof. In the reconstruction the bulkheads were removed so that the platform could be made a part of the interior car body. Folding doors and steps were added. The seating was changed to cross-seats and the roof construction was remodeled to provide for arch roof construction.

In the illustration showing the framework of the car body during the process of reconstruction it will be seen that the car originally had 8-in. concave sides below the belt rail. In the reconstruction the cars were made straight by the use of 5-in. I-beams cut in seven pieces. The side posts were sawed and the straight pieces were spliced to it and bolted to the old side sills. In the new construction No. 14 gage steel was used for sides. In the reconstruction of the roof the old monitor deck was removed, but all sheathing and the rafters were used by raising them 2½ in. in the center and sloping to the original roof position at the sides. The same size and number of windows were retained in the car body, but an additional window was added at the closed side of the end.



The Interior Seating Arrangement Was Changed from Longitudinal to Cross-Seats

The trucks were Brill type 21-E. These were reconstructed and the wheelbase, originally 7 ft. 6 in., was lengthened to 9 ft. This was done by sawing the side frames apart in the center and lengthening these out by the use of four pieces of ¾-in. x 4-in. x 4-ft. 2-in. iron. These pieces were bolted on each side with ⅞-in. bolts, which were installed with a driving fit. The two sides were tied together by two angle-iron braces ¼ in. x 1½ in. x ½ in. Corner plates were used to make the connections between these cross-angles and the side frames. These braces were of angle iron ½ in. x 6 in. x 6 in. This provided a very strong construction and will prevent the side frames from kicking out.

In order to prevent the teetering and side swaying which is so common with single-truck cars, four shock absorbers were installed. An accompanying illustration shows the construction of one of these. They were made by using some trolley base springs. Two irons with hooks at the end were run through the center of the springs so that the pulling caused a compression of the spring. These shock absorbers were connected between the end crossbar of the truck and the end of the car body at an angle of about 45 deg. Two of these springs were used on each end of the car.

The manually operated doors and steps were furnished by the National Safety Car & Equipment

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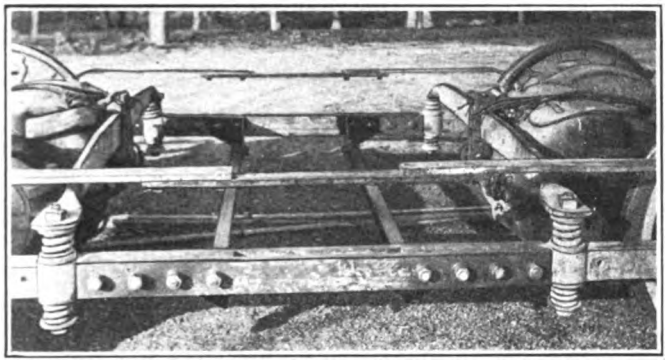
The Type of Shock Absorber Used



Construction View Showing How Truck Was Lengthened

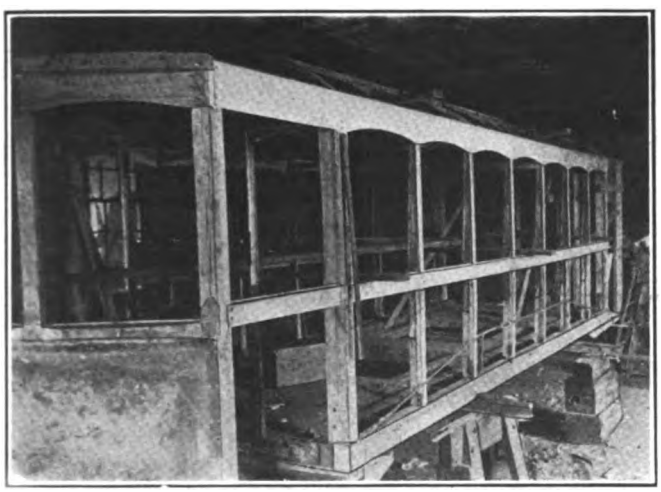
Company. As the doors open six lamps, three on either end, are lighted. These are installed over each set of doors, and the opening of the doors throws a drum switch which is fastened to the end of the door shaft and makes the necessary connections for lighting the lamps, which remain lighted as long as the doors are open. A switch in this circuit provides for cutting out the lights during daylight hours.

The interior of the arch roof was painted with white enamel, and four Electric Service Supplies Company's safety fixtures were installed for lighting. These are arranged in a single row down the center of the car. Four Garland ventilators were used which were furnished by the National Railway Appliance Company. Other fixtures installed included a Faraday signal system with push buttons on each vertical side post and also at the right side of the bulkhead posts. Sanitary hand straps and a motorman's seat were also added.

The new cross-seats installed were manufactured in the shops of the railway, the castings being made in a local foundry. Rattan cushions and backs are used and corner grip handles are provided. The Cooper hot water heater which formed the original heating equipment was retained, but this was supplemented by four electric heaters which will be used in the fall and spring when continuous coal fires are not required.

Air-brake equipment was added which consists of a Westinghouse D.H. 10 compressor, with the necessary governor and motorman's valve. Two 6-in. brake cylinders are used, one for each side of the truck. The new seating capacity is thirty-three, which is provided by ten cross-seats, four longitudinal seats, and one seat on the platform.

All other equipment used on the car was completely overhauled. The old Union standard No. 1 trolley base was rebuilt and roller bearings provided.



Car Body Framework in Course of Reconstruction

Changing from 25 to 60 Cycles

Indiana Service Corporation Replaces Old Converters with Modern 60-Cycle Machines, but Reconnects Old Transformers for Use on New Frequency

THE Indiana Service Corporation, Fort Wayne, Ind., recently tackled the problem of changing over its converting equipment from 25 to 60 cycles in accordance with the present tendency in power distribution for electric railways as well as general service. Some 60-cycle service had been furnished by the company, but most of the railway distribution had been at the lower frequency.

The company has ten substations, which are now in process of conversion, and one new substation is under construction. There are fourteen of the 25-cycle rotary converters with a combined capacity of 4,650 kw., which are being replaced with G. E. 500-kw., 60-cycle, six-phase machines.

In order to save expense, the company desired to utilize the old transformers, if possible, with the new rotaries. They were of sizes suitable for use with three-phase rotaries of from 200 to 450-kw. capacity, stepping down the voltage from 33,000 to 370. The new rotaries require about 445 volts from the transformer secondaries, being six-phase machines.

The manufacturers did not recommend this procedure, but after some experimental work had been done on the transformers by the Service Corporation it was decided that they could be made to serve for the present. In the shell-type transformers one of the middle primary coils was cut out of circuit and left dead. This gave the proper ratio, maintained the balance of stresses due to magnetic forces and left the transformers with the four 2½ per cent voltage regulation taps intact.

The core-type transformers were dismantled and equal amounts of the primary winding were removed from the core legs. Wood spacing blocks were inserted to replace the removed windings.

As for the reactances of the remodeled transformers, these were found to be about right for the new rotary converters, whether the reactance was all in the transformer or part in external coils.

While, of course, the transformer windings are being operated at a voltage per turn higher than that for which they were designed no bad effects have been discovered so far.

Obviously the old transformers do not match the rotaries in regard to capacity, but this fact was disregarded because each substation has ample transformer capacity to handle present loads. As new transformer equipment proves to be necessary this will be purchased in capacity suitable for the rotaries and of standard size. The fact is that the discrepancy in capacity between the old transformers and the new rotaries is less than

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might be supposed because the old transformers were designed on a liberal basis of rating, while the new rotaries are rated according to present standards.

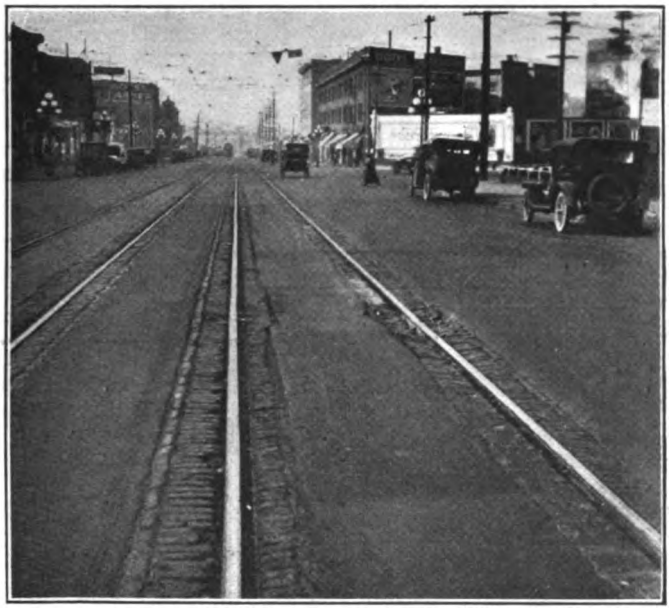
In the making of the changeover from one frequency to the other a 500-kw. portable substation is employed to carry the substation load temporarily while the rotary and its control panel, which is purchased as part of the new equipment, are installed ready to cut into service. Interconnection with other companies already furnishing 60-cycle service is utilized also if necessary and available.

In the studies made preliminary to the work now under way the practicability of using frequency changers was investigated. The cost of this plan would have been about the same as the one adopted, but there would have been loss in conversion efficiency and expensive changes later as the old 25-cycle equipment reached the end of its useful life.

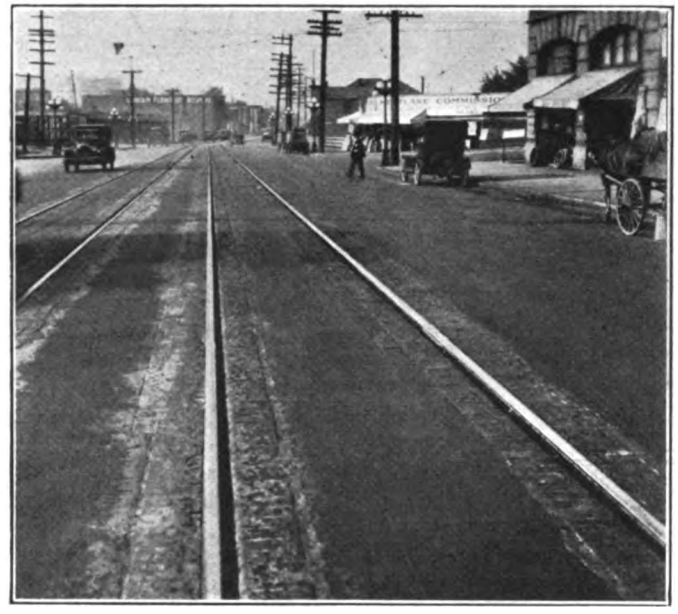
Method and Cost of Reclaiming Seattle Paved Track

A Detailed Account Is Given of the Organization Used, Which Was Designed to Foster Competition but Insure Good Work—Reclamation Work Was Done Under Traffic by Shimming Solid Against Old Foundation

By A. E. Pierce
Superintendent of Railway Maintenance, City of Seattle, Wash.



Track and Paving Were Badly in Need of Repair



Surface Appearance of Rehabilitated Track

THE way and structures department of the Seattle Municipal Street Railway was confronted with rehabilitating approximately 2½ miles of paved tee-rail track in the spring of 1922. This was in different sections of the city, the separate jobs varying in length from a half to one mile. The track was breaking down at the joints, rail working badly on the ties, pavement along the rail loose and the general condition a source of continual complaint from property owners and tenants.

A closer examination showed that the track gage had become wide; that the majority of the ties were solid in the concrete base but the rail had cut into the ties and concrete; that the joint plates were badly pounded and cupped and the rail at the joints in a majority of cases split back under the head or through the web at the bolt holes, necessitating the removal of about 3 ft. of bad rail at each joint, or the installation of a total of 12 per cent new rail in making repairs.

A number of different methods were considered for overcoming these conditions and it was finally decided to remove all brick paving liners along the rail, cut the rail back at the joints, install sufficient new rail to make up for ends cut off, shim and surface-weld the joints and repave.

The organization for handling this work was next considered and it was decided to divide the separate jobs into three divisions, with a foreman responsible for a certain portion of the work. These divisions were segregated as follows: First, a crew which removed the pavement and concrete to the top of the ties, cut off broken rail ends and moved back the rail. Second, a

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crew (which proved to be the most important) for aligning the track, gaging and shimming. Third, a crew which installed concrete and paving, preceded by the welder crew, which surface-welded and ground all joints.

The work was all handled (first on our outbound and later our inbound track) in stretches of approximately four blocks at a time, the first crew continually opening more track and the third crew closing up. This scheme caused the minimum of interference to traffic and inconvenience to stores along one of the most heavily traveled thoroughfares in the city.

The type of construction on this street was as follows: The tracks were laid on 10-ft. centers with 80-lb. A.S.C.E. Lorain Section 353, 7-in. tee-rail with an average of 1 in. of ball, set on fir ties, spaced on 1½-ft. centers on an 8-in. concrete base with a sub-base of clay and gravel fill.

OLD JOINT PLATES RECLAIMED

In cutting back the rail at the joints there was necessarily an increase in the number of plates and the old ones had to be rebuilt or new ones substituted. This was taken care of by supplying a small number of new plates. As fast as the old plates were removed from the track they were sent to our shop, built up with an electric welder and then machined to a true surface for bearing under the ball of the rail. This work was done at a cost of approximately 80 cents per pair and the results have proved very satisfactory. It was also found in surface-welding at the joints that the grinder did not leave the joints so that they conformed to the original contour of the rail. A pound developed, occasioned by the flanges striking the small bead along the gage side. This was immediately taken care of with a small hand grinder, which is considered very essential for obtaining the best results.

Employing foremen at $145 per month and laborers at $4.50 and $4.75 per day of eight hours, and following the above method and organization, the following is a more detailed description, with pictures and cost data, of the separate units performing the work on Westlake Avenue from Pine to Mercer Streets, a total of 4,705 ft. of double track. The work was done under traffic with an average headway of two and one-half minutes:

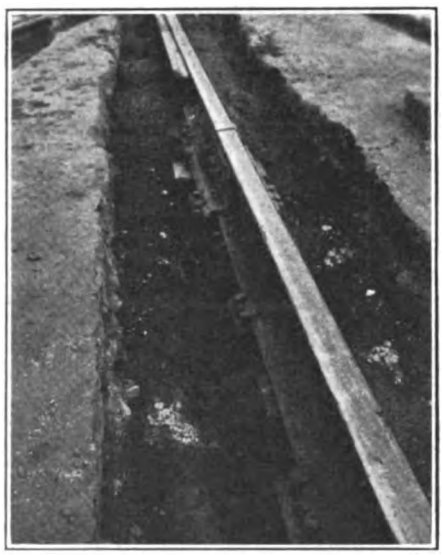
Excavating (Cutting Back) Crew—forty-four men:

1. Two men each rail picking and gadding out brick.
2. Two men each rail piling and sorting brick.
3. Twelve gangs of three men each gadding concrete, one man holding gad and two striking with hammers.

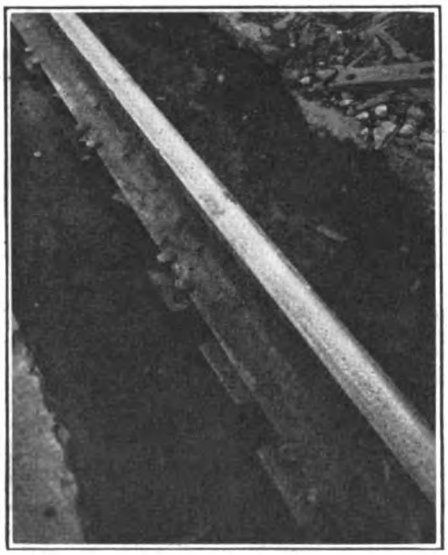
This crew cut out all battered and broken ends of rail and moved the rail back, placing a new or first class relay rail at the end of each block or whenever the waste rail equaled a standard stock length. These men gaged and spiked this rail only temporarily as they went along. This crew was also used with the work train after service to clean up dirt and refuse behind the paving crew when the paving had set sufficiently to allow automobile traffic on it.

Shimming Crew—twenty-eight men:

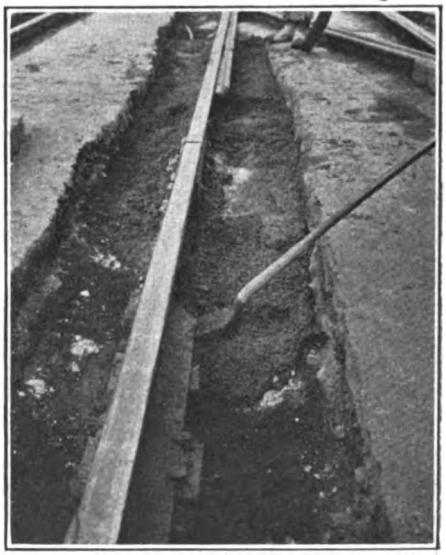
1. Two men aligning each rail, pulling old spikes, plugging old spike holes and sorting and distributing shims.
2. Four men each rail adzing ties to a level surface under base of rail and on either side of base for approximately 6 in.
3. Eight men each rail placing and wedging in shims to a solid and even bearing between base of rail and tie.



Oak Shims in Weak Cement Bearing Between Ties Where Ties Were Loose



Iron Shims Were Driven in on Top of the Oak After the Latter Had Set



Manner of Tamping Concrete to Get Bearing Under Rail

The shimmers under (3) worked in pairs and were organized as follows:

Head line side crew, taking every fourth tie and shimming and spiking rail on this tie to a true line and surface, using centers and grades set for this work by an engineering crew.

Second line side crew, taking the middle one of the remaining ties and shimming and spiking this to even surface and true line.

Third line side crew, shimming and spiking one of the remaining ties soundly and straight down.

Fourth line side crew, shimming and spiking the only remaining unshimmed tie in this group and following the crews previously mentioned but not passing around any of the head crews.

This method insures specializing by each crew. The foreman is always able to place his finger on the crew doing inefficient work, thereby stimulating rivalry.

On the gage side there are also crews numbered head, two, three and four, which work at all times directly opposite crews of like number on the line side. These crews or gangs place their shims and spikes evenly, solidly, carefully and permanently with crews numbered head and two, each using standard track

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gages and levels. Crews numbered three and four use their eyes to surface and align on their ties.

This work was done under traffic and the foreman watched at all times for any deflection caused by cars passing. As soon as the above work was satisfactorily completed a welder crew installed welds and surface-ground at all joints.

Paving Crew—twenty-two men:

1. Eight men cleaning out all dirt and refuse and trimming the asphalt to a true line. They mixed the concrete, which was installed with the use of a templet to within 1 in. below the brick paving level, allowing for a sand and cement cushion. This concrete was tamped firmly under the base of the rail and between shims, using tamping bars, one man working from either side of the rail and opposite each other.

2. Two men mixing cushion and installing, making use of a templet to even the surface to the proper level for the paving brick.

3. Ten men laying brick, a sufficient number of brick having been salvaged from the removal to do the paving on the outside of the rail. A new bull nose brick was installed on the gage side. This bull nose was separated from the rail by second-hand liner brick laid parallel to the rail and acting as a spacer for the bull nose brick and providing flangeway for the wheels. All paving was kept ½ in. below the ball of the rail to allow for wear.

In bringing the rail up to its proper grade on the adzed face of the ties all shims ½ in. or over in thickness were of oak, while for less than ½ in. iron shims were used. The oak shims varied by quarter inches from ½ in. to 3 in. in thickness and were drilled on four corners to allow a ⅝-in. spike to fit in without breaking the shim and allowing the spikes to come up flush with the base of the rail. In all cases the oak ties were separated from the base of the rail by a thin iron shim driven in diagonally and held in place by spikes. In cutting off broken rails the ball and web were cut by hack saw and the base burned with an acetylene torch and all holes for plates drilled by machine or hand.

COST OF RECONSTRUCTION WORK

Excavating		
Removal of brick	$1,247.18	
Removal of concrete above ties	5,887.56	
Removal of concrete below top of ties	3,569.69	
Trimming asphalt	1,194.56	
Hauling away refuse	1,252.45	
Cutting rails	592.74	
Pulling back rails	2,051.15	
Changing plates	771.28	
Bolting plates	414.18	
Total		$16,980.79
Shimming		9,511.22
Welding and grinding 299 joints		1,307.20
Paving		9,309.58
Grand total		$37,108.79

The ties in places were found to be loose in the concrete base, in which case a special method of shimming was followed. An oak shim was placed on the concrete between ties and allowed to set in a weak sand and cement mixture, with a slight clearance between the top of the shim and the base of the rail. As soon as this shim bearing had set an iron shim was driven in on top of the oak. This should prevent any deflection in the rail which would otherwise be caused by the ties working in the concrete base.

The method of placing concrete under the rail and between the shims, as described under paving crew, is shown in an accompanying photograph which illustrates the operation with but one tamping bar, another being used in the same manner from the opposite side simultaneously.

The figure given in the tube covers completely overhauling and repaving of 4,705 feet of double track, or at the rate of $7.88 per lineal foot.

This track has been under service for six months and a recent investigation shows it to be in splendid condition and good for six or eight years more traffic with very little maintenance.

The main cost of doing this work was in labor, as but a very small amount of material, such as shims, bolts, spikes, cement, sand and gravel, was used.

How the Holyoke Street Railway Organizes for Snow Fighting

THE snowfall during the past winter has been very heavy in the New England district. Recently the Mayor of Holyoke, Mass., publicly commended the Holyoke Street Railway on its success in keeping the railway lines clear during the unprecedented bad winter. The organization and methods used by this electric railway will be of interest.

For convenience in operating snow equipment during storms, the system is divided into four parts and a man is assigned to have charge of each section and is held responsible for keeping the particular lines in that section clear. The company operates eight snowplows, five sweepers, one rotary snowplow and a freight car which is used as a pusher when necessary. This equipment is definitely assigned to the various divisions except the rotary snowplow, which is held in reserve at the carhouse subject to call from any section.

At the beginning of the season, the office of the superintendent of transportation makes a list of men who are willing to serve on snow duty and assigns a certain number of these to each section. In case of a snowstorm, these men report immediately for snow duty and follow the instructions of the men in charge of that section. Snow duty is given preference over any other work. In addition to this listing and assigning of men the superintendent keeps informed in regard to weather reports and watches the barometer for any indication of a coming storm. He also provides relief crews for the men on snow duty, and refreshments as required.

All crews subject to call for snow duty are instructed regarding the equipment they use and the work that they are expected to do, so as to be fully prepared for any emergency. At the beginning of a storm and as soon as conditions demand, snow sweepers are sent out. These are followed by snowplows, whenever the snow becomes too heavy for the sweepers. In some cases where the snowfall is particularly heavy, the snowplows precede the sweepers.

During the progress of the storm, each inspector and division superintendent keeps the superintendent's office fully informed as to the condition of the line and reports immediately whenever conditions are such as to make it possible to release the snow-fighting equipment. Thus if one line is cleared ahead of another, this equipment is available for assistance on other lines. Carhouse foremen are held responsible for maintaining the snow-fighting equipment in proper condition and for supplying salt and sand as required. If any trouble or defects occur during operation, which cannot be repaired on the road, the equipment is sent to the shop immediately and is never run in snow duty with less than the full equipment of motors.

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Equipment Maintenance Notes

Cutting Metals with the Electric Arc

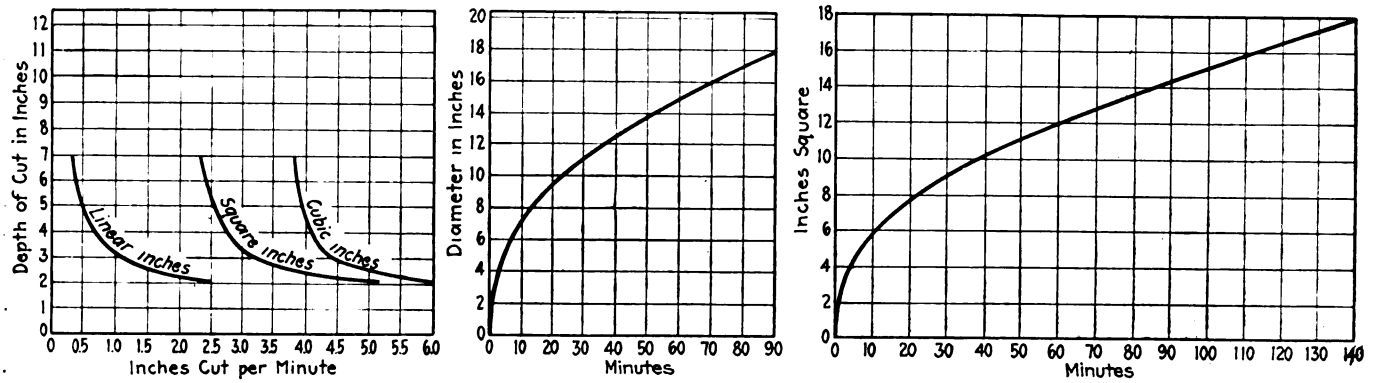
Costs and Current Values Necessary Are Given for Cutting Various Types of Plates and Castings by Use of the Electric Arc

By A. M. CANDY
General Engineering Department
Westinghouse Electric & Manufacturing Company

THE process of arc cutting is purely a melting process, the heat energy of the arc terminal being directed along the line where the cut is desired. Graphite or carbon electrodes are usually employed for this work, although bare metallic electrodes have been used by operating them at current values in excess of those used for welding. This latter scheme is not economical. In special cases metallic electrodes heavily wrapped with asbestos yarn using current values higher than normal have been used for cutting, the electrodes being first dipped in water, which forms steam and blows the molten metal away. This method, however, is also very expensive and has been used only to a limited extent by the British Admiralty for cutting deep, small diameter holes in armor plate.

For general cutting work graphite or carbon electrodes are used and current values of 300 to 1,000 amp., depending upon the nature of the work and the cutting speed desired.

Foundries make use of arc-welding equipment for repairing defective castings and use the same apparatus for cutting off risers and burs from their castings. A riser from a large gray iron casting was cut through the neck in five minutes' time using 800 amp., the neck measuring 3 in. x 9 in. Just as a demonstration the riser was then cut through the main portion, 8 in. x 8 in., in seventeen minutes, using 800 amp. With labor at 60 cents an hour and electric power at 2 cents a kilowatt-hour for the motor-generator, there would be a cost of 15 cents for cutting the neck and 52 cents for cutting the body of the riser. The speed of cutting castings of several forms is shown in the accompanying graphs.



At Left—Rate of Cutting Cast Iron Plates. In Center—Rate of Cutting Circular Sections of Cast Iron. At Right—Rate of Cutting Square Block of Cast Iron

Where it is desirable to cut the material to accurate dimensions, it is necessary to lay out a guide line with white lumber crayon, which the operator can follow with his arc. It is then possible to make a neat cut in ¼, ⅜ or ½ in. thick plate steel. As an example, a piece of ¼-in. plate steel was cut at the rate of 75 ft. per hour using 450 amp.

Companies scrapping or rebuilding steel cars will find the arc process by far the cheapest method for cutting rivets and for cutting up steel plate material into pieces sufficiently small either to be charged directly into the cupola or to be cut up to such size that the pieces may be handled for recutting in a shear. The plate material in these cases is generally heavily covered with paint or rust so that current values of 400 to 600 amp. are frequently used and, in some instances, as much as 800 amp. Using this latter current value cars have been cut up at an average rate of 75 ft. per hour, an entire coal car being cut up in four hours' time into pieces sufficiently small to be handled by four men who were shearing the material for cutting into charging size. The cost of the arc cutting, including labor and power for the motor-generator, was $6.80.

For cutting the rivets, currents of 400 or 600 amp. are usually used. When using 400 amp. average operators will cut from 1,800 to 2,000 rivets, ⅝ in. in diameter, per ten-hour day, and some operators will run as high as 2,600 to 3,100 such rivets when the work is on a piece rate basis. Cutting with the arc is not limited to iron and steel, but can be applied equally well to non-ferrous metals such as brass, bronze and copper. In fact, for cutting copper which cannot be cut mechanically the arc process is by far the cheapest to use.

Because of the high thermal capacity and high heat conductivity of copper it is necessary to concentrate the applied heat at a sufficiently high rate to melt the copper before the heat is dissipated in it. To do this cutting effectively it has been found most satisfactory to use a current value of 800 to 1,000 amp.

A large piece of copper slag which was originally 6½ ft. wide and 7 ft. long along the central cut had several cuts made. The metal was approximately 1½ in. thick through the sections where the side cuts were made. This was done at a rate of 3½ ft. per hour. The thickness of the metal through the central cut varied from about 1½ in. at the extreme edge to 7 in. at the center of the

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piece, the average thickness therefore being about 4¼ in. This cut was completed in five hours. A current value of 1,000 amp. was used for all this work. The cost of doing the work on the basis of labor at 60 cents an hour and electric power for the motor-generator at 3 cents a kilowatt-hour is $16.78.

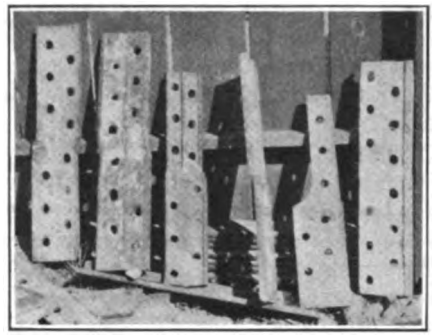
Reclaiming Worn Rail Joint Plates

AT THE Valencia Street shops of the Market Street Railway, San Francisco, a crew of two to four men is kept busy continually offsetting 7 and 9-in. rail joint plates for renewal, or reworking plates that have been worn down in service. Offsetting is done to adapt plates to the connection of rails whose heads are of different thicknesses or whose webs are not in the same vertical plane, or in any of the combinations of various rail sections that require joint plates to be offset vertically or horizontally. Both offsetting and reworking usually require two heatings. The use of an oil furnace and a steam hammer greatly expedites this work, which is done by an expert blacksmith and a helper.

Worn plates are not built up by welding in new metal but by heating the plate and reshaping the same metal to the desired dimensions. The plate is taken from the furnace to the steam hammer, where the blacksmith holds it on the anvil with long-handled pincers in his left hand. With his right hand he places a long-handled shaping tool in proper position to make the blow of the steam hammer effective at the desired point. The steam hammer is operated by the helper. The tool is relocated after each blow. Work with the steam hammer is confined chiefly to the vicinity of the worn upper edge of the plate or to the longitudinal rib along the middle of the plate.

For finishing up to exact form the plate is placed on an anvil, where the helper can use a sledge on a shaping tool held by the blacksmith. On a bench beside this anvil are short pieces of rail of the section for which the plates are being reshaped, and as the final form is approached the blacksmith tries the plate in the rail section to make sure that it fits exactly.

The plates which are most extensively used on this system have a ridge running longitudinally along



Offset Rail Joint Plates

the center. When it is necessary to increase the height of the plate to compensate for wear the blacksmith lays it on the flat side and, with a shaping tool on the ridge, blows are struck with the sledge. Before the final fitting is finished the metal has usually cooled to such an extent that a reheat is necessary. Ordinarily worn plates are reshaped in this way in an average of thirty minutes each throughout the day.

The offsetting is done with the steam hammer, using a die shaped to fit the particular plate section being worked.

Lubricating Trolley Wheels and Sweeper Brooms

THE Fall River division of the Eastern Massachusetts Street Railway had some trolley wheels that were cored out hollow. This fact was taken advantage of to assist in lubrication. The hollow space was packed with waste and a hole drilled in the bushing. Then when the waste is saturated with oil the trolley wheels lubricate themselves. Wheels of this type are oiled slightly about every 500 miles and about every 1,000 miles they are dipped in oil so as to resaturate the waste. A light automobile oil is used for this purpose.

Having trouble in connection with lubrication of sweeper brooms, the railway's local master mechanic

Jinxville Railway Hits a New Pace

WILLIAM REDFIELD, the general manager of the Jinxville Electric Railway, was attending one of the evening gatherings of his superintendents, foremen and employees. In the course of the evening the question of education came up, and he asked his colleagues how many people on the property, men and women, boys and girls, they supposed were doing any regular studying to fit them to do their work better or to prepare themselves for better jobs.

"Mighty few, I'm afraid, boss," said Jones, the foreman of the machine shop, "although I believe that agent of some correspondence school who went through the shops a month or two ago took several subscriptions for his courses, particularly drafting courses. As far as I know the boys are keeping up the work, but I don't hear much about it."

"There are several of our fellows taking night courses in the Y. M. C. A.," said Tom Fairweather, the roadmaster, "and they seem to be getting a lot out of it, according to the talk I hear around the property. One or two of our boys are studying nights down at the mechanics' institute, too—been doing it for a year or two."

"Not so bad, after all," said the G. M., "taking it altogether and over the property as a whole, there's a lot of studying going on, it seems to me. Tell you what, boys, the trouble is nobody is looking after this educational work. If it was somebody's job to take an interest in the whole matter and head up the ambitions and plans of our young people we'd get somewhere. These fellows who are studying on the side are the 'comers'; they need to be encouraged. Our company will get a handsome return on any effort put out in helping them. The company can afford to spend some money, too, in this direction. We might pay part of the tuition for the courses the young people are taking. I'll guarantee that the directors will back me up in any reasonable expense."

"Boss, to bring this matter to a head," said John O'Neill, the superintendent of overhead, "I move you we have a small educational committee to get information together and report at our next meeting. I suggest Bill Gainway, the general superintendent, for chairman. Bill's always shown an interest in the young people. The committee might find out what our people are doing now and lay plans for stimulating other young people to make plans for self-improvement."

"All in favor of John's motion say 'aye,' " said the G. M. "Aye!" shouted everybody with a will.

"You're on, John," said the G. M. "Pick two good scouts to help you and have a report here at the meeting next month. We'll get something worth while started in this educational movement, you bet. Meeting's adjourned."

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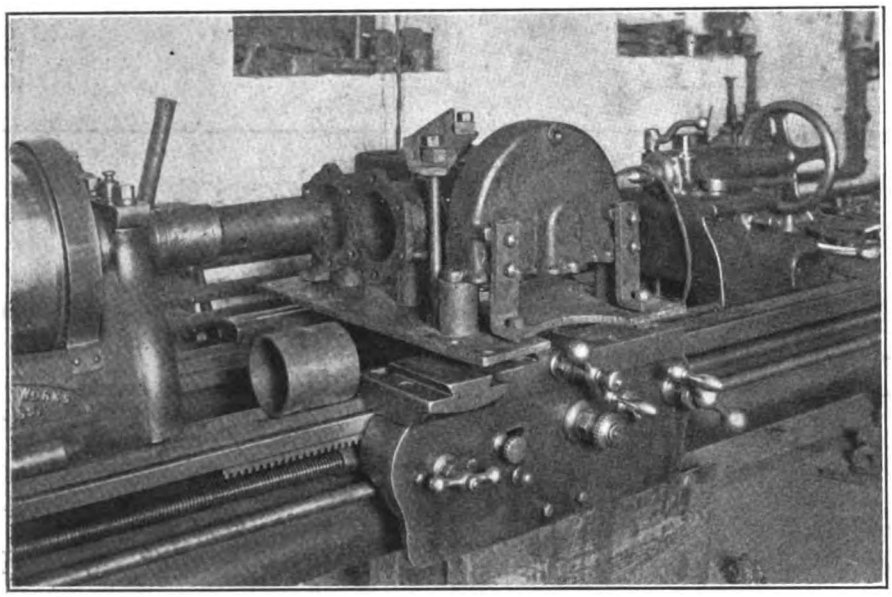
equipped each oil hole with a short standpipe of ¾-in. pipe, screwed into the top of the bearing and is provided with a cap. Oil squirted into this tube is sure to reach the spot and without waste.

Reboring Compressor Cylinders

THE cylinders of compressors which have been in service for a considerable time become scored and rough so that the piston rings do not fit properly. Where the compressors have to be set up in a lathe for reboring without special fixtures, much time is consumed. In order to cut down this time the Eighth Avenue Railroad, New York, N. Y., uses a special jig to hold its compressors in position, while the cylinders are



Machine and Set-Up Used in Reboring a Compressor Cylinder

being rebored. An accompanying illustration shows a National A-3 compressor in position for reboring.

The base plate of this fixture is made of a ¾-in. steel plate. There are six finished bosses on the top of this; the finished parts at the base of the compressor are set on these bosses, and thus the position in height of the center of the cylinders with reference to the boring bar is accurately established.

The compressor is fastened to the base plate by two angles on one end, a yoke on the other, and two additional angles at the back of the compressor. These are bolted to the compressor frame at points ordinarily used for the compressor suspension cradle. There is a space of approximately ¼ in. between the bottom of these angles and the base plate, so that a clamping action is obtained as the bolts in the base plate are inserted. In addition to this, an angle iron clamp extends across the top of the compressor and is bolted to the base plate by long bolts which extend on either side of the compressor frame.

In mounting the compressor and fixture in the lathe, the compound swivel is removed from the carriage and the base plate is bolted to the swiveling portion about which the "compound" rotates. By this method the compressor, together with its fixture, can be rotated so as to line up the face of the cylinders readily. The faces of the cylinders are squared up by use of a templet which is fitted to the boring bar. The position back and forth and crosswise of the lathe is regulated by shifting the carriage.

In reboring the cylinders their diameter is increased ⅜ in. and a cast-iron ring is inserted, which is forced into position. The wall of this ring is ⅛ in. thick. The bore of the cylinder is made 0.004 in. smaller in diameter than that of the outside of the cast-iron ring, so that considerable pressure is required to force this in position. The reboring does not extend the entire length of the cylinder but a shoulder of ½ in. is left at the back, so that the cast-iron ring seats against the shoulder. After the rings have been forced into position, these are rebored to the correct diameter to make an accurate fit with the piston rings.

The compressor, together with the jig, is handled into and out of the lathe by a chain hoist, and the entire operation of setting up, boring the two cylinders, pushing the cast-iron bushings into position, and reboring them to the proper diameter requires the time of one man for about three hours.

Setting a Pole Butt Up

IT SOMETIMES happens with a railway company which uses tubular steel poles to support its overhead work that one of these poles will become broken off at the ground line. The repair gang may not be able to dig a new hole and set the shortened pole in it, and even if it should do so the repair would be but temporary as the replaced portion of the pole would be several feet shorter than the others on the line. While it is not desirable to go to the labor and expense of resetting the old broken pole in this way, yet it is desirable that some arrangement be made for supporting the span where the pole was broken off.

The easiest and quickest way of doing this is to put the old pole back just where it was in the first place, only upside down. What was formerly the upper section is stuck down into the hole, the walls of which are formed by the piece of the old pole remaining in the ground, and the largest section of the reset pole is then at the top. With the ordinary three-section tubular steel pole the internal diameter of the largest pipe —the section left in the ground—is approximately 1 in. larger in diameter than the external diameter of the smallest section, so that there is sufficient room for making the repair in this manner.

The span wire is then attached to what was formerly the butt of the pole and the temporary repairs are complete. While the job is not an ornamental one and can be considered merely as a temporary expedient, yet it is safe and can be left standing for some time if there is no opportunity to set a new pole at once.

Grading Trolley Poles for Length Automatically

A CONVENIENT plan for storing trolley poles is used in at least one shop. The poles are hung from the harp end with the upper ends at a uniform height. The location of the lower end of the pole on the wall then is an exact measure of its length and a man who needs a particular length for a car can pick out the one he needs without having to stop to measure it.

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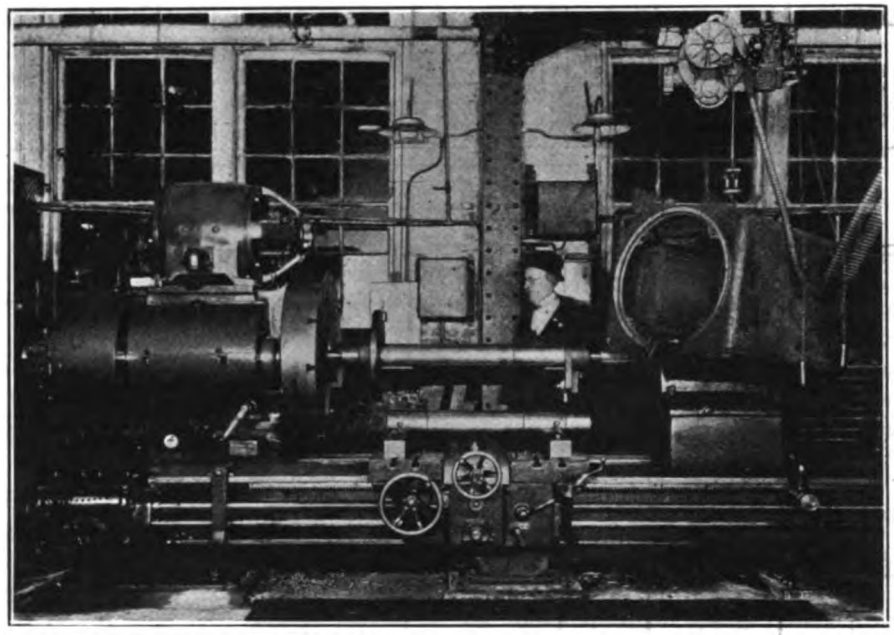
Jig for Reboring Large Motor Cases

AMONG the equipment of the Chicago Elevated Railroads is a large number of cars equipped with G.E.-55 box frame motors, which have been in service for more than twenty years. These motors, which have cast-steel frames, were designed for inside suspension and have a channel in one side of the frame to make room for the axle. Some time ago the axle diameter was increased, which necessitated a deeper milling of the axle groove so that the frame thickness at that particular point was materially reduced. At a later time the thickness was again reduced by milling to make room for heavier axle brasses. The decreased thickness along the axle channel and the uneven thickness of the frame in various other parts allowed it to become considerably warped and out of true. The high average operating temperature, approximating closely 275 deg. F., reached during the summer months, was undoubtedly the actual cause of the distortion. The frame distortion naturally threw the end plates out of line so that considerable trouble was experienced from hot armature bearings. When it was discovered that the end plates in the box frame were not in line with the pole pieces, steps were taken immediately to find some way of lining up the bearings. The process of shimming was discarded as impractical. The only method left was to rebore the motor shells and for this work a specially constructed jig was devised. The accompanying photographs show the jig in place on the lathe and illustrate the process.

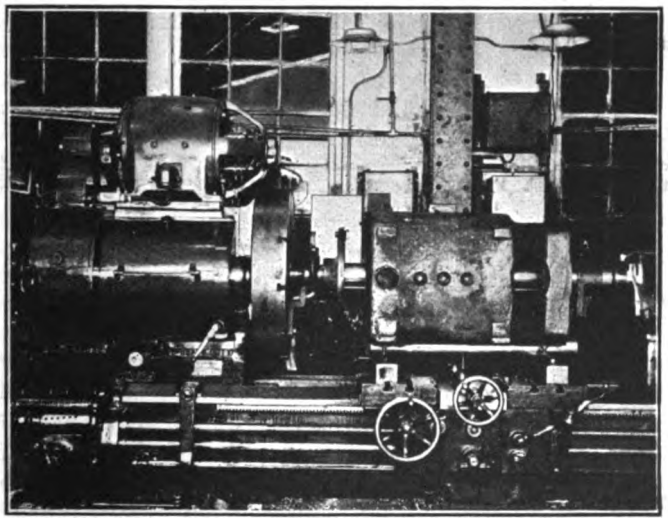


Jig Set Up for Reboring G.E.-55 Motors in the Wilson Avenue Shops of the Chicago Elevated Railroads

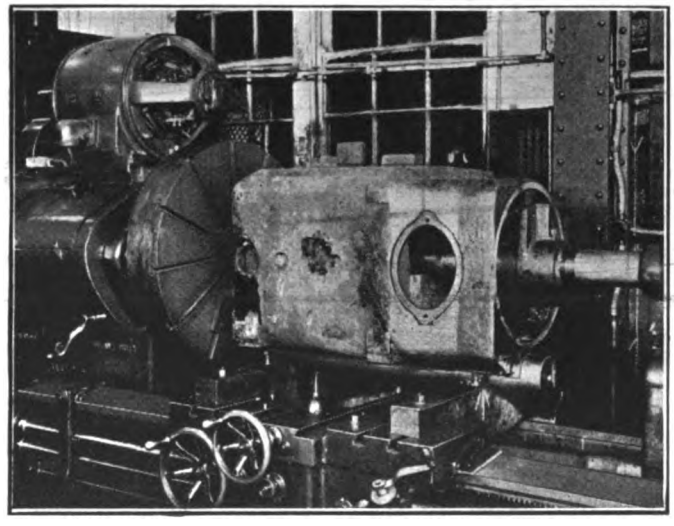
The jig consists of two bed blocks laid across the lathe carriage. These two blocks are milled to receive a rod of the same diameter as the car axle. The motor housing is lined up on this rod, axle brasses having been inserted to obtain the correct distance between the axle and motor centers. Two cap screws are provided in each cross block, so that the motor frame can be centered in the lathe by rotating it slightly about the axle.

A boring bar with a tool plate on one end and a tool arm on the other comprises the remainder of the special equipment. In reboring a frame end the tool is set so that a cut is taken over the whole surface and the carriage is advanced far enough so that the tool forms a new seat for the end plate. Thus no two motor shells are bored to the same diameter so that each end plate has to be fitted individually. In doing this the plates are reamed and mounted on an arbor. The edge is turned down to a smooth surface and a ⅛-in. steel strap applied around the whole circumference which is again turned down to the diameter of the shell to which it is applied.

With the equipment set-up as illustrated it is possible for a good machinist to rebore five shells in one day, or four per day if the jig must be set up and taken down besides. With machinists being paid 90 cents an hour the cost of reboring the motors alone amounts to $1.80. Lining up the motors in this way has been very effective in eliminating bearing trouble but unfortunately there is no asurance that the housing will remain square because of the uneven expansion and contraction.



Motor Frame in Place and Centered by Adjusting Capscrews



View of the Tool Arm on One End Taking a Cut

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Transfer Table Controller Used for Shifting Trucks

MANY electric railways shift their trucks about the overhauling shops by applying power to the motors mounted on them. In most cases a permanent installation is made of a controller with the necessary resistance, together with long flexible leads which can be attached to the terminals of the motor on the trucks. The New York & Harlem Railroad, New York City, makes use of the controller and resistance which is used on a transfer table for its operation. The transfer table runs along the end of the truck overhauling shop, and after cars are jacked up the trucks are moved out from underneath and to convenient tracks in the overhauling shops by shifting them to the transfer table and then off as required.

In this case the only additional equipment required is a four-pole double-throw switch, together with the necessary receptacles and long flexible leads. An accompanying illustration shows the method of connecting. The four-pole double-throw switch is installed in a cabinet alongside the transfer table controller and connections are made to the center studs of this switch from the A1, AA1, F1 and G1 terminals in the controller. The upper studs of the switch have leads connecting to the motor on the transfer table, so that with the switch in the up position the transfer table is operated in the usual manner. The lower poles of the switch are connected to permanent receptacles, so that the male portion, which is attached to the long flexible leads, can be inserted without trouble, and by attaching the other end of the flexible leads to the motor terminals on the truck and by throwing the switch to the down position power can be applied to the motor mounted on the truck. This arrangement is very convenient and the transfer table is really a part of the truck overhauling shop. The necessary equipment for moving the truck is provided at very small additional cost.

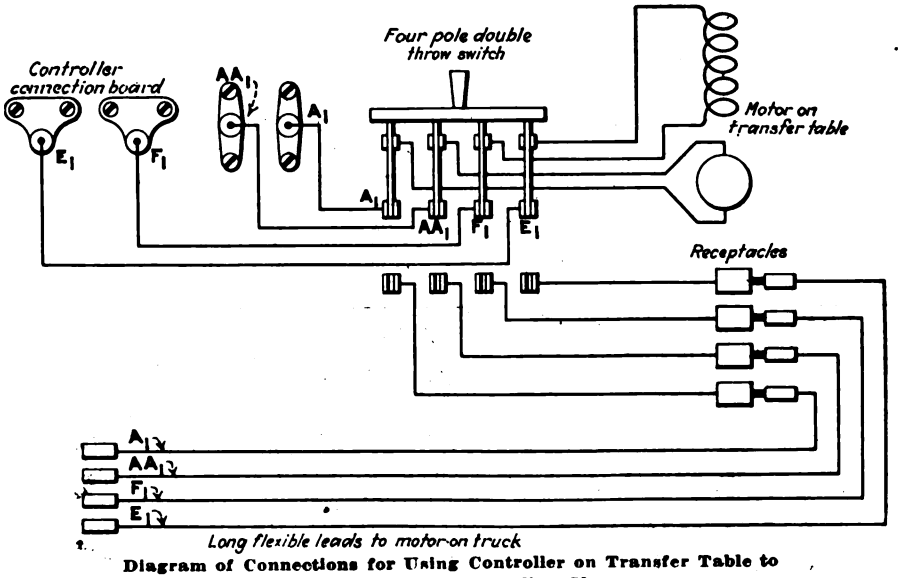
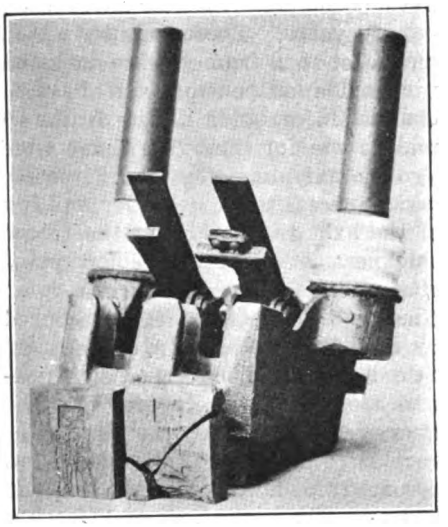


Diagram of Connections for Using Controller on Transfer Table to Shift Trucks in Overhauling Shops

Flat vs. Rounded Contact Tips for Brushholders

THE contact tips on the pressure fingers of a great many of the older types of railway motor brushholders were made from either brass castings, copper drop forgings or extended copper bars. In general, all of these tips were very similar in design and shape, consisting of a flat back or base with a projecting rounded front or face which extends beyond the sides of the base. These tips are held to the flat braided shunt and pressure spring by means of four rivets. The flat base of these tips makes a good contact with the shunt, while the rounded face engages on top of the carbon. This type of construction has been more or less criticised by railway men, as they have always experienced considerable trouble due to the rounded face of the contact tip seating itself on the top of the carbon, and in many cases damaging the brush to such an extent that it must be replaced shortly after it has been put in service.

To overcome this trouble, present-day practice is to use a flat copper tip which in some cases is brazed to the shunt and pressure spring, while on other designs the tip is riveted to the shunt and spring. Both of these types of construction seem to give good results in service. In order to get some definite information as to the operation of the flat contact tip as compared with the rounded tip in service a special test brushholder was made up on which one of the pressure fingers was fitted with the old type extruded metal contact tip, while the other pressure finger was fitted with a flat copper tip brazed to the shunt and pressure spring.



Brushholder with Flat Contact Tip

This brushholder, with spring pressures adjusted to approximately 6 lb. and fitted with new carbons of the same grade, was given a test in a railway motor under actual service conditions, and after about three months' service was removed for inspection. By referring to the accompanying illustration it will be noted that the old type rounded tip has worn a seat in the top of the carbon and finally broke out the sides on the top of this carbon. After this damage is done, the tendency is to rattle the carbon brush about in the box, which finally breaks it to pieces. On the other hand the carbon used with the new flat type of tip is intact and in good condition and shows no signs of breaking either on the top or in the body of the carbon. It is, however, slightly grooved on the top by the rubbing action of the flat tip on the carbon at this point. Not only does this test brushholder show that the flat type of tip is an improvement over the old rounded type tip, but the operating results of brushholders fitted with these tips confirm these test results, which indicates that this construction is a decided improvement over the old design.

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Welding Old Rail by Thermit Process

WELDING old rail by means of the Thermit insert process can be carried out providing the rail is not too badly corroded and pounded at the joints. Where the rail is in good condition and only slightly pounded, the weld can be made without cutting in a new piece of rail. In such cases the receiving rail should be raised until the lower part of the cup is on a level with the running surface.

The end of the discharging rail should then be cut off about ½ in. to ¾ in. to eliminate the battered end and at the same time to provide a gap for the Thermit insert. This procedure after grinding eliminates the battered joint and restores a smooth running surface. The usual method of making the weld is then followed identically with what has already been described, excepting that in some cases it is necessary to do a little hand-luting with fire clay around the edges of the mold boxes, in view of the fact that it is quite impossible to design patterns which will conform exactly to the contour of rail which is partially worn.

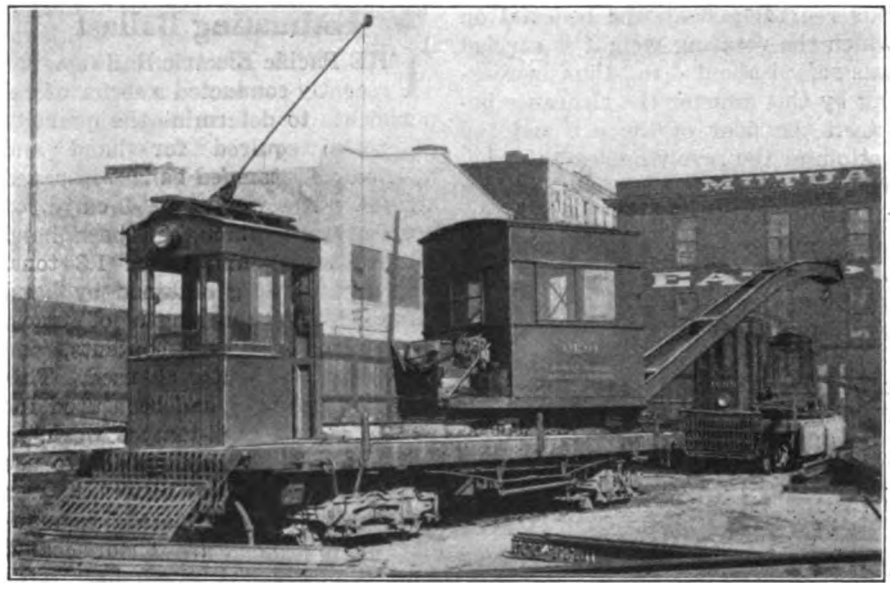
Transferring Trucks Across Pits

ON THE Fall River division of the Eastern Massachusetts Street Railway considerable remodeling has been going on recently in the maintenance shops. A shop that was at one time a paint shop and later used for storage has been converted into an excellent pit shop with concrete pits.

The construction of the shop is simple and does not readily permit the installation of many of the devices familiar in large shops. Ingenuity has been brought into play in the development of simple schemes for performing routine operations. An example is the plan used for transferring trucks from pit to pit.

For this purpose a portable crossover with an auxiliary flat track is used. A hose bridge such as is ordinarily used for carrying cars over fire hose was mounted on a square framework built up of T-rails and flat bar as shown in the accompanying illustrations. This rolls on double-flanged wheels carried by the T-rails, which project beyond the hose bridge.

The transfer truck thus constructed rolls on temporary track with stout timbers across pits to support the rail. It is the work of but a few minutes to bring it into action.



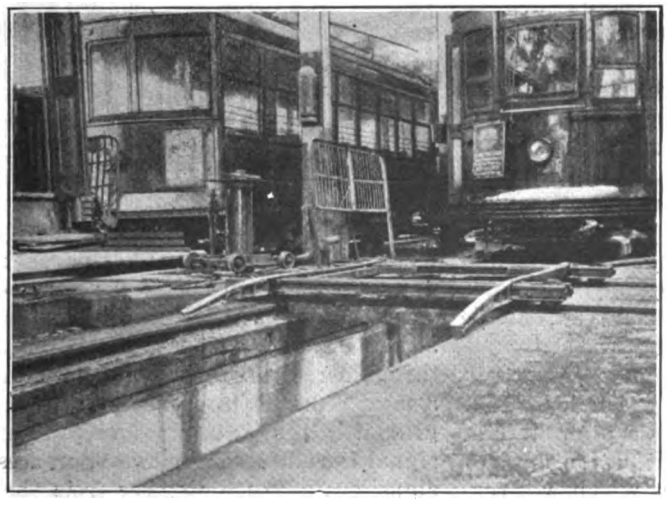
Crane Car as Reconstructed

Crane with One Trolley Serving All Motors

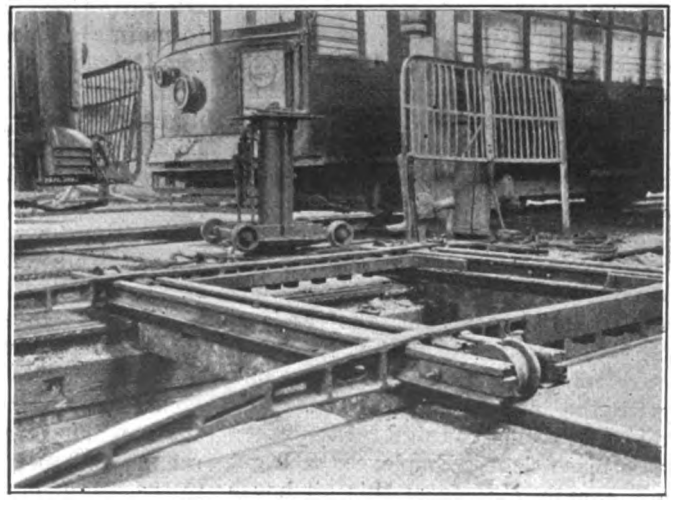
A 5-TON electric locomotive crane owned by the Market Street Railway, San Francisco, was recently reconstructed in such a way that instead of requiring two trolleys, as heretofore, one is used both for supplying motive power and for operating the crane motor. This was highly desirable because the trolley on top of the crane cab, which served the crane motor only, was found to interfere with or render dangerous the operation of the crane boom.

The rearrangement was made by removing the crane trolley and bringing in the power supply lead from the other end of the car. This lead was fastened under the car body and passed upward into the crane cab through a hole drilled in the center pin of the revolving base.

While the base was dismantled for



The Use of This Transfer Permits Trucks to Be Shifted Readily from Track to Track



A Closer View Showing Some of the Construction Details of the Transfer Truck

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this rearrangement, the pedestal on which the rotating weight is carried was raised about 4 in., thus increasing by this amount the clearance between the floor of the car and the bottom of the revolving crane frame. This change made it possible to carry a supply of 9-in. girder rails 62 ft. long loaded on the car flange down, instead of flat, thus increasing the carrying capacity of the crane from two to six such rails.

The crane has been in service about seventeen years and was built by the Northern Engineering Company.

Where Cleanliness Is Next to Godliness

THE importance of keeping dirt and grit out of lubricating oils is realized by all responsible for the maintenance of electric railway rolling stock. Results have shown that a very little dirt mixed with the lubricating oil in bearings causes them to wear in a very few hours.

Oil Room, New York State Railways, Rochester

Where armature bearings become worn, there is danger of very costly damage through the armature being let down sufficiently to rub the poles.

The New York State Railways realizes the importance of keeping oil as clean as possible and it has endeavored to impress this on its railway maintenance men. The accompanying illustration shows one of the oil rooms at the Federal Street carhouse, Rochester, N. Y. A very conspicuous sign impresses one with the importance of keeping the oil house clean. The sign reads: "Keep this place clean. Employees who get oil, grease, etc., from this oil house must not spill oil on the floor or tanks. Don't use wool waste to wipe hands."

Estimating Ballast

THE Pacific Electric Railways has recently conducted a series of experiments to determine the quantity of rock required for hand and mechanically-tamped ballast in paved streets. The weight of 1 cu.yd. of crushed rock which had been hand tamped was found to be 1.3 tons. This figure being obtained by hand tamping a given length of track, figuring the cubical contents, and weighing the material used. This figure of 1.3 tons had been used for estimating all hand-tamped work.

When the company decided to use mechanically-tamped ballast it was necessary to re-estimate the quantity of rock needed. Theoretically, 1 cu.yd. of crushed rock ballast, with all voids removed and the proper compression obtained, should equal 1 cu.yd. of rock. Therefore, for the original estimate the weight of 1 cu.yd. of rock was used, namely 1.75 tons. Even with mechanically-tamped ballast this theoretical condition cannot be reached. However, the actual results of experiments show that 1 cu.yd. of mechanically-tamped ballast weighs 1.69 tons or 30 per cent more than the hand-tamped ballast.

This increase in the amount of crushed rock is a large item in the consideration of ballast, but tests have proved that mechanically-tamped ballast adds greatly to the life of the roadbed by furnishing firmer base for pavement and heavy girder rails.

Living Up to the Reputation of a Parlor City

BINGHAMTON, N. Y., has been termed the parlor city. The electric railway company there is helping to maintain this reputation by keeping its cars in an attractive condition. All cars are cleaned every night, and before they leave the carhouse in the morning they are sprayed with West's disinfectant. All windows are wiped every day. Three times a week all windows are wiped with a wet chamois inside and car renovator is used on the outside in winter. In summer the outside surfaces of the car are washed.

In addition to keeping the cars in a clean and attractive condition, the equipment is kept in a high state of repair, and special attention is given to the use of devices which will render the cars more satisfactory to the public and promote better service. The cars are electrically heated and the heat is automatically controlled by a thermostat. In addition particular attention is given to ventilation.

The railway company has made it a practice to advertise these features and an advertisement in the Binghamton *Press* for Feb. 13 reads in part as follows:

"The street cars of Binghamton are considered by those who have seen equipment in other cities to be the most modern and up to date as well as the cleanest. Our cars are a credit to the parlor city. We gladly welcome an inspection by the public any morning before the cars leave the carhouse."

New Equipment Available

New Crossing Signs

HIGHWAY crossings on the right-of-way of the suburban lines of the Twin City Rapid Transit Company, Minneapolis, Minn., are being marked with a new type of signal. This is an Adams & Westlake design and burns Standard Oil Company's "Fortnight," oil, which enables the lamp to burn thirty days without attention. The railway company's standard railroad crossing sign is

Railroad Crossing Stop Sign

mounted at the top of a 10-ft. post set in concrete. Beneath is the illuminated signal, which has two lamps 24 in. apart. The light shines through red projecting lenses and also is reflected by mirrors through ground glass "Stop" signs. This signal is reinforced by two approach signs located some distance from the crossing and reading "Danger, Railroad Crossing 400 ft."

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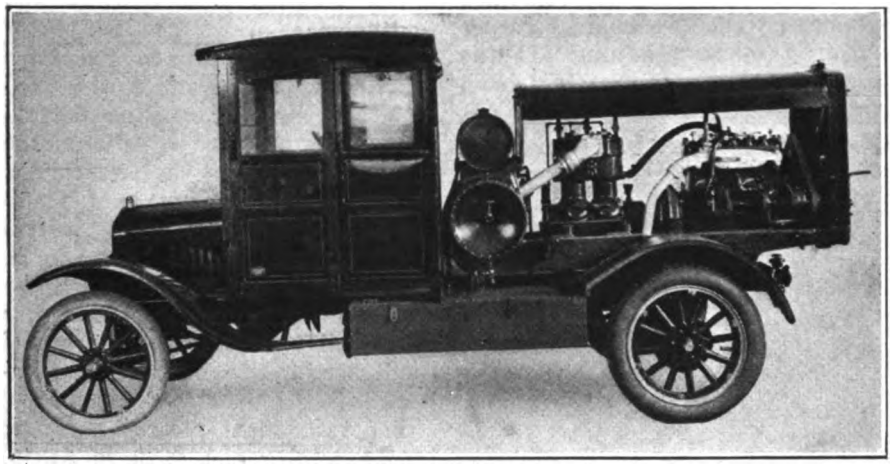
Truck-Mounted Portable Air Compressor

A NEW development in portable track maintenance machinery is found in an air compressor mounted on a standard Ford truck which has just been introduced by the Ingersoll-Rand Company, New York, N. Y. This complete portable air compressor is constructed in such a way that it can be mounted on the standard Ford chassis without any alterations in the chassis. It is not even necessary to drill any bolt holes in the chassis as the compressor is firmly held down by means of "U" bolts.

The air compressing plant consists of a two-cylinder vertical compressor, direct-connected to a four-cylinder, four-cycle, tractor type of gasoline engine; a radiator and fan for cooling the water for both the compressor and engine, an air receiver, fuel tank and other accessories. A regulator is furnished for automatically throwing the load off the compressor when a predetermined maximum reservoir pressure is reached and throwing the load on the compressor at a predetermined minimum pressure.

With the outfit there are also supplied several tool boxes which are attached to the steel frame holding the compressor and engine. These are used for holding rock drills and pneumatic tools driven by the compressor. As will be seen by the illustration the entire outfit is mounted on a steel base and covered by means of a sheet steel canopy with removeable sheet steel doors. This compressor has a capacity of 91 cu.ft. of free air per minute.



Compressor Outfit Mounted on Ford Chassis

This outfit was developed essentially for high-speed transportation. Small jobs requiring from ten minutes to a day's time were often necessarily performed by hand because it was hardly a paying proposition to haul a standard portable compressor to the job.

Recent Signal Developments

DURING the past year the Nachod Signal Company, Inc., has further developed its automatic headway recorder, for printing on a chart the time that cars pass a given point, so as to render it more robust and foolproof. Means have been provided now so that a winder may not overwind and break the clock spring in the movement and the design has been changed so that friction will be reduced.

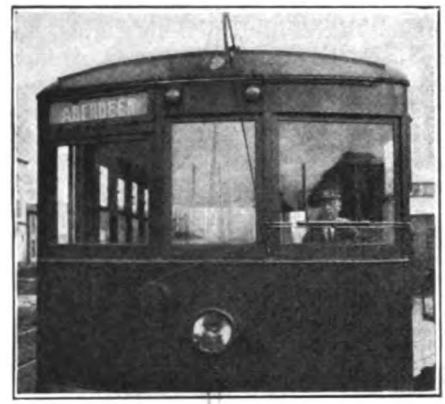
Block signals have been further developed so that relays for different purposes may be assembled largely from the same elementary parts, whereby railways using several kinds need carry but relatively few different spare parts.

Highway crossing signals for single track have been installed with an overlapped clearing control, so that the bell or other warning signal is not stopped until the car going either way has passed the crossing by a short distance. Thus the bell continues to ring, even after an accident, with the car stopped near the crossing, so that better evidence is afforded that the signal was given properly.

Further developments of block signals will be made for long single-track blocks between passing sidings, in which the entire block is retained as a unit for opposing movements, but is subdivided into absolute sections for following movements, in each of which sections but one car of a train is permitted at a time.

Automatic Window Wiper

AFTER a test under service conditions the Grays Harbor Railway & Light Company, Aberdeen, Wash., has installed on all its cars the Polk-Hueber automatic window cleaner. This device keeps the window in front of the motorman free from rain, mist or snow. In this section of the country the rains are very severe and the average rainfall per year is well over 80 in. Rain, mist and snow cover up the window in front of the motorman and make it difficult for him to discern clearly objects even close to him.



Automatic Window Wiper on Safety Car

The device consists of a cylinder reciprocating on a hollow "power rod," through one end of which air pressure from the air brake system is delivered to the cylinder. Small brass tubing connects the power rod to the air piping in the front of the car, where a small shut-off valve is located conveniently for the motorman. The cylinder moves back and forth across the window as long as the valve is open and the speed of the cylinder is regulated by the valve.

Attached to arms extending from the cylinder are rubber blades which are, by a simple spring arrangement, made self-aligning to the window glass with sufficient pressure to wipe the window clean of rain or snow as they travel back and forth. The blades will clean a space 15 in. wide from edge to edge of the glass, the length of travel being determined by the length of the cylinder.

The application of "suction" to the "exhaust" end of the power rod instead of air pressure to the pressure end causes the cylinder to operate the same as when air pressure is used. As only a very small amount of air pressure is required to operate the cylinder the cost of operation is small.

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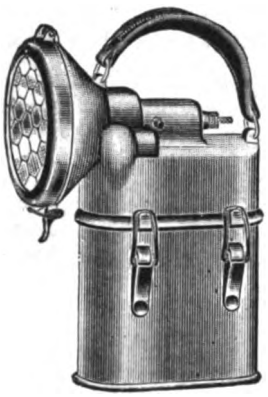
Handy Electric Flash Lamp and Lantern

ELECTRIC flash lamps and lanterns have come into quite general use in electric railway shops at points where extension lights are not available, or where their use is inconvenient.

To supply the demands for a convenient electric lantern, the National Marine Lamp Company, Forestville, Conn., has just brought out a new type to which it has given the name "Excellight." This light embodies elements of safety, more powerful illumination and convenience not found in previous types. Two No. 6 dry cells are used for furnishing the current. These are mounted in an aluminum casing and the connections between the light switch and the battery terminals are made when the top section of the lantern casing is set in place on the lower section. Four spring clamps, two on each side hold the two sections of the aluminum casing together. A soft fiber gasket forms a leakproof joint.



New Type Electric Lantern

For turning the light on and off a push button switch is provided in a convenient location, so that it can be manipulated by a finger of the hand carrying the lantern. This leaves the other hand free for carrying materials or performing other duties. Special precautions have been taken to make a unit which will withstand rough usage, and this light can be dropped or knocked against hard objects without impairing the working of the light or damaging the lantern.

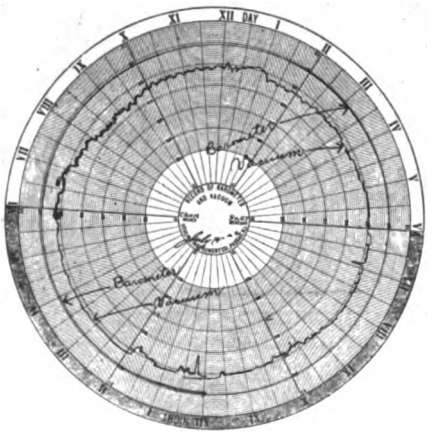
A bell-shaped reflector is provided with an adjustable focus which permits a spread of light to be regulated as desired. This reflector is protected in the aluminum casing by a ¼-in. wire-reinforced glass. Provision is made for carrying two extra light bulbs by small spring clamps which are conveniently attached inside the top of the casing.

Metal for Welding Aluminum

THE Marshall Metal Corporation, New York, N. Y., is marketing a new metal welding aluminum. This has the trade name of Bulldog Metal. The welding is accomplished by applying heat at and around the surfaces to be welded with an acetylene or gasoline blow torch until the Bulldog Metal will stick to the surfaces when rubbed on. The metal is then distributed by brushing firmly with a wire brush so that it will enter the pores of the aluminum. When the surfaces are well tinned, additional metal is puddled onto the surfaces, and when held firmly together while additional heat is applied a thorough fusion weld will result. After the weld has been completed and the metal is cooled, the welding metal can be chiseled, filed, ground, scraped and buffed to make a perfectly smooth surface.

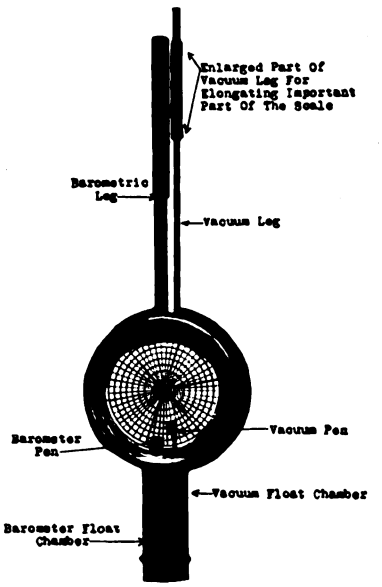
New Barometer and Vacuum Recorder for Steam Turbines

THE Uehling Instrument Company, Paterson, N. J., has just placed on the market a new combined barometer and vacuum recorder primarily for determining (1) the absolute back pressure in steam turbine and condensing plants, (2) the barometric pressure, (3) the condenser vaccum, (4) the existence of air leakage into the condenser, etc., and (5) the ability of the condenser to handle the load.



Sample Record Chart of Barometer and Vacuum

The combined recorder consists of two float chambers, one of which is connected with a barometric mercury column and the other with a mercury column in communication with tne condenser. These columns and float chambers are secured to the recorder case. The pens are actuated by means of floats resting on the mercury in the two chambers. The movements of the floats correspond exactly to the changes in barometric pressure and in vacuum.



New Combined Barometer and Vacuum Recorder

The use of the mercury columns obviates the necessity for calibrating the recorder against mercury column testers.

The recorder automatically and continuously draws the barometer and vacuum records on the same chart. The barometer record is used as a base line for reading the absolute back pressure directly off the chart. As long as the two curves, barometer and vacuum, vary simultaneously and proportionally, everything is as it should be. Should, however, the vacuum fall when the barometer remains constant, either considerable air is leaking into the condenser, or the condenser is overloaded.

The instrument records any part of the total range of 0 to 31 in. Vacuums from 25 in. to 31 in., and the corresponding absolute back pressures, or vacuums from 20 in. to 31 in., etc., may be recorded with great accuracy over nearly the full face of the chart, the rest of the chart being used for recording, on a contracted scale, the lower vacuums down to atmospheric pressure.

The accompanying chart shows a typical barometer record in the outside line, with a fluctuating vacuum line inside.

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Association News & Discussions

Welded Rail Joint Work Progressing

A MEETING of the executive committee of the committee on welded rail joints, whose work is being financed by the American Electric Railway Association and administered under the auspices of the American Bureau of Welding, met in Washington, D. C., on Feb. 15. There was a fu l attendance.

Details of the methods to be used in the making of the tensile, bending, drop and conductivity tests were settled. The preliminary designs for the proposed repeated impact and rotary service testing machines were closely studied and the preparation of the final designs was placed in the hands of sub-committees. E. J. McIlraith is chairman of the committee on the impact machine and W. W. Wysor is chairman of the one on the rotary machine.

A meeting of the full committee was held on Feb. 16, with forty members and guests in attendance. The committee went over in detail a report from the executive committee and approved all of its recommendations.

There was then given, in the laboratories of the Bureau of Standards, where both meetings were held, a demonstration of the bending, tensile and conductivity tests which will be made later on an extended scale. The demonstration was highly satisfactory to the committee. The special grips for the tensile tests were examined, and announcement was made that the committee has ordered special auxiliary heads for the bureau's Emery testing machine. These permit a specimen to be gripped without machining.

After the demonstration the group was divided into small parties and conducted on a tour of inspection through the bureau property.

Building and Structures

THE outstanding feature of the meeting of the Engineering Association committee on buildings and structures, held recently in New York City was the planning done in regard to researches on passenger and freight terminals and arrangements for prepayment and postpayment of fares. Committees had already been appointed to handle the four topics assigned by the executive committee. The personnel of these subcommittees is as follows: Electric railway terminals for city and interurban service, C. W. Burke, Brooklyn, N. Y.; J. D. Kent, New York, N. Y.; S. J. Steiner, Aurora, Ill., and D. A. Scanlon, Akron, Ohio (representing the T. & T. Association). Waiting stations other than terminals of moderate cost for interurban lines, J. R. McKay, Fort Wayne, Ind.; B. R. Brown, Dallas, Tex.; Mr. Scanlon and L. L. Newman, Birmingham, Ala. Design of small bridges, culverts and trestles, Mr. Steiner, J. N. Penick, Richmond, Va., and James Link, Knoxville, Tenn. Review of existing standards, etc., the whole committee.

The committee went into details of design of small bridges, culverts and trestles, as well as interurban waiting stations. Blueprints were shown of modern electric railway buildings.

The meeting was attended by N. E. Drexler, chairman, and Messrs. Burke, Kent and McKay of the committee, Mr. Scanlon for the T. & T. Association, R. C. Cram, vice-president of the association, and S. Clay Baker, East St. Louis, Ill.; J. H. Haylow and Frank Tingley, Washington, D. C., representing the committee on way matters.

Midyear Conference Gets Wide Attention

BELIEF that the holding of the Midyear Conference in Washington would result in widespread publicity for the industry is borne out by proof now at hand. Both the Washington newspapers and those outside Washington recognized the gathering of the great national body to tell what had been done to carry out the government's suggestions for rehabilitation as one of considerable news interest and handled it accordingly.

A striking feature of the meeting was that every paper in Washington regardless of its utility policy handled the meeting on its news merits. In fact the two papers generally reputed to be "anti-utility" showed their fairness and recognition of news values by publishing the proceedings liberally.

A special news service for the benefit of all newspapers and press associations was run during the meeting by the advertising section of the Committee of One Hundred. Individual stories were prepared for the different papers and organization in accordance with the committee's policy not to deal in "canned" material.

Three speeches, those of President Emmons, Mr. Lewis and Senator Davenport, were distributed to newspapers throughout the country by mail in advance of the meeting and they were used generously.

Pictures also played an important part in the proceedings. On Thursday every newspaper in Washington carried pictures of some of the officials of the association. When the executive committee called at the White House half a dozen photographers representing national services posed the committee on the steps and took photographs of them. The Washington papers carried the pictures the following day and later they were given country-wide distribution.

Old newspaper men in Washington were impressed by the fact that any convention—of which there are about a dozen a week in the capital—would attract a letter from the President, and a visit from the Vice-President and the former Vice-President and a member of the cabinet in person.

The conclusion to be drawn from the entire situation is that the Association's policy of "the truth in publicity" adopted at the outset of the Federal Electric Railways Commission hearings in Washington, four years ago, was the constructive one to follow.

New Date for C.E.R.A. Summer Meeting

ON ACCOUNT of conflicting with another convention scheduled for Cedar Point, Ohio, the date of the summer meeting of the Central Electric Railway Association has been changed from June 27, 28 and 29 to a new date of July 18, 19 and 20. In some respects this date will be more desirable as the water will be somewhat warmer for bathing purposes, Cedar Point having a splendid beach. The hotel and arrangement committee, of which S. D. Hutchins, Westinghouse Traction Brake Company, Columbus, Ohio, is chairman, is laying plans to make this meeting unusually attractive.

Six Standards Approved

THE American Electric Railway Association has received word from Dr. P. G. Agnew, secretary American Engineering Standards Committee, that the following proposed standards, after consideration by a special committee which approved their adoption, had been unanimously approved by the member bodies and may now be designated as American Standards:

A.E.R.E.A. Manual Section	Subject	A.E.S.C. Designation
Wr 3c	9-in. girder grooved rail	E 5-1923
Wr 4c	7-in. girder grooved rail	E 4-1923
Wr 5a	9-in. girder guard rail	E 7-1923
Wr 6a	7-in. girder guard rail	E 6-1923
Wm 4b	Joint plates for 7-in. girder grooved and guard rails	E 2-1923
Wm 5a	Joint plates for 9-in. girder grooved and guard rails	E 3-1923

The adoption of these specifications as American Standards is a logical step, since they have been widely accepted by the electric railway industry. The extent of their use is found in the records of one of the principal manufacturers of steel rails, which show that during the year 1922 approximately 79 per cent of its total tonnage of girder rails shipped to electric railways were A.E.R.A. standard sections. This company's records also show that during the past seven years 62 per cent of its total tonnage of electric railway girder rails were association standard sections. The increasing use of these rails by the industry and their adoption as American Standards is evidence that the work of the association in this field of standardization has been based on sound engineering principles.

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The News of the Industry

Paving Assessment Upheld

United States Supreme Court Declares Legislature Has Power to Make Reasonable Classifications for Taxation

"The power of the Legislature to make reasonable classifications (for taxation) and to impose a different burden upon the several classes cannot be denied," declared the written opinion of the United States Supreme Court, rendered on Feb. 19, in affirming the decision of the North Carolina Supreme Court, which upheld an assessment for paving made by the city against the Durham Public Service Company.

The city decided to pave Main Street and made demand that the company bear the cost of paving between its double street car tracks on the street. The company refused on the ground that its contract did not contain this obligation. The city thereupon paved the entire width of the street and assessed the company $102,942 as its share of the cost. The company brought suit to resist this assessment, alleging that its contract did not compel it to bear the cost of paving the roadbed and that the assessment was excessive, pointing out in the latter connection that owners of abutting property had been assessed a sum approximately $13,000 less than that claimed from the Public Service Company, although the taxable valuation of this abutting property was many times greater than the value of the company's physical property on the street.

In making the assessment the city relied upon an act of the legislature delegating authority for such acts to municipalities of North Carolina. Both the State Supreme Court and the United States Supreme Court declared this legislative act valid, and the assessment by Durham under the act legal.

United States Supreme Court Denies Canal Title to State

Restoration of the title to the Columbia Canal to the State of South Carolina from the Columbia Railway, Gas & Electric Company, which uses it for hydro-electric development, was denied by the United States Supreme Court in a decision rendered Feb. 19.

Title to this canal was vested by the State in the penitentiary board in 1887, with the proviso that it be extended to Gervies Street within two years or not more than seven on penalty of forfeiture, and eventually extended to the Congaree River. A later act permitted sale to a private corporation, with the stipulation that 1,500 hp. be furnished free to the State, the city of Columbia and an individual.

The Columbia Railway, Gas & Electric Company acquired title from the grant. In 1917 the Legislature passed a bill for recovery of the canal by the state on the ground that the canal had not been extended to the river. The State Supreme Court sustained this act and declared the canal forfeited for nonperformance of contract.

In reversing this decision, the United States Supreme Court declared that as there was no penalty clause attached to the original act, as to extension to the river, and as other conditions have been met, the South Carolina act of 1917 was unconstitutional and that title to the canal is properly vested in the Columbia Company.

Utility Bill Introduced in New York

Membership of the Up-State Commission Would Be Reduced from Five to Three—Right to Fix Rates Rescinded—Municipal Ownership Provisions Included in Measure

THE administration at Albany, N. Y., has placed all of its eggs in one basket in its feature measure introduced by John J. O'Connor in the Assembly, in that it is both a ripper bill and generally divests the commission of the powers conferred upon it by the legislation of 1921 and 1922.

The measure is entitled "An act to amend the public service commission law, in relation to membership and powers of the commission." In the first part of the bill, the "ripper" part, section four of the public service commission law is amended to provide that the public service commission shall consist of three instead of five members, and that the term of office shall be six years instead of ten, the commissioners first appointed to hold office, one until Feb. 1, 1924, and the term of one commissioner shall expire on Feb. 1 of each second year thereafter.

If this measure passes, the Governor will appoint three new commissioners to take the place of the five now in office, who would be automatically legislated out of office. Under the terms of the bill, however, the power of removal is left as it is "by concurrent resolution of both houses of the Legislature if two-thirds of all the members elected to each house concur therein." This section as amended turns the control of the public service commission and its patronage over to the administration.

Stripping the Commission of its Powers

Under chapter 134 of the laws of 1921, the Legislature delegated its powers of raising or lowering a rate, fare or charge, regardless of the existence of any statute to the contrary, to the commission.

There are four general subjects of regulation treated in the public service commission law: railroads and street railroads; gas and electric corporations; steam corporations; telephone and telegraph corporations. The regulatory provisions of law to each of the four subjects are very similar in language but adapted to the requirements of the different utilities.

Under the new bill, section 29 relating to railroads, street railroads, etc., has been amended by striking out the provision that "the commission may as authorized by subdivision one of section 49 establish temporary rates for any period of suspension under this section."

Subdivision 1 of section 49 is amended by striking out the provision that "the commission shall with due regard among other things [to the estimated prospective earning capacity of such property at the rate of fare at the time fixed and existent] and the provision notwithstanding that a higher or lower rate, fare or charge has been heretofore [prescribed by general or special statute, contract, grant, franchise, condition, consent or other agreement] *authorized* . . . shall fix the rate, etc."

The intent of this amendment is to revive to the commission the mandatory obligation to consider previous agreements, franchises and general or special statute in fixing rates and charges.

Section 66 subdivision 5 of the law relating to gas and electrical corporations has been amended:

"The commission shall determine and prescribe . . . the just and reasonable rates . . . notwithstanding that a higher [or lower] rate or charge has heretofore been prescribed by [general or special] statute [contract, grant, franchise, condition, consent or agreement]."

Subdivision 12 of section 66 has been amended by striking out the provision "unless the commission shall establish a temporary rate or charge as authorized by section 72 of this chapter."

Section 72 relating to order fixing price of gas or electricity has been amended:

"After a hearing . . . the commission may, by order fix [just and reasonable prices, rates and charges] *the maximum price* for gas and electricity *not exceeding that fixed by statute* to be charged . . . [notwithstanding that a higher or lower price has been theretofore prescribed by general or special statute, contract,

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grant, franchise condition, consent or other agreement.]"

It also eliminates this provision from the law:

"Any such change in price shall be upon such terms, conditions or safeguards as the commission may prescribe. It it shall be made to appear to the satisfaction of the commission that the public interest requires a change in the price of gas or electricity charged by any such person or corporation, or that such change is necessary for the purpose of providing adequate and efficient service or for the preservation of the property, the commission, upon such terms, conditions or safeguards as it deems proper, may authorize an immediate reasonable, temporary increase or decrease in such price pending a final determination. . ."

Subdivision 10 of section 80 which relates to steam corporations is amended so as to prohibit the commission from establishing a temporary rate or charge; and section 86 is amended by providing that the commission *within lawful limits* may, by order, fix the maximum price of steam *not exceeding that fixed by statute* and striking out the law "notwithstanding that a higher or lower price has been theretofore prescribed, etc."

TELEGRAPH AND TELEPHONE

Subdivision 2 of section 92 of the public service commission law is amended by striking out the provision allowing the commission to establish temporary rates, charges or rentals, for any period of suspension, etc., and providing "at any hearing involving [a change] *an increase* or a proposed [change] *increase* of rates, the burden of proof to show that the [change] *increase* of proposed [change if proposed by the corporation, or that the existing rate, if on motion of the commission or in a complaint filed with the commission it is proposed to reduce the rate,] *increase* is just and reasonable shall be upon the corporation [charging] *increasing* or proposed such [change] *increases*.

(Note: Matter in roman old law; matter in brackets stricken out; matter in italics new.—EDITOR.)

Within thirty days after this act takes effect, the Governor is to appoint three new public service commissioners who are to take the place of the five now in office.

The intent of this measure is to make the public service commission consider in fixing a rate, fare or charge a contract, agreement, franchise or ordinance previously had or a general or special statute and not to allow the commission to raise a rate or charge in contravention of any such. Whether this is accomplished or not, however, is a question.

The Legislature in 1921 repealed by implication all existing statutes fixing rates, fares and charges and delegated to the commission the right to fix and adjust the same just as if it were the Legislature itself. The bill now proposed does not specifically restore to the law the statutes and agreements which by the law of 1921 were summarily swept aside; it takes away from the commission its legislative powers so that the commission cannot restore them. The Legislature has not by this bill at least attempted to do so.

The question arises, could the commission, operating under the amended law, use general or special statutes, franchise contracts or agreements as a basis for rate fixing as such franchises and laws are not restored in effect by this measure?

Buffalo Hearing to Be Resumed on March 6

The Public Service Commission of New York has fixed March 6 as the date for the resumption of hearings before Commissioner Pooley in Buffalo on the service and rate case instituted by the municipal authorities against the International Railway. Buffalo seeks a return to the 5-cent fare but some members of the City Council favor a service-at-cost proposal.

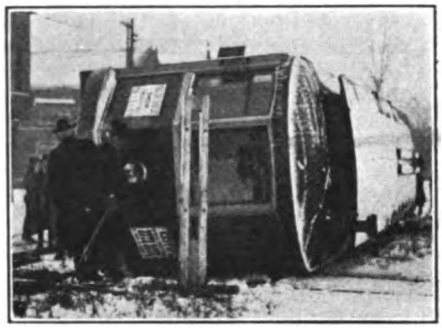
Herbert G. Tulley, president of the International, has sent a letter to Mayor Frank X. Schwab saying that under the present relations between the city and company a service-at-cost plan is impossible. The letter says in part:

> Any service-at-cost plan would be made impotent by use of municipal or other private buses, because the possibility of better service and lower fares would, in either event, be dissipated by the waste in duplicated service. The company is desirous of reaching a settlement with the city, by which the best of service may be supplied for the lowest possible fare. To secure this desired result city and company must necessarily co-operate so as both to increase and conserve the company's revenues.
>
> This company, if the city so desires, will undertake to operate a motor bus line on Delaware Avenue, from Church Street to Amherst Street, for a 10-cent fare with a 3-cent exchange to connecting street cars, and a motor bus line on Bailey Avenue, from Broadway to Kensington Avenue, for a 7-cent cash fare, or four tickets for 25 cents with free transfers to connecting street cars.

In referring to the plea for motor routes, Mayor Schwab says that this matter is now waiting for a public hearing. The hearing is set to be held on Feb. 23.

Accidents in Indianapolis and Louisville

A second serious grade crossing accident within thirty days occurred on the morning of Feb. 13 when a Louisville & Nashville Railroad double-header train crashed into a big Fourth Avenue car of the Louisville (Ky.) Railway at Fourth and A Streets, where there is an unprotected grade crossing, indicated merely by a swinging signal device. The car had just left the carhouse northbound and had only taken on four passengers. As a result of the accident two people were killed and four injured. The crew of the car escaped with minor injuries, being on the head end, which had passed over the crossing.



Car Overturned in Indianapolis

In an accident on the Indianapolis Street Railway recently the front end of one car was demolished and another car was thrown over on its side. Four persons were injured. A College Avenue car crashed into a Twenty-seventh Street car as it crossed the southbound tracks into a loop. Slippery tracks are said to have made it impossible for the motorman on the car which was struck to get enough traction from the rails to move his car quickly so as to escape the collision when it was seen the other motorman could not stop his car. Of those injured, two were passengers and two were members of the car crew which struck the other car.

Passenger Train Hit Fourth Avenue Car in Louisville

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Buffalo Strikers Plead Not Guilty

State Senator Robert C. Lacey and thirteen of the fourteen striking street car men indicted by the Federal Grand Jury in connection with the dynamiting of the Buffalo-Niagara Falls high-speed electric train on the International Railway last August, appeared before Federal Judge John R. Hazel and entered pleas of not guilty. Vincent F. Tuero, financial secretary of the Amalgamated, who also is under indictment, was sick and unable to plead. He will be arraigned later. State Senator Lacey also was indicted on a perjury charge.

James H. Vahey, Boston, general counsel for the Amalgamated Association, will assist in the defense of the strikers when they are brought to trial at the April term of United States Court in Buffalo. Ernest W. McIntyre will be the trial lawyer for the prisoners.

Counsel for the striking car men asked the court to direct the government to elect which of the conspiracy indictments would be tried. He argued that inasmuch as they are both for the same offense, one should be dismissed. The court postponed argument on the motion until the return of District Attorney William J. Donovan, who is now in Europe. Counsel for the car men asked permission to withdraw the not guilty plea at some future time and enter a demurrer.

$75,000,000 Power Program Under Way in Ohio

According to the Ohio Committee on Public Utility Information a tentative program is under way involving the expenditure in Ohio of a sum in excess of $75,000,000 during the next three or four years, for the purpose of building additional facilities for the generation and distribution of electricity to meet demands in that State.

This program, part of which will be actually carried out during the present year, involves the establishment of an Ohio super-power zone system that will link together most of the great electrical central generating stations of the State. Practically every large city in the State will be affected.

Before the end of 1923, electricity generated down on the Ohio River will meet with electricity generated on the shores of Lake Erie, by reason of physical interconnection between the properties of the Cleveland Electric Illuminating Company, the Northern Ohio Traction & Light Company and the American Gas & Electric Company, operating through its subsidiary, the Ohio Power Company.

Actual construction on this project is now well under way, as is also another interconnection that will link with this power zone the properties of the Ohio Public Service Company, which is already tied in through the Lake Shore Electric Railway, with big generating plants of the Toledo-Edison Company.

This means that by fall there will already have been built a super-power system for the entire eastern half of the State and that whole portion lying along Lake Erie stretching from Cleveland to Toledo. In addition to this, engineers have already begun calculations to determine how the properties of the Union Gas & Electric Company at Cincinnati, might be hooked up so that they could carry current up as far as Columbus. In this scheme is also involved the problem of linking in the Dayton Power & Light Company, which serves many towns in the southwestern part of the State, and the Consolidated Light, Heat & Power Company, of Huntington, W. Va., which company serves communities in the southeastern part of Ohio and in West Virginia.

Meeting Reveals Progress of Plan

The plan to operate interurban cars of the Cincinnati, Lawrenceburg & Aurora Electric Street Railroad into the heart of Cincinnati, Ohio, is well under way, it was revealed at a meeting on Feb. 17 of the Hamilton County legislative committee. A delegation of business men, headed by Charles A. Hinsch, president of the Fifth-Third National Bank, appeared before the committee and presented a bill for amendment of present laws that would facilitate the entrance of the traction company to the Dixie Terminal from its present terminus at Anderson's Ferry. The measure of Mr. Hinsch and his constituents urged that the Ohio Legislature give the Council of Cincinnati the right to grant a franchise permitting an increase in fares on the extension. Members of the legislative committee present agreed to urge passage of the bill and explain its purpose to the Legislature.

The law prohibits a franchise for more than a 5-cent fare on railways that use elevated tracks over any of the city streets. Unless that section of the law is repealed or changed, the traction company would have to convey passengers for 5 cents.

The traction officials said that they could not operate their cars to the Dixie Terminal on a 5-cent fare without losing money. The petition presented to the legislators was emphatic in its assertion that the present law would "forever prohibit the construction of elevated tracks in any Ohio city and would hinder traction progress."

Mr. Hinsch spoke of the financial considerations involved, and the convenience of residents of the lower-river towns was the theme of L. B. Patterson and H. Lee Early, directors of the traction company.

Several months ago directors of the Cincinnati, Lawrenceburg & Aurora Electric Street Railroad announced their intention of bringing the line into the heart of Cincinnati by using the right-of-way of the Big Four Railroad and the construction of elevated tracks over Mill Creek and the streets in the "bottoms."

The building of the extension would enable many thousands of buyers from southern Indiana municipalities to come to the heart of Cincinnati's shopping district without change of cars or other inconvenience. At present those who come have to change cars at Anderson's Ferry.

Nothing to Arbitrate, Says Mitten

T. E. Mitten, chairman of the board of directors of the International Railway Company, Buffalo, told Governor Smith there is nothing to arbitrate and the Governor is now convinced that any investigation by the State Industrial Commission into the causes of the strike last July would be a mere waste of time. The investigation by the state was asked by a delegation of strikers and labor leaders.

Governor Smith issued a statement after the conference with Chairman Mitten of the board in which he said:

> It is only fair to the strikers to say that such an investigation will not amount to anything. From what Mr. Mitten said I am convinced he will never consent to arbitrate and he seems to be a man who means what he says. Mitten told me that before he would consent to negotiate with the union, he would give the road to the men who are now running it. When a man takes that position how are you going to find anything to arbitrate?

The Mitten plan has gone into full operation on the local and interurban lines of the International. The emergency provision brought into existence by the strike, under which loyal employees were guaranteed ten hours pay every day, or $5.50 per day, has been abandoned as of Feb. 15. Under the new regulations the men have gone on straight platform time. Men with regular runs will be guaranteed the opportunity to work up to ten hours per day. Men not regulars will receive two hours pay for showing up in the afternoon. Any runs that they get will be paid for at the regular rate in addition to the pay for showing up.

President Herbert G. Tulley announced that the wage schedule will be 50 cents an hour for the first three months of employment with a 3-cent raise for the next nine months and 55 cents an hour thereafter. When the new men were employed they were told that when the strike emergency ceased, they would be placd on regular platform time.

Commerce Commission Will Hold Hearing on Terminal Issue

Richard Sachse, chief engineer California State Railroad Commission, has returned from Washington, D. C., where he went in connection with the application of the State Railroad Commission to the Interstate Commerce Commission for a decision on the matter of a union terminal at Los Angeles for the steam road and electric interurban lines entering Los Angeles. In view of the fact that the California State Supreme Court on two hearings overruled the State commission in its order on the railway lines to construct the terminal, that commission saw fit to appeal to the Interstate Commerce Commission.

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Will Vote on Fare Increase

Electors of East Liverpool, Ohio, on Feb. 27, at a special election, will vote on the councilmanic ordinance granting the Steubenville, East Liverpool & Beaver Valley Traction Company a fare increase.

Arguments for and against the passage of the ordinance were recently mailed to 9,000 voters in the city of East Liverpool. The arguments are mandatory under the provisions of the referendum law. The registration of voters for the special referendum vote has been light, but in view of the fact that hundreds of voters registered at the last election a heavy vote is anticipated. Since May 1 of last year the traction question has been of paramount importance in the city of East Liverpool.

No cars have operated within the city limits of the pottery city since May 1, 1922, and the question of restoring car service, in a measure, may be considered dependent upon the approval of the ordinance by the voters.

It is the general belief that if the fare increase is granted the officials of the traction company may consider a resumption of negotiations with their employees who walked out last May.

Interurban cars of the Steubenville, East Liverpool & Beaver Valley Traction Company are operating outside the East Liverpool city limits, non-union men being in charge of the cars. They have been operating for some time, but there has been no interference, the union men declaring when the announcement was made that service would be resumed that they would in no way interfere.

Delicate Sensibilities of Hoosiers Outraged?

Indiana is all het up. Every once in a while a prophet of the plain people arises in Indiana filled with the ambition to turn things topsyturvy. Not so long ago it was Mayor Shank of Indianapolis who occupied the limelight. Now it is the members of the Board of Public Works of Indianapolis. The sensibilities of these gentlemen and some others are being outraged, it seems, by the fact that long trains of live stock are being handled by the electric interurbans. In consequence a bill has been introduced in the Legislature to prohobit the hauling of live stock or other freight by traction lines through the streets of any city in the State. The bill permitting this practice was enacted at the 1920 special session of the Legislature, largely through the support of the farmers' organizations.

As just indicated the story of hauling cattle dates back to the stressful days of 1918 when the farmers were sore put for means of transporting their cattle. When fear for the ways and means of supplying food was felt the interurbans were induced to ship cattle, though they were reluctant to do so. The scheme has proved successful and has developed, in the opinion of the county agents of the agricultural interests. It has added to the meat supply and at lowered costs. In 1921, for instance, the Terre Haute, Indianapolis & Eastern Traction Company handled 402 cars of cattle. The editor of the Terre Haute *Tribune* considers this a record of which not only the company but the State may well be proud. In a recent editorial that paper said in part:

> Of late there has grown up a disposition to criticise the traction lines of the State for hauling cattle through the streets of the cities through which the interurban lines pass. Terre Haute is participating in this. While it is no new subject, it seems that it has just occurred to a lot of people to find fault therewith. And behind it all there is quite a long story.
>
> Back in 1918, during the war, the farmers were sore put. In fact, all classes of people were sore put. If no cattle was shipped there would be no supply of meat for food. The case looked critical. Leaders in public thought induced the interurban lines to make the experiment of shipping cattle. Cars for the purpose were bought. Cattle shipping pens were built along the lines. The method was a success, and was hailed as a boon to the farmers. The scheme was not born of the greed of the traction lines. In fact, it is generally known that they undertook the work with some reluctance. It affords quick transportation; it saves the farmers an enormous amount of money on the weights of their stock; it is acclaimed by county agents who certainly are well meaning in their efforts to develop the agricultural interests of a community, and, last but not least, it adds to the meat food supply and at lowered costs.
>
> It may offend some tastes to see a cattle car go through the streets on the interurban tracks, but the thing is too important to be so jauntily disposed of. People who take snap judgment on these matters simply are deficient in fundamental knowledge. A cattle car may not be the most enticing or alluring thing on the horizon. But it can nearly always demonstrate its utility beyond a shadow of a doubt.

News Notes

Name of Department Changed.—The name of the claims department of the Indiana, Columbus & Eastern Traction Company, Cincinnati, Ohio, has been changed to the safety department. H. P. Smith continues as director in charge, with headquarters in Springfield, Ohio.

Money for Rehabilitation Increased.—The amount of money to be spent in putting the Goldsboro (N. C.) Electric Railway system in operation to be voted on at a general election has been increased from $35,000 to $40,000. The sum was advanced due to a loss of $5,000 in a carhouse fire.

Keeps Line Open During Blizzard.—All traffic, including train service and mail service, was tied up recently in western Michigan as a result of the worst blizzard which that section had experienced in several years. The city of Holland would have been cut off from the rest of the world except for the line kept open by the Michigan Railway.

1923 Expenditure $8,000,000.—Public utility statistics recently compiled in the State of Tennessee show that electric light and power companies, street railway, gas and telephone companies in the state will spend $8 350,000 during 1923 for extensions and improvements. This sum is in addition to $2,000,000 more for replacements and renewals.

The One and Only Car to Go.—Bellefontaine, Ohio, likely will lose its only street car—a one-man car operated over the tracks of the Indiana, Columbus & Eastern Traction Company's lines in the city limits. Traction line officials have asked permission of the Council to discontinue service because the car was a losing proposition, and the Council has indicated that the permission will be forthcoming. The car has been in operation for about fifteen years.

Railway Companies Order Buses.—On Feb. 16 the Pacific Electric Railway and Los Angeles Railway Companies placed an order with the White Auto Company for eighty Model 50 motor buses. The purchase price of the big consignment is $550,000. Some of these new buses, the railways announce, will be jointly operated by the two street railway companies and others individually, but all will be used to supplement the street car and interurban service furnished by the two corporations in Southern California.

25,000 Miles Without Accident.—Four motormen of Green Bay, Wis., have set a record safety mark. The big record was made by Henry Erdman who operated a car through the streets of the city for 25,000 miles without one accident, without one report and without one complaint. The three other motormen who equalled this safety showing operated interurban cars. The company paid out $1,089 in bonus awards during the three-quarters of a year that the bonus plan was in effect. The awards are based on courtesy, safety and service.

Leaves Transit to Mayor.—The City Council of Philadelphia, Pa., wants the Mayor to handle the entire transit situation. Councilman Charles B. Hall on Feb. 15 presented the resolution instructing Mayor Moore to call meetings of city and company engineers to determine the proposed high-speed routes. The resolution then requested that negotiations take place with the president of the Philadelphia Rapid Transit Company, looking toward an operating agreement for the Broad Street subway. Previous to this recommendation the Councilmen had rejected the Mayor's solution. The Mayor has passed no comment upon this action of the City Council.

Stage Western Hold-Up. — Two masked bandits, each armed with two revolvers, held up and robbed twenty passengers and the crew of an interurban car on the Martinsville division of the Terre Haute & Eastern Traction Company just south of Indianapolis recently. The men staged a regular Western hold-up, firing several shots into the car and, after the motorman slowed down, pulled the trolley from the wire, bringing the car to a stop. No one was injured. Cash, jewelry and valuables to an estimated value of more than $1,000 were obtained from the passengers and crew after they were ordered out and lined up along the tracks and searched. One suspect is being held by the police.

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Financial and Corporate

Pittsburgh Accounting Ordered

Another Move Made Toward Restoring the Pittsburgh Railways, Now in Receiverships, to Its Owners

An accounting of the receivers of the Pittsburgh (Pa.) Railways probably will be filed in Federal Court by March 1 as the first step toward the dissolution of the receivership and the reorganization of the company. This was indicated by C. A. Fagan, W. D. George and S. L. Tone, the receivers, on Feb. 15, following the filing of a petition in Federal Court by A. W. Thompson, president of the Philadelphia Company, acting as president of the Pittsburgh Railways, asking for the accounting and the return of the property to the railways company.

The petition asks that when the account is filed it be referred to a master appointed by the court to determine its correctness, and that a reasonable time be given all claimants to present their claims.

The petition states that the company has made arrangements to borrow $5,000,000 from the Union Trust Company, Pittsburgh, provided it can repossess itself of its property. Of this sum, $3,000,000 will be used for the purchase of approximately 300 new cars and $2,000,000 will be used for improvements and betterments which are calculated to increase earnings and enable the company to operate the system at a profit. Financing will be accomplished through the issuance of $3,000,000 in car trust notes and $2,000,000 in four-year 6 per cent notes, with a sinking fund of $500,000 a year.

The petition states that, at the present rate of earnings, it would take the receivers a great many years to pay their obligations, and even an increase in fare would not be effective on account of the diminishing returns which result in such action.

The reorganization is to be accomplished under an agreement already made by the city of Pittsburgh, the Philadelphia Company and the Pittsburgh Railways. This agreement provides for a reorganization by the Philadelphia Company, at a capitalization of $62,500,000, and stipulates a traction conference board for the control of all financial matters. This board is to be composed of representatives of the city of Pittsburgh, the boroughs through which the traction lines pass, the Philadelphia Company and the Pittsburgh Railways.

All pre-receivership claims are to be paid over a ten-year period and without interest. The petitioner is also entitled to receive sufficient operating expenses to enable it to maintain its property in good condition. All the larger creditors, such as incorporated bodies, have been induced to accept the ten-year-payment plan. Holders of a number of claims for personal injury received before the receivers took charge have been asked through their attorneys to accept the same plan of payment. These claims are from 266 persons, and amount to approximately $750,000.

Shore Line Sale Arranged

The part of the Shore Line Electric Railway between New Haven and Saybrook, Conn., about 30 miles distant, which has not been in operation for several years, has been purchased by A. William Sperry, New Haven, for $140,000, of which $5,000 was paid immediately and the balance is to be paid within thirty days after the Connecticut Legislature grants a charter to Mr. Sperry. The sale was made by Robert W. Perkins, the receiver, and has been confirmed by the Superior Court.

New Haven capital became interested in the plan for the rehabiliation of this road because it was a substantial feeder to the mercantile and industrial establishments in New Haven. It runs through the towns of East Haven, Guilford, Branford, Madison, Clinton, Westbrook and Saybrook, and the purchase includes all its property in those towns, its power stations, buildings, machinery and equipment. Considerable work of reconstruction will be required. The road was built by the late Morton F. Plant.

City Expert's Value $29,805,956

Differences Among Railway, Commission and City Experts Over St. Louis Valuation Not Violent Until Realm of Intangibles Is Entered—Company's Claim $70,000,000

FOLLOWING the submission of the city's appraisement of the valuation of the United Railways, St. Louis, at $29,805,956, as opposed to the receiver's claim of $70,000,000 value, the argument of the case before the Missouri Public Service Commission has been set for March 8. In the meantime the company's counsel will file a brief.

The present tentative valuation upon which car riders are paying a 7-cent fare is $50,000,000.

The city's figures are named in a brief just sent to the Public Service Commission by Judge Henry S. Caulfield, who has continued to act in this case as special counsel since his retirement from the office of City Counselor. The commission now has before it the following valuations to guide it in reaching a decision which is expected in a few months:

By the company: Historical cash investvent, $77,632,428; historical cost, $86,440,697; reproduction value at a five-year average price of materials, $87,440,697; reproduction cost as of June 30, 1921, $100,722,813; reproduction cost as of Jan 1, 1920, $103,100,511. The company declares that in view of all these values it should be allowed $70,000,000 valuation.

By the Commission's Engineers: Reproduction cost on average material prices existing between 1906 and 1918, $47,970,841; reproduction cost, less depreciation, $34,285,531. These figures do not include any allowance for intangibles such as promotion and going value which, if the commission chooses, it may add.

By the city: $29,805,956.

The three interests agree upon the items of physical property represented in the railway system. They begin their calculations from the same inventory. As is usual in all public utility valuations, they reach widely diverging conclusions by invoking radically different theories of extensions of that inventory and by the inclusion or exclusion of various items of overhead.

For instance, the city keeps in virtual agreement with the commission's engineers until it reaches these overheads. The company continues in agreement only until the valuation of land is taken up. It then asserts a valuation more than $1,000,0000 higher for this item than the commission's engineers and the city assert.

Even, then, the difference is not violent until the realm of valuation theories is entered. At that point, by asserting that it should benefit by the rise in prices, the company estimates such items as $5,000,000 for promotion costs, and like sums for "going value" and "cost of consolidation."

Meanwhile the commission's engineers have maintained that wartime and post-war peak prices are not admissible and the average over a long term of years is proper. In this the city supports them.

However, the commission's engineers and the company adopt the same percentages for overhead costs during construction and arrive at different sums for these charges only because the company applies them to slightly higher inventory extensions. Mr. Caulfield in behalf of the city takes emphatic exceptions. The items and the sums claimed for them by the three parties at interest follow:

Law expenses and miscellaneous: Company, $2,072,177; commission's engineers, $1,901,954; city, $1,048,548.

Engineering and superintendence: Company, $1,703,921; commission's engineers, $1,609,404; city, $973,790.

Interest during construction: Company, $2,194,223; commission, $1,956,680; city, $174,758.

Taxes: Company, $342,856; commission's engineers, $282,290; city included with interest during construction.

Omission and contingencies: Company, $1,389,497; commission's engineers, $1,350,874; city, none.

The totals of the items are: Company, $8,002,967; commission's engineers, $7,387,693; city, $2,721,370.

In discussing his opinion of these overhead costs during the remote period of original construction, Mr. Caulfield says:

The allowances made by the commission's engineers must be rejected. They are purely imaginative and speculative. They are made merely upon the assumption that

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they must have been incurred and the sums are arbitrary engineers' percentages. There is no proof by the utility that they were incurred. They are not based upon actual expenditures, but merely upon what such expenditures might have been. They are allowed on improvements and betterments made piecemal, as well as on original construction. They are allowed on the theory that if the property were now reproduced as a whole they would be necessary. There is no evidence of actual expenditure. Undoubtedly the proper course for the commission would be to refuse to include any overheads during construction.

He adds that if the commission feels that some allowance should be made, the percentages set up by the commission's engineers and adopted by the company should be cut from a total of 19.44 per cent to 7.5 per cent.

Mr. Caufield Against Allowances for Omissions

Mr. Caulfield makes clearer his opposition in discussing of some of the individual construction overhead items. He declines flatly to entertain any allowance for omissions and contingencies. The theory of the company and the commission's engineers is that in so large an inventory, there must necessarily have been some omissions. Mr. Caulfield points out that the engineers of the commission were aided by a large valuation staff of experts employed by the company, and that in co-operation they made very minute examination of the property and search in the books for all items. He declares that their zeal makes it probable that it is absurd to assert as the company and commission's engineers do, that 5 per cent, or 25 miles of track might have been overlooked, and that 3 per cent, or 42, of the company's cars were not listed.

On other of the items, he asserts that if these overheads had been incurred they would be found on the company's books. Either they were not incurred, he cites, or when incurred were in such small amounts that they were charged directly to operating expenses, which were paid for by the fares of the car riders and not by capital investment. There is considerable difference between overhead construction costs for a brand-new property and for property that grows up by the piece in the course of ordinary maintenance and created during the ordinary routine work of the company. In such work there is no cost directly traceable to engineering and superintendence other than that directly included in the cost, nor for organization, nor law expenses, nor interest, nor taxes, nor insurance, nor for other overheads admissible to a valuation except injuries and damages.

Mr. Caulfield objects to the sum allowed for working capital, that of the commission's engineers and the company being identical, $2,585,015. Of this sum, approximately $1,000,000 is cash. Mr. Caulfield points out that the business of a railway is cash and that it requires no cash that is not provided as fast as its needs accumulate by the fares of the car riders. He deducts the cash item.

He scouts the claim of the company for $5,000,000 for each of the items "promotion cost," "going value" and "cost of financing." On the cost of financing, he declares that there is no evidence in the case that any sum whatsoever was paid to bankers and brokers and cites court decisions to show that inclusion would be improper if the expenditures had been made. On promotion, he declares that there might be need for promotion if a system such as the United Railways were to be created at one time, but "were promoters required when the Sarah Street line, the Union Avenue line or the recent City Limits line were built." He pointed out that the company expanded and grew in the course of its routine existence.

"Going Value" is dismissed with a statement that the United States Supreme Court has held that it has no place in valuation for rate-making. Similarly, the item $11,536,385, asserted by the company to have been the cost of consolidating the various systems into one, is stamped as an effort to value something that is admittedly water. The sum is the difference between the market value of securities given to the bankers who effected the consideration and the sum realized by the company from its total issue.

Mr. Caulfield summarizes his valuation as follows:

All physical property and franchises except working capital	$38,308,101
Construction overheads	2,621,371
Working capital	1,915,405
Total as of Dec. 31, 1918	$42,844,877
Additions to property and plant, Jan. 1, 1919, to Dec. 31, 1920	604,039
	$43,448,916
Deduct depreciation	13,034,674
Final value as of Dec. 31, 1920	$30,414,241
Deduct non-carrier property	608,284
Final value of carrier property	$29,805,956

In addition Mr. Caulfield fixes the value of the Missouri Electric Company, the name under which the county lines are operated, at $447,738.

Aside from its importance as the sum which in the future riders of St. Louis must furnish a "fair return" above all operating costs, the valuation about to be fixed likely will be employed in terminating the receivership and reorganizing the company.

The net earnings for 1922 of the United Railways were $3,222,325, or approximately 6½ per cent on the tentative valuation of $50,000,000. The railways carried 286,076,475 passengers and had a gross income of $19,963,555.

$1,829,277 Net for Philadelphia Transit

Mitten Men and Management Earned and Paid Dividends of $1,800,000 and Also Earned and Paid $1,650,000 Co-operative Wage Dividend—Road Ahead a Hard One

THE report of the Philadelphia (Pa.) Rapid Transit Company for the year ended Dec. 31, 1922, presented to the stockholders on Feb. 19, shows a net income of $1,829,277 compared with $1,807,292 for 1921. The comparative statement for the two years follows:

INCOME ACCOUNT OF THE PHILADELPHIA RAPID TRANSIT COMPANY

	1922	1921
Gross passenger earnings	$41,758,763	$41,514,830
Other operating revenue	770,780	905,775
Ry. operating revenue	42,529,543	42,420,605
Way and structures, equipment and power—maintenance, renewals and depreciation	8,560,400	8,560,400
Power operation	3,475,307	3,252,188
Conducting transportation	13,383,430	13,330,470
General	3,548,378	3,291,709
Taxes, including paving tax	2,586,002	2,798,822
	31,553,517	31,233,589
Operating income	10,976,026	11,187,016
Non-operating income	706,429	490,435
	11,682,455	11,677,451
Interest	1,020,090	1,029,245
Rentals	8,683,087	8,720,913
Sinking fund—city contract	150,000	120,000
	9,853,177	9,870,158
Net income	$1,829,278	$1,807,293

In his remarks to the stockholders President Mitten referred to the organization changes noted elsewhere in this issue as a result of which he will be succeeded as president by W. C. Dunbar but will continue as chairman of the board. He also said:

P. R. T. stockholders, at the 1922 annual meeting, assented to the Mitten proposal that a co-operative wage dividend should be paid to the employees of the company after the P. R. T. dividend had been earned.

Mitten men and management, by super-co-operation, together earned and paid four quarterly dividends of 1½ per cent each totaling 6 per cent, or $1,800,000, on P. R. T. stock for the year 1922, and also earned and paid the 10 per cent co-operative wage dividend of $1,650,000 to the employees.

The co-operative wage dividend fund has been invested by the men in 55,000 shares of P. R. T. stock, par value $50 per share, bought by the trustees of the co-operative wage dividend fund in the open market, and which, at the price paid, $30 per share, represents an investment paying 10 per cent per annum so long as P R. T. pays its dividend of 6 per cent per annum.

P. R. T. employees, at the midwinter meeting, gave such assurance of continued super-co-operation, as to justify the continuance of the same 10 per cent co-operative wage dividend during 1923, which continuance will be presented for acceptance at the annual meeting of P. R. T. stockholders.

Super-co-operation during 1922 was surprisingly effective in reducing labor costs. The comparative result hereunder is enlightening:

Boston is operated by public trustees, with union working conditions enforced. Its labor cost is 3.61 cents per passenger carried.

Philadelphia is operated by men and management, co-operating for economic accomplishment. Its labor cost is 2.23 cents per passenger carried, which cost includes the co-operative wage dividend.

Philadelphia carried 848,883,512 passengers during 1922. Its labor cost of 2.23 cents per passenger, compared with Boston's labor cost of 3.61 cents shows P. R. T. savings from greater efficiency to be $11,714,592.

W. C. Dunbar, vice-president in charge of finance, in reporting to President Mitten said in part:

Income account for 1922 shows net income of $1,829,277 available for the $1,800,000 dividend of 6 per cent on $30,000,000 P. R. T. capital stock. Car schedules now in effect provide 10 per cent better service than one year ago, representing an added cost of approximately $1,000,000 per annum; this in accordance with the policy to use earnings of present fare over dividend requirements to increase service.

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STATEMENT OF AVERAGE FARE AND PASSENGERS CARRIED BY PHILADELPHIA RAPID TRANSIT COMPANY

Calendar Year	Average Fare Per Passenger	Total Revenue And Transfer Passengers	3-Cent Exchange Passengers	Per Cent Total	Free Transfer Passengers	Per Cent Total
1910	4.15c	443,204,502	21,285,569	4.80	67,281,688	15.18
1911	4.09	517,697,478	24,795,479	4.79	84,363,551	16.30
1912	4.06	549,674,683	25,684,710	4.67	93,072,322	16.93
1913	4.03	580,011,057	26,784,380	4.62	101,319,056	17.47
1914	3.97	581,297,949	27,119,544	4.67	107,908,712	18.56
1915	3.94	594,220,409	27,221,024	4.58	114,620,321	19.29
1916	3.93	669,008,258	31,939,375	4.77	127,990,030	19.13
1917	3.94	726,936,340	36,710,434	5.05	136,595,637	18.79
1918	4.01	763,008,395	43,791,710	5.74	130,472,269	17.10
1919	4.00	866,944,336	51,675,791	5.96	149,427,164	17.24
1920	4.18	908,482,135	55,233,232	6.08	154,079,623	16.96
1921	4.95	836,547,351	51,761,227	6.19	151,171,356	18.07
1922	4.91	848,883,512	55,206,600	6.50	157,705,870	18.58

P. R. T. has paid 6 per cent in four quarterly dividends for the year 1922, and has included in the wages paid to P. R. T. employees a 10 per cent co-operative wage dividend amounting to $1,650,000. This payment is well earned and properly paid, as the added production of P. R. T. employees saves Philadelphia car riders many million dollars annually.

Balance sheet of Dec. 31, 1922, shows that in addition to cash working capital of $1,410,118, there is $3,069 500 of cash in the reserve fund for renewals. This reserve fund will be drawn on during 1923 in excess of $2,500,000, to meet cash down payments on the 576 new cars, the cost of substation equipment, and other projected improvements.

P. R. T. basis of appropriation from earnings for maintenance, renewals and depreciation, as now in effect, is planned to overcome insufficient upkeep during the war, so that within the five year period 1921-1925, deferred maintenance shall have been picked up, thereafter making possible a fuller use of P. R. T. earnings to meet the anticipated deficit resulting from the operation of city-built lines.

P. R. T. must now overcome a greater loss from the operation of Frankford "L" than the city-company estimate of $1,000,000 per annum; this because of more duplicate service by surface car routes being required than was originally thought necessary by city-company engineers. Overcoming this loss of more than $1,000,000 and the payment of $150.000 rental to the city is made possible only by the 7-cent—four-for-25-cent fare and the assured super-co-operation of the men in still further reducing the cost of operation.

It is now privately admitted, by those connected with the valuation proceedings, that the value of P. R. T. property is more than ample to justify continuing the present rate of fare.

Mr. Dunbar says that the recent agitation for a return to the 5-cent fare is unimpressive, since the general desire of the car rider, as expressed to P. R. T. men on the cars, is for more subways, and better service, things impossible with a lower rate of fare. Furthermore as the operation of the Broad Street subway, which the city wants P. R. T. to undertake, will be unprofitable, and must depend, at the outset, on P. R. T. earnings, the inconsistency of agitating for a 5-cent fare, while the city is urging P. R. T. to assume this loss, is quite obvious.

Equipment Trusts Arranged

P. R. T., through its bankers, Messrs. Dillon, Read & Company, accomplished the sale of $7,750,000 equipment trusts as follows: Equipment trust series "F" certificates 6 per cent 1923-1932, $3,000,000; Equipment trust series "G" certificates 5½ per cent 1924-1933, $4,750,000.

It is explained by Mr. Dunbar that Series "F" completes repayment of Government advances during the war, and covers 210 wartime U. S. Government cars and 500 nearside cars formerly under Series "C," which has been retired. Series "G" covers 520 new passenger and fifty-six utility or work cars, representing a total of $6,500,000, financed by $1,750,000 cash down payment from the renewal fund and by sale of $4,750,000 equipment trusts. The sale basis of 5.20 per cent to 5.50 per cent was made possible through the improved credit of P. R. T. and its now established banking connection.

Only 1313 suits were pending against the company at the end of 1922, as compared with the 4,953 unsettled suits inherited in 1911 from former management. Only 2.71 per cent of operating revenue was required in 1922 for accident account, as against 6.21 per cent required in 1910.

P. R. T. improvements and additions for 1923, now in contemplation or actually under way, represent the expenditure of more than $12,000,000,

Changes Announced in the Public Service Company Organization

At the annual meeting of the directors of the Public Service Company, formerly the Hagerstown & Frederick Railway, M. F. Riley was elected president to succeed Emory L. Coblentz, who held the position for twenty-five years and resigned to accept the position of chairman of the board of directors and executive committee of the organization. Mr. Riley was formerly with the American Water Works & Electric Company, part owners of the Public Service Company with principal operating office at Frederick, Md.

The changes in the personnel of the company are in line with the program announced several months ago, at which time the American Water Works & Electric Company became interested in this utility. The financial interest of the local community in the utility remains approximately the same as in the past, while the American Water Works & Electric Company is supplying a large amount of capital for the new developments, it being felt that the local interests, together with that of the American company, will assure success to the future of this company.

At a meeting of the stockholders Mr. Coblentz submitted a detailed report of the year's operations. It showed that last year the company made its best showing. The directors elected were as follows: Emery L. Coblentz, Henry Holzapfel, Jr., Cyrus F. Flook, C. M. Harris, Thomas H. Haller, M. F. Riley, William P. Lane, M. P. Moller, Walter D. Willson, Alexander Armstrong, Victor M. Cushwa, D. Ramacciotti, H. S. Bomberger, W. S. Finley, Jr., W. R. Voorhis, J. C. Byron, H. E. Bester, E. Charles Wertheimer, Charles C. Biser, Thomas B. Hayward, G. Mantz Besant, Thomas B. Johnson, C. E. Schildknecht, Guy K. Motter, Charles M. Shank, Grayson H. Staley, George K. Birely, Robert E. Delaplaine, R. J. Funkhouser.

Following this the board organized by electing the following officers for the ensuing year: Emory L. Coblentz, chairman of the board and executive committee; M. F. Riley, president; Henry Holzapfel, Jr., and Cyrus Flook vice-presidents.

Conspectus of Indexes for Feb., 1923

Compiled for Publication in this Paper by

Albert S. Richey
Electric Railway Engineer
Worcester, Mass.

	Latest	Month Ago	Year Ago	Peak	1913
Street Railway Fares*	Feb. 1923 **6.94**	Jan. 1923 **6.94**	Feb. 1922 **7.16**	May 1921 **7.24**	**4.84**
Street Railway Materials*	Jan. 1923 **175**	Dec. 1922 **174**	Jan. 1922 **157**	Sept. 1920 **247**	**100**
Street Railway Wages*	Feb. 1923 **207**	Jan. 1923 **207**	Feb. 1922 **178**	Sept. 1920 **232**	**100**
Steel Unfilled orders (Million tons)	Jan. 31 1923 **6.91**	Dec. 31 1922 **6.75**	Jan. 31 1922 **4.24**	Apr. 30 1917 **12.18**	**5.91**
U.S. Bank Clearings Outside N. Y. City (Billions)	Jan. 1923 **16.56**	Dec. 1922 **14.94**	Jan. 1922 **12.13**	March 1920 **18.54**	Av. Mo. 1913 **6.12**
Business Failures Number	Jan. 1923 **2,165**	Dec. 1922 **1,851**	Jan. 1922 **2,722**	Jan. 1922 **2,722**	**1,213**
Liabilities (millions)	**53.43**	**45.84**	**105.7**	**105.7**	**24.64**

	Latest	Month Ago	Year Ago	Peak	1913
Eng. News-Record Construction costs	Feb. 1923 **197.4**	Jan. 1923 **191.7**	Feb. 1922 **168.7**	June 1920 **273.8**	**100**
U.S. Bur. Lab. Stat. Wholesale Commodities	Jan. 1923 **156**	Dec. 1922 **156**	Jan. 1922 **138**	May 1920 **247**	**100**
Bradstreet's Wholesale Commodities	Feb. 1 1923 **13.72**	Jan. 1 1923 **13.70**	Feb. 1 1922 **11.42**	Feb. 1 1920 **20.87**	**9.21**
Dun's Wholesale Commodities	Feb. 1 1923 **186.2**	Jan. 1 1923 **185.6**	Feb. 1 1922 **165.0**	May 1 1920 **263.3**	**128.9**
U.S. Bur. Lab. Stat. Retail food	Jan. 1923 **144**	Dec. 1922 **147**	Jan. 1922 **142**	June 1920 **219**	**100**
Nat. Ind. Conf. Bd. Cost of living	Jan. 1923 **158.1**	Dec. 1922 **158.9**	Jan. 1922 **161.4**	July 1920 **204.5**	(1914) **100**

*The three index numbers marked with an asterisk are computed by Mr. Richey, as follows: Fares index is average street railway fare in all United States cities with a population of 50,000 or over except New York City, and weighted according to population.

Street Railway Materials index is relative average price of materials (including fuel) used in street railway operation and maintenance, weighted according to average use of such materials. Wages index is relative average maximum hourly wage of motormen and conductors on 105 street and interurban railways in the United States, operating more than 100 passenger cars each, and weighted according to number of cars.

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Protective Committee Formed

Stockholders of the Denver (Col.) Tramway (operating company) and of the Denver & Northwestern Railway (holding company) have formed a protective committee to look after their interests in any reorganization of this utility which has been in the hands of a receiver since Dec. 24, 1920. A number of large holders have already selected representatives, of whom S. M. Perry, president of the Denver & Northwestern Railway and vice-president of the Denver Tramway, is chairman, and the other members are W. N. W. Blayney, Hume Lewis, C. R. Martin and Henry W. Bull. This committee began proceedings in behalf of the stockholders last December and on Feb. 16 issued a formal call to all others similarly situated to deposit their stock with designated trustees.

For a long time there have been two protective committees of the bondholders, who have held meetings from time to time, but the stockholders heretofore have not been active in their own protection. R. M. Perry is secretary of the committee and L. Lewis counsel.

Depositaries are the International Trust Company of Denver, The Illinois Trust & Savings Bank of Chicago, and The Industrial Trust Company of Providence.

North American Declares Stock Dividend

The directors of the North American Company, New York, N. Y., on Feb. 19 announced that the par value of that company's common stock, now $50 a share, would be reduced to $10, subject to the approval of stockholders, and exchanged at the rate of five shares of the new stock for each share of the present $50 stock now held by them.

The directors also have submitted to stockholders a proposal to double the amount of the authorized preferred and common stocks to enable the company to keep its earnings free for distribution to stockholders as dividends, and to be in a position to acquire additional properties.

In addition, the directors declared a quarterly dividend of 2½ per cent on the common stock, payable April 2, to stock of record March 1, in the form of common stock, and also announced the regular quarterly preferred dividend payment of 1¾ per cent, also payable on April 2. In connection with the declaration of the 2½ per cent stock dividend on the common, the company announced that it would pay cash to those stockholders who did not desire a payment in stock on the basis of $2 for each $1 par of the stock distribution, or the equivalent of a payment on a 20 per cent annual basis against the present 10 per cent basis.

Auction Sales in New York.—At the public auction rooms in New York this week $4,000 Columbus, Newark & Zanesville Railway first mortgage 5 per cent bonds were offered, certificate of deposit, 2½ per cent; also $3,000 Columbus, Newark & Zanesville Railway first mortgage 5 per cent bonds, 3½ per cent.

Service Temporarily Suspended. — Service on the Ocean City (N. J.) Electric Railroad has been suspended while the cars are being repainted and overhauled for next summer's business.

Operations Ceased. — The Chicago, Aurora & DeKalb Electric Railroad, which for twenty years has been operating between Aurora, Ill., and DeKalb, Ill., ceased operations on Feb. 1. The line was sold for junk, bringing $90,000.

Abandonment Possible.—The Newark-Granville branch of the Newark & Zanesville Electric Railway, said to have been one of the first traction lines operated in the state of Ohio, will be abandoned if the State Public Utilities Commission heeds a petition of the concern. The line is 6 miles long, and was financed in 1888 by Governor Altgeld of Illinois, a pioneer traction magnate. The company's petition says that $8,000 was lost in operation last year. If the company's petition is granted service will be discontinued on March 10.

Ninth Annual Report Submitted.—The directors of the Ottawa (Canada) Traction Company have submitted their ninth annual report for the year ended Dec. 31, 1922. The amount received from the Ottawa Electric Railway during the year was $279,069. This sum paid the usual quarterly dividends of 1 per cent and a bonus of 1 per cent. The report states that the efforts of the Ottawa Electric Railway during 1922 were directed toward the maintenance of the plant and equipment in an efficient condition.

Elects Director.—The Cities Service Company, New York, N. Y., announces that John Gribbel of Philadelphia has been elected a member of the board of directors. Mr. Gribbel is owner of John J. Griffin & Company, manufacturers of gas meters, and is president of the Royal Electrotype Company of Philadelphia and the Athens (Ga.) Gas & Fuel Company. He is vice-president of the American Railways Company of Philadelphia and the American Meter Company of Delaware. Besides numerous other associations, he is a director of many insurance and public utility companies.

Official Name Announced.—The York Utilities Company is the official name of the new corporation that has taken over the management of the Atlantic Shore Line Railway in Maine, which serves the towns of Kennebunk, Kennebunkport, Cape Porpoise, Wells, Ogunquit, York, Biddeford, Sanford, Springvale. The new officers are: F. O. Conant, Portland, president; Constant Southworth, Portland, vice-president; George S. Hobbs, Portland, treasurer; Miss Persis B. Hawley, Kennebunk, assistant treasurer; Sterling T. Dow, Kennebunk, general manager and clerk of the corporation.

Gold Bonds Offered.—The National City Company of New York, N. Y., is offering at 92 and accrued interest, to yield more than 6.65 per cent, $1,000,000 of the first lien and refunding mortgage gold bonds of the Southern Indiana Gas & Electric Company. The bonds, known as series B, are dated Oct. 1, 1922, and are due Oct. 1, 1947. The purpose of this issue is to provide for refunding of underlying bonds and for partially reimbursing the company for property expenditures, heretofore unfunded, including a new 10,000-hp. steam turbine-generating unit, recently installed to supply the constantly increasing demand for electric energy.

$3,250,000 Winnipeg Issue Offered.—A new issue of $3,250,000 Winnipeg (Man.) Electric Railway twenty-year general mortgage and collateral trust 6 per cent gold bonds, dated March 1, 1923, and due March 1, 1943, is offered at 94 and interest to yield over 6½ per cent. According to the announcement $815,000 of the total issue is to be offered in Canada, and Kissel, Kinnicutt & Company, E. H. Rollins & Sons and Spencer Trask & Company are offering the remainder in New York. The bankers say the company's total debt, including this issue, will be $12,630,000 against a net property value of $23,187,915, after deducting depreciation of $4,153,508.

Demand Receiver Be Appointed. — Four former stockholders in the Universal Elevated Railways, Seattle, Wash., have filed suit in the Superior Court against R. G. Howe, former president and manager of the concern, demanding an accounting and the appointment of a receiver. The complaint recites that the company was incorporated in May, 1917, for $2,500,000 capitalization, to build a monorail elevated railway. In January 1921, the company was disincorporated and its assets were turned over to Mr. Howe. The plaintiffs assert that these assets have been mismanaged and that for a time Howe went to California, taking assets and books with him. He has returned, and the plaintiffs ask an order preventing him from making a similar trip and for appointment of a receiver and an accounting.

Luce Line Increase Authorized.—The Interstate Commerce Commission has authorized the Electric Short Line Railway, an Arizona corporation with an authorized capitalization of $100,000,000, equally divided into common and preferred stock, and owning an electric railroad in Minnesota, to issue not more than $367,000 of 5 per cent fifteen-year first mortgage bonds and to deliver $342,000 of them to W. L. Luce, J. E. Luce, E. D. Luce and Hazel B. Luce in payment for advances made by them to the company, and not more than $25,000 to be delivered to E. D. Luce for advances to be made to the company by him hereafter. The company bought the railroad from the Phoenix Company, controlled by the Luce family, in 1908, but made no cash payment for it. The railroad has been extended westward from Minneapolis about 30 miles. The Luce family has been furnishing money for the construction, which was delayed by the war. The bonds are to be dated Sept. 15, 1916.

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Traffic and Transportation

Boston "L" on Jitneys

Public Trustees Clearly Define Their Attitude on Subject of Competitive Service

The Boston (Mass.) Elevated Railway has adopted a settled policy toward the jitney proposition. It will resort to drastic measures, if necessary, to carry that policy into effect in the city of Malden. For a considerable period it has been a much disputed question whether the residents of one section of Malden should have both jitney service and electric car service over the same route. The city government granted a jitney license to Mr. Hart to operate cars through Salem Street, despite the warnings from the Boston Elevated that it could not submit to competition. The Elevated compromised the situation at first and withdrew its non-paying service from Lebanon Street and Broadway, which lie beyond the Salem Street route and serve as feeders to it, but continued to operate its cars through Salem Street and pick up such small amount of traffic as the jitneys left, the jitneys taking the cream of the business. The company continued this competitive service, though it did not pay, on the assurance that the jitney license would not be renewed by the city government this year.

Up to the Community to Decide

There had been a strenuous political campaign in the city, in which the jitney and the Boston Elevated became the main issue. There was a distinct set of jitney candidates for the City Council, pledged to the idea that the jitney service should be protected, and this set of candidates carried the election, with the result that when the new City Council met it promptly voted to renew the jitney licenses, and at the same time to give the Boston Elevated Railway a jitney license, so that it too could operate buses. Up to that time the Boston Elevated had not explicitly indicated its determination to discontinue its service entirely on the East side of Malden Square.

The board of trustees has, however, decided that it cannot accept any form of competition from the jitneys and that it will not attempt to dictate to a community what form of transportation it shall have, but that if the community chooses to select the jitney the company will withdraw from the field and not attempt to divide the traffic with the jitney.

In discussing this situation with the representative of the ELECTRIC RAILWAY JOURNAL at Boston Edward Dana, general manager of the Boston Elevated Railway, said that in view of all the circumstances the trustees have no other course open to them than to quit, because they are responsible under the public control act for the financial condition of the road and are not warranted in continuing any branch of the service that does not pay for itself. They are required to operate the system so that the receipts shall cover the cost of service, and the system as a whole shall not be burdened with deadweight branches that unduly impair the finances of the company. They have been operating on the east side of Malden at a loss, partly because Lebanon Street and Broadway do not serve many passengers, and more particularly because the jitneys have taken away paying business in Salem Street.

Formal Statement to Mayor

The position of the public trustees is stated in the following communication sent to Mayor Kimball of Malden to warn him of the consequences if he signs the jitney order which has been passed by the City Council:

> As stated in my last letter the trustees of the Boston Elevated Railway must decline to enter into any competition with jitney lines which will involve a loss of revenue that imposes an unjust burden upon other users of the railway. To take any other position would be to disregard the fundamental principle of the service at cost contemplated in the statute under which they act. It has been repeatedly explained that this does not mean that the trustees assume to interfere with the preference of a community as to the kind of transportation it desires.
>
> In this instance the recent action of the City Council of Malden in approving a competitive line of jitneys on Salem Street east of Malden Square, has exercised this right of choice.
>
> While regretting the necessity of withdrawing street railway accommodation, the trustees feel compelled to enforce the rule which they have established. Therefore, in view of the loss that would result from the proposed competition and subsequent burden upon the system as a whole, railway service will be discontinued on Salem Street east of Malden Square when this competition occurs.

This question of jitney competition with the Boston Elevated has been brought up before in many of the communities which the railway is serving, but those communities have taken a different view of it from the residents of Malden. In Boston, for instance, the city government granted a license for the operation of a jitney line at the Orient Heights, in direct competition with the Boston Elevated, but when the order came before Mayor James M. Curley he promptly vetoed it, with the assertion that it would be an uneconomic arrangement and that the street railway service was the more reliable. The Boston Elevated has, however, obtained a license to operate buses in Boston as feeders, and its plan is to install buses in various sections as the requirements of traffic call for it, and it plans to install buses on branch lines when the old tracks wear out and the traffic does not warrant the expenditures involved in putting down new tracks.

Cambridge, Medford, Somerville and Everett have had occasion to take action on the jitney proposition and in all instances have favored the Boston Elevated as against the jitneys. Some of them have asked the Boston Elevated to install bus service in certain sections and the company has taken their propositions under consideration.

It is to be understood, however, that the Boston Elevated enters no opposition to jitney service in any community where the jitneys do not operate over the same route as the street cars or do not enter into competition with them.

Plea Upheld

Supreme Court Agrees With Paducah Company That City Cannot Arbitrarily Fix Fare at Five Cents

The contention of the Paducah (Ky.) Railway that the city of Paducah could not arbitrarily declare by ordinance a 5-cent fare and that the franchise contained no such right was upheld by a decision of the United States Supreme Court Feb. 19, affirming the decision of the United States District Court for the Western district of Kentucky. The decree of the lower court, however, was modified so as to protect the city's rights in the event conditions change in the future.

The company was granted a franchise for twenty years in April, 1919. The franchise contained a clause that the fare should be 5 cents, and half fare for children between the ages of five and twelve, for a period of twelve months; that the company was to report its financial conditions and that if it could not make operating expenses plus a reasonable return (8 per cent) on its investment, this fact should be shown, and if it made more than operating expenses plus reasonable return there should be payment to the city.

The company reported in September, 1920, that its income for the year was $4,800 less than expenses and that to include reasonable return on its investment there would be a shortage of $72,350. It figured that a fare of 13½ cents would be necessary to make up this amount, but offered to declare a cash fare of 10 cents, tokens 7.5 cents and children's fare, 5 cents. The city passed an ordinance declaring the old fare legal, with provision for a heavy fine for violation by requiring a higher fare.

Appeal was made by the company for an injunction, and a temporary order was issued. On the trial of the case on its merits, the city did not make serious effort to prove that the financial facts were not as stated by the corporation, but contended that the franchise constituted a contract for the 5-cent fare. The lower court held, and the Supreme Court agrees, that the clause for 5-cent fare for a year, annual reports and payment of excess to the city plainly meant that fares were subject to adjustment. The modification in the decree was directed by the Supreme Court in order that if, in the future, operating costs are reduced, or income grows, a readjustment downward of the fares in Paducah might be made.

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Milwaukee Asks Injunction Against One-Man Cars

An application has been filed by the city of Milwaukee for an injunction to restrain the Milwaukee Northern Railway, operating a city line in Milwaukee, from placing one-man cars in operation on this line. The case is before the Dane County Circuit Court.

The city contends that the recent order of the Wisconsin Railroad Commission, authorizing the company to operate one-man cars in the city, should be vacated because it nullifies a city ordinance passed in 1914 requiring a two-man crew on every street car operated in the city.

One-man cars are already being operated in Milwaukee by the Milwaukee Electric Railway & Light Company. The Wisconsin Railroad Commission recently permitted the Milwaukee Northern and the Chicago, North Shore & Milwaukee Railroad to operate one-man cars on their city lines in Milwaukee. The case will therefore be in the nature of a test case which will probably determine whether one-man operation will be permitted in the city.

Fare Argument Scheduled

Appeals of the Georgia Railway & Power Company, Atlanta, Ga., and others challenging the constitutionality of the law under which the Railroad Commission of Georgia fixed fares at Decatur and College Park, were recently advanced by the Supreme Court for argument on April 16.

This case dates back to four years ago, when the cities of Decatur and College Park contested the right of the power company to increase fares from 5 to 7 cents, claiming that they held contracts with the power company guaranteeing them perpetual 5-cent fare service in return for franchise rights. The various steps in this fare issue have been referred to previously in these columns.

Weekly Pass Has Grown in Popularity in Terre Haute

When the weekly pass was introduced in Terre Haute, thirty-eight weeks ago, said the Terre Haute *Tribune* recently, it was an entirely new venture in passenger transportation, but it has met with such favor from all sides that it has established itself as a permanency in the local system of the Terre Haute Traction & Light Company. Patrons, officials and employees of the railway have voiced their approval of the weekly pass because of its economical advantages, elimination of labor and confusion in making change and transfer.

Since the pass was adopted by the Terre Haute company several other transportation systems throughout the country have adopted a similar method, but there are very few cities where the pass has been introduced against a 5-cent fare. The majority of cities which are using the pass have a regular fare which is several cents higher than the local rate and there are only a very few cities which maintain the 5-cent fare. The paper then quotes E. M. Walker, general manager of the company, as follows:

> We are very well satisfied with the pass, but probably not more so than the patrons of the traction system. The pass reaches the person who has to ride frequently, and it offers a much cheaper ride. The pass has met with such favor that I do not believe that it could be dispensed with, as it is becoming an essential part of the service. It has proved a very good thing.
>
> Operators of the cars like the pass, as it acquaints them with their regular passengers by getting them into close touch as merchants and customers. The pass eliminates delays in making change, transfers and in loading passengers. It also offers economical transportation for the man who is a daily user of the street cars. Steady workers and pupils have taken the greatest advantage of the pass, although the housewives have realized its value in shopping and making social calls. The pass follows the laws of economy very closely, for we find that only the people who make daily use of the cars purchase the passes.

Something New in Passes

The City Council of Seattle, Wash., has received an unusual proposition from I. T. Cross, a Civil War veteran more than eighty years old, who asks that the Municipal Railway carry him at his pleasure for one year, upon his payment of $40, "cash in advance." The city would not be bound to make a rebate in case he moves away, becomes ill or dies in the meantime, he makes plain in his letter. He states that he has no business that would require even $5 in carfare a year, but "being so lonesome from my poor hearing, and to pass away the time more comfortably and pleasantly, I would like to pay $40 in advance for a yearly pass, and would waive all damages for any accident that might come to me while riding." The Council has taken the matter under consideration.

Seeks Bus Franchise

The New York State Railways has petitioned for a franchise to operate a bus line in Greece Township from the present Dewey Avenue line terminus at Lewiston Avenue beyond the Rochester city line to Stone Road, a distance of approximately 2 miles.

The city had granted a franchise to the company to extend its Dewey Avenue line to the city limits and the company planned the installation of trackless trolleys. The poles, ordered some time ago, did not arrive, and it was decided to resort to bus operation.

Commissioner Barnes stated that the buses would be in service within sixty days after a franchise had been granted by the Town Board of Greece.

James F. Hamilton, president of the New York State Railways, said that his company was taking the step essentially for the development of a rapidly growing section of Rochester.

Forbids Operation Along Traction Line.—An ordinance introduced in the City Council of Marion, Ohio, forbids motor buses operating along the lines of the Columbus, Delaware & Marion Railway. They are also prohibited from crossing railroad tracks until the driver gets out to look for a train.

Seeks Reduced Fare Schedule.—The Ogdensburg (N. Y.) Street Railway has made application to the Public Service Commission for permission to adopt a reduced fare schedule for school children.

Asks for Buses for Emergency.—Mayor Clarence A. Whitmyre of Schenectady, N. Y., has asked for emergency buses to aid in handling passenger traffic on the lines of the Schenectady Railway.

Offers Bus Service.—The Tacoma Railway & Power Company, Tacoma, Wash., will operate buses from the City Hall to the flour mills on the waterfront, in lieu of re-establishing railway service on Pacific Avenue north of Seventh Street.

Add Buses to Northeast.—The City Council of Des Moines, Ia., has approved the petition of the Four Mile Improvement League which provides for bus service by the Des Moines City Railway in the Northeast section of the city. Manager Chambers of the railway company stated that nothing definite would be done until the fund status could be ascertained.

Request Fare Adjustment.—The Glendale & Montrose Railway, operating between Glendale, Montrose and La Crenscentia, also between Glendale and Eagle Rock, has applied to the California State Railroad Commission for an adjustment of its passenger rates, claiming that the return on the present rate of fare on its lines is insufficient to cover its cost of operation.

No Boost in Income.—The Waterloo, Cedar Falls & Northern Railway, Waterloo, Ia., recently lowered its fares from 10 cents to 7 cents in the hope that new business would result and so solve the operating cost problem. C. D. Cass, general manager of the property, in a recent letter to the Mayor and Councilmen, stated that the gross revenue from 7-cent fares had decreased more than 19 per cent compared with January a year ago and decreased 24 per cent compared with December, the last month of the 10-cent fare.

Starts Service on New Extension.—The Taraval Street extension of the San Francisco (Calif.) Municipal Railway was formerly opened for traffic on Jan. 14, with Mayor James Rolph, Jr., acting as conductor on the first car over the line. A branch line was built some two years ago from the west portal of Twin Peaks tunnel to Taraval Street and Thirty-third Avenue. The extension just put in service is seven-eighths of a mile long and is an extension of the line just mentioned along Taraval Street to Forty-ninth Avenue, which is close to the ocean beach. Headway on the new line will be about eight minutes, the cars operating in shuttle service from the tunnel portal to the beach. On Sundays and holidays through cars will be operated from the ferry via this branch to the ocean beach terminal.

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Personal Items

New Head for Transportation Department

The Chamber of Commerce of the United States has announced the appointment of A. B. Barber, Portland, Ore., as manager of the chamber's Department of Transportation and Communication. He succeeds J. Rowland Bibbins, who has resigned to take up private engineering practice.

For the past three years Mr. Barber served as technical adviser to the Republic of Poland, having been nominated for that work in 1919 by Secretary Hoover, on request of the Polish government to designate an American engineer to assist in the organization of the railways, coal industry and other technical services.

Mr. Barber is a graduate of West Point. Prior to his resignation from the army three years ago to become head of the American technical staff for Poland, he had wide experience with the United States Army engineers. Soon after the entry of the United States into the war he was sent to France with a railway commission to report on the needs of the French railways supplying the Allied troops. Later he was assigned to General Pershing's staff. From June to November, 1918, he was at the front with the First Corps and First and Second Armies. After the armistice, he was assigned to the American Relief Administration, handling the transportation of relief supplies to the various countries of Central Europe.

The department of which Mr. Barber is head handles the activities of the United States Chamber of Commerce in connection with shipping, ocean and inland; steam and electric railroads, motor transportation; aeronautics; and communication by cable, telegraph, post and radio.

E. F. Chaffee Elected Vice-President of Edwards Company

Edward F. Chaffee has been elected a vice-president of the O. M. Edwards Company, Inc., Syracuse, N. Y. Mr. Chaffee has been manager of the company's railroad department for the past twelve years. The new vice-president has been identified with railroad and allied industries since a boy. Eighteen years ago he went with the Edwards Company from the New York Central Railroad, where he had charge of the passenger car shops at West Albany. His first work for the Edwards Company was in the capacity of eastern sales representative, a position which he held for six years. He then was promoted to manager of the railroad department. Under his supervision the department which manufactures car window fixtures and metal extension platform trapdoors for steam and electric cars has enjoyed a substantial growth.

At the recent annual meeting of the Edwards Company, O. M. Edwards, president, voiced considerable optimism over the business prospects during the present year, not only for the company's railroad department, but for the steel metal furniture and padlock departments.

E. H. Thomas Director

Former Managing Editor to Direct Work of Washington Committee on Public Utility Information

E. H. Thomas, who has been placed in charge of the Washington Committee on Public Utility Information as director, with offices in the Henry Building, Seattle, Wash., is a newspaper man of very broad experience. He is known in Seattle and elsewhere in the Pacific Northwest as plain Ed Thomas. The committee of which he is the director is organized along the lines of similar committees in other states. It represents the electric railways, electric light and power companies and, to a great extent, the gas industry of the State.

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E. H. Thomas

Mr. Thomas' experience in newspaper work covered a period of twenty-seven years. He was formerly managing editor of the Seattle *Post-Intelligencer*. In addition to that he had eight years experience in public utility publicity work, being formerly publicity director for the Puget Sound Power & Light Company.

As Mr. Thomas sees it, the committee of which he is the director exists to furnish accurate information and facts about the public utility business to any citizen or group of citizens. The bureau will send out each week to the newspapers information about various phases of the public utility industry in the belief that the business, touching as it does so very intimately the domestic, social, commercial and industrial life of the people, is a matter of concern to the public.

Mr. Thomas has already reduced to concrete figures some of the outstanding facts in regard to the workings of the utility industry in Washington. The aggregate assessed valuation of the properties subscribing to the Washington committee is in excess of $45,000,000, but, unlike other kinds of business, the gross revenues of the companies are only a fraction of that figure, being $19,540,000 annually, or less than 40 per cent of $45,000,000. The utilities in Washington pay more than $1,600,000 annually in taxes, have 4,359 persons on their $6,129,000 annual payroll and serve a total of more than 146,000 light and power customers.

The long experience which Mr. Thomas had as an active newspaper man has taught him the things in which the public is interested, and his previous association with public utility work has furnished him with a fund of information as to the sources contained within the utilities themselves for obtaining material that has a popular appeal and at the same time is founded on facts.

Changes Made in Western Light Personnel

Paul W. Lee has succeeded W. J. Barker as second vice-president of the Western Light & Power Company, Boulder, Col. E. E. Sherman, formerly the auditor, has now assumed the position of assistant secretary along with the auditorship. D. W. Guiney has taken on the work of assistant treasurer as well as performing his duties as purchasing agent. C. L. Green's official title has been changed from superintendent of street railway to railway superintendent. C. W. Vandiver will now be known as railway engineer instead of chief engineer. The title of electrical engineer has been changed to that of superintendent of electrical equipment and John D. Elftman, formerly known as engineer of power station, has become superintendent of production.

Tom Owens Promoted

Tom Owens, who has been in charge of the schedule department of the Dallas (Tex.) Railway, under supervision of George I. Plummer, superintendent of transportation, has been promoted to be in charge of the employment and training department. Mr. Owens is a veteran employee of the Dallas Railway. He worked up from the ranks. He succeeds M. B. Parsons, who has been appointed superintendent of maintenance and operation of the Texas Interurban Railway, and will also have charge of the maintenance and operation of the Dallas-Denton Interurban.

Mr. Porter on Engineering Body

H. Hobart Porter, president of the American Waterworks & Electric Company and vice-president of the Brooklyn City Railroad, has been appointed a member of a committee recently created by the Engineering Foundation to

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co-operate in a nationwide study of arch dams. Silas H. Woodward, New York, is another member of the committee, which is made up largely of representatives of Western cities and the United States Reclamation Service. The Engineering Foundation, of which Charles F. Rand, mining engineer of New York, is chairman, will investigate the question of arch dams in all its phases of construction, design and relation to industrial and municipal problems, particularly water supply. A large investment is involved in these problems.

Mr. Mitten Resigns as President

Head of Philadelphia Rapid Transit Retires in Favor of W. C. Dunbar, but Continues as Chairman of the Board—New President Has Been Associated with Mitten Activities Since 1908

THOMAS E. Mitten resigned on Feb. 19 as president of the Philadelphia Rapid Transit Company. W. C. Dunbar, an official of the company since 1911 and recently financial vice-president, was elected to serve as Mr. Mitten's successor.

Mr. Mitten will not sever his connection with the company, but will retain the chairmanship of the board of directors and executive committee. In

T. E. Mitten

that capacity, he will assume personal charge of all negotiations between the company and the city looking to company operation of the city-built high-speed lines.

The retirement of Mr. Mitten has been contemplated for some time. On several occasions, in public speeches, he has announced that he intended to withdraw from active management, leaving that to the young officials whom he was training while he remained in the background and advised his successors on questions of policy.

At the tenth anniversary banquet of the Co-operative Committees in the Hotel Lorraine on March 2, 1921, Mr. Mitten said that he had developed an organization which was self-perpetuating, and that the working out of the plan which the Mitten interests had in mind went beyond one man's lifetime. Mr. Mitten then said that he expected to die in harness, but that he was sure the work would go on without him when his time came. It was then that he first explained publicly the plan of organization of Mitten Management, Inc., with Messrs. Tulley, Dunbar, Joyce and P. J. Mitten as vice-presidents, each an expert in his own particular line of work.

Mr. Mitten believes now that his personally trained assistants are able to take charge of the road and operate it efficiently, thus demonstrating that the policies of Mitten men and management will endure even after his tenure of life. He said so in the official announcement of his withdrawal as president of the company. His statement to the stockholders in that connection reads:

> Mitten men and management, appreciative of stockholders' support, now propose to prove the strength of P. R. T. organization, fully manned, thus showing P. R. T. capable of continued prosperity under co-operative management, independent of Mitten's remaining tenure of life.
>
> T. E. Mitten will continue as chairman of the board of directors, chairman of the executive committee, and will counsel the entire organization, directing his greatest personal effort to reach a city-company understanding, by which city-built subways may be made possible of operation.
>
> C. J. Joyce, legal adviser since 1918, will become vice-chairman of the Board and counselor, with Ellis Ames Ballard as general counsel.
>
> Vice-President W. C. Dunbar, directing P. R. T. finances since 1911, connected with Mitten activities since 1908, is responsible for the first-class banking connection and A-1 credit established during 1922. Mr. Dunbar will become the new P. R. T. president, which appointment is particularly fitting at this time, as P. R. T.'s principal problems now lie in the direction of such readjustment of its financial structure as will best fit it to undertake the operation of city-built lines.
>
> Vice-President R. T. Senter, formerly shop superintendent and engineer, with Mitten activities since 1901, will continue in charge of all engineering; with J. H. M. Andrews, P. R. T. engineer since 1903, as chief engineer in charge of construction and maintenance, all departments.
>
> Traffic Manager Leon Jewell, in charge of traffic since 1911 and in similar capacity with Mitten activities since 1905, will become vice-president, in charge of traffic, with G. P. Good, superintendent of transportation with P. R. T. since 1895, in direct charge of transportation matters, including the operation of the cars on the streets.
>
> W. K. Myers, actively engaged in valuation of P. R. T. since 1918 and later assistant to Mr. Dunbar, will succeed as vice-president in charge of finance and accounting, thus continuing his valued service.
>
> A. A. Mitten, "the chief's understudy in industrial relations," will continue as secretary of the Co-operative Welfare Association, thus assuring the continuance of all co-operative undertakings.
>
> Officers in subordinate capacity are in training as successors to all these positions. Their places will in turn be filled by advancement from the most efficient of the 10,000 employee-owners who continually and increasingly press upon the heels of their leaders.

Mr. Mitten's resignation as president and the appointment of Mr. Dunbar to succeed him have been formally ratified by the board of directors, composed almost entirely of the men who will now assume the active charge of the road under the leadership of Mr. Dunbar.

Mr. Dunbar has been associated with Mitten activities since 1908, when he became comptroller of the International Railway, Buffalo, N. Y., of which company T. E. Mitten was then chairman of the executive committee. Mr. Dunbar went to Philadelphia at the incoming of Mitten Management in 1911, in charge of P. R. T. accounting department, later becoming comptroller. In 1919 he was elected vice-president of the company in charge of finance and accounting.

When the stockholders returned Mr. Mitten following Mr. Stotesbury's withdrawal from the board, they expressed not only their confidence in Mr. Mitten as an operator, but evidenced their faith that he would rehabilitate the company's financing and banking just as he had rebuilt the operating organization. That job he turned over to Mr. Dunbar, who is directly responsible for the first-class banking connection and A-1 credit established by the company during 1922.

Mr. Dunbar was born in Michigan in

W. C. Dunbar

1881. He received his public schooling and high school education in Bloomfield, N. J. His first job was in the auditor's office of the New York Central Railroad. This he left in 1901 to become assistant auditor of a coal company. He received the degree of C. P. A. in New York State in 1904 and for the next three or four years was engaged with Marwick, Mitchell & Company, chartered accountants, the last year of which he was in charge of the Kansas City office, which position he left to become comptroller under Mr. Mitten at Buffalo.

J. S. Bleecker Heads Terminal Company

John S. Bleecker was elected president of the Columbus Interurban Terminal Company, at the annual election in Columbus, Ohio, on Feb. 14. The company owns the terminal building, which is used by three traction lines. Other officers elected are: A. F. Van Deinse, vice-president; F. A. Healy, secretary-treasurer, and J. M. Pogue, assistant secretary and treasurer.

Messrs. Bleecker, Healy and Pogue are executives of the Indiana, Columbus

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& Eastern Traction Company, with headquarters in Springfield. The terminal company is owned jointly by the I., C. & E., Columbus, Newark & Zanesville, and Columbus, Dayton & Mansfield traction companies.

These directors were elected at the annual meeting of the stockholders on the same day: John S. Bleecker, F. A. Healy, F. G. Clunis, A. F. Van Deinse, M. P. Maloney and W. Finley Downs.

John A. Miller, Jr., has joined the New York editorial staff of ELECTRIC RAILWAY JOURNAL. Mr. Miller comes to the paper after several years experience in various departments of the Public Service Railway of New Jersey. After he was graduated in civil engineering from the Sheffield Scientific School, Yale University, 1915, Mr. Miller began a "cadet engineer" course with the Public Service Railway. Following out the progression in this course, he was employed in the maintenance-of-way department, the Marion and Essex power plants, the distribution department, the mechanical department at the Plank Road and Roseville shops, in the time-table department and in the traffic department. He served for a time as assistant supervisor at the Montclair carhouse, was temporarily in charge of the trainmen's school of instruction at Hoboken, and also served as special instructor for safety cars in Paterson.

Mr. Miller is a native of New Jersey. He was born in Newark, on Sept. 20, 1895, and received his early education at the Newark Academy. He served with the First New Jersey Cavalry on the Mexican border in 1916, and during the World War with the 104th Engineers in France as second and first lieutenant. Mr. Miller comes to the ELECTRIC RAILWAY JOURNAL with a well-rounded knowledge of the various departments of street and interurban railway operation and the inter-relations of the various departments as well as experience in the policies and problems of an electric railway.

E. G. Stevenson, acting president of the Detroit (Mich.) United Railway, has been made president.

J. C. Price, formerly superintendent of overhead construction of the Lafayette (Ind.) Street Railway, has been succeeded by Curtis Lewis.

J. W. McConnell has resigned as director and vice-president of the Montreal (Que.) Tramways. Mr. McConnell has been associated with the company from its commencement.

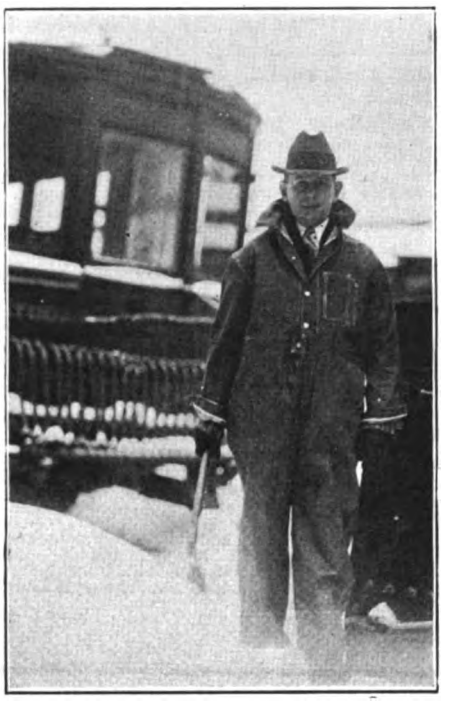
Charles E. Whelan, superintendent of the Lowell division of the Eastern Massachusetts Street Railway, Boston, Mass., has tendered his resignation to take effect on Feb. 1, after twenty-three years of railroad experience. Mr. Whelan began his career as a railway worker in 1900, when he was only twenty-one years old. He came to Lowell from the Boston office on July 6, 1921, to fill the position of superintendent. Mr. Whelan has not announced his plans for the future.

Mr. Uffert on the Job

Unprecedented Snows in New York State Throw Great Burden on Railway Equipment

John F. Uffert, superintendent of equipment of the New York State Railways, has been having more than his share of troubles recently. It is a big job at any time looking after all the equipment of the system of that company in Rochester, Syracuse, Utica, Schenectady and other cities, but this winter the work has been unusually trying.

There have been unprecedented snows up-State and the storms seem to have spent their greatest fury on Schenectady. In consequence more than forty cars, or about one-fourth of the



John F. Uffert on the Job

total, were put out of service there at one time. This was too much for the local force, and an S. O. S. was sent out to General Manager Hamilton at Rochester for help. He and Mr. Uffert hastened to Schenectady, there to remain until a semblance of order had been restored.

Hard work is nothing new to "Jack" Uffert. He just donned his overalls and went to it. A newspaper man nosing around for copy found John on the job, and much against the wishes of Mr. Uffert insisted upon telling the people of Schenectady that not a stone was being left unturned to restore service to normal and then "shot" Mr. Uffert in overalls to prove that the story he wrote was based on fact. Under Mr. Uffert's direction at Schenectady was an expert force of shopmen recruited by him from the other cities in which the New York State Railways operate.

"Jack" Uffert needs no introduction to electric railway men in New York State and east of the Appalachians. To the men in the Sunny South and on the balmy Pacific Coast, however, the story is of interest of this man who donned his overalls again and went to work out in the open with the mercury in the thermometer down around zero.

Mr. Uffert was born in Newark, N. J., in 1880. At thirteen years of age he went to work for the Consolidated Traction Company of New Jersey, the lines of which are now included in the system of the Public Service Railway. This was at the time of the installation of electricity as motive power. Mr. Uffert caught on quickly, as the saying goes. The man was rare in those days who knew much about the workings of railway motors under service conditions, but in four years Mr. Uffert learned a whole lot. The result was that at the age of seventeen he became shop foreman for the Union Railway, New York. Since then his work with one exception has all been with roads in the East, among them the United Traction Company, Albany, and the Hudson Valley Railway. On the occasion that Mr. Uffert did venture West he was with the Portland Railway, Light & Power Company on its city and interurban lines in Oregon for a short time.

Obituary

W. M. Weatherwax

William M. Weatherwax, formerly in charge of the transportation department of the Chicago City Railway and later superintendent of transportation of the Chicago Surface Lines, died at his home in the town of Schaghticoke, near Troy, N. Y., on Feb. 16. He was fifty-six years old. Mr. Weatherwax was one of the aides of Thomas E. Mitten, chairman of the board of the Philadelphia and Buffalo traction lines. He was in Buffalo during the strike of the platform employees on the lines of the International as official representative of Mr. Mitten.

Mr. Weatherwax began street railway work as a conductor on the Troy & Lansingburgh Street Railway, Troy, N. Y., in 1884. His first work in the West was with the Northern Transportation Company, where he advanced successively from watchman to lookout and finally to wheelsman. In 1866 he entered the service of the Chicago City Railway as a driver of tow horses. He was soon thereafter transferred to general carhouse service. He was next made a conductor, in which position he remained until April, 1890, when he was advanced to assistant foreman in charge of cars and trainmen at one of the carhouses. In April, 1893, he was made a carhouse foreman, and later was transferred to what is now known as the Englewood carhouse with the same title until the position was redesignated division superintendent. From this he was promoted to superintendent of transportation of the Chicago City Railway and then the Chicago Surface Lines.

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Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

European Situation Improving

General Tripp Tells Westinghouse Veterans at Tenth Annual Banquet that Business Outlook is Good

Prosperity in the United States depends largely on the re-establishment of the purchasing power of Europe. Gen. Guy E. Tripp, chairman of the board of directors of the Westinghouse Electric & Manufacturing Company, told guests at the tenth annual banquet of the Westinghouse Veterans' Association in Pittsburgh recently. General Tripp said, in part:

I am one of the apparently very few who think that the administration in Washington is better equipped to decide what part we ought to take than the vast majority of private citizens can be, and I have no doubt that the President and his Cabinet are fully alive to the bearing of the Ruhr occupation upon our immediate prosperity. If a man cannot be an optimist in the United States he must get off the planet to find a place to suit him, because there is no better place on this one.

The greatest single question involved in our industrial problem is how much do European conditions affect this country? If what happens in Europe doesn't matter to America, then I would take the risk of saying that we are going to have a period of great activity and prosperity. If, on the other hand, what happens in Europe does greatly affect America, then no man can safely predict the immediate future.

The American farmer cannot sell his product even at cost because of overproduction due to the decrease of purchasing power in Europe. When you think of the large percentage of products of the soil which was formerly sold abroad, amounting to as high as 50 and 60 per cent in the case of cotton, and when you consider that this market is almost closed, and then remember that the agricultural industry supports more than one-third of our population, you have the picture in the outlook.

If, then, we agree that American industry cannot long be prosperous with the business of one-third of the population prostrate, it follows that the continuance of a high degree of prosperity here depends largely upon the re-establishment of the purchasing power of Europe.

The demand is there, and, notwithstanding the loss of population during the war, their needs are greater than ever and buying would undoubtedly be resumed if international credit would be re-established. All this being true, we need to look at European conditions in order to form a complete idea about our own future.

Now what are the prospects for Europe? My own opinion is that the outlook is improving and that in time full equilibrium will certainly be restored. There are many concrete things which show this to be true. Italy under the guidance of Mussolini has rescued itself from a condition of disorder and waste. A new government has been born in Ireland which will reanimate the Irish people. England by heroic self-sacrifice has re-established her finances and the sterling exchange is on the high road to a gold parity. Soviet Russia is appealing to the world for capital and promising stable economic conditions for its protection. France has begun to reduce her paper currency and has actually retired nearly 10 per cent of it.

Germany, it is true, has by means of unlimited issues of paper money practically escaped payment of her internal obligations, but the French occupation of the Ruhr Valley will, I hope, prove an effectual bar to her escape from paying substantial reparations. France is not only within her legal and moral rights but is pursuing a course calculated to produce a "showdown."

I might go on further and recite many other favorable indications that Europe is progressing toward the light. But most of these processes must be slow and 1923 has but fifty-two weeks in it. It is the immediate future which is in doubt, and I think the one outstanding thing which will give immediate relief is that France shall be successful in forcing an early settlement of the reparations question in order that international credits may be established and confidence restored. In fact, it is probable that our prosperity for 1923, particularly the latter part of it, depends to a considerable extent upon this issue.

Meeting Called to Consider Car Leasing

Seattle car builders who are interested in supplying the Seattle (Wash.) Municipal Railway with 200 street cars have been invited by the utilities committee of the City Council to appear at a hearing to consider the leasing of the cars to the city for a period of five to ten years. The bill introduced in Council authorizes the Board of Public Works to call for bids for the leasing of from 100 to 200 new cars, to weigh about half as much as the cars now in use. The cars are not to be purchased, but leased to the city with the option of purchase for $1,000 each at the end of ten years, $2,000 in seven years, and $3,000 in five years. A state law prohibits direct purchases. The only question concerning the ability of Seattle builders to compete is the proper financing, committee members state.

Research Group Holds Meeting

The Electric Steel Founders' Research Group held one of its regular meetings in Detroit, on Feb. 5 and 6. The group is composed of the Electric Steel Company (of Chicago), Fort Pitt Steel Casting Company, Lebanon Steel Foundry, Michigan Steel Casting Company, and Sivyer Steel Casting Company. Officers and operating officials of each of these steel foundries discussed the reports which were presented at this meeting, on investigations being carried on at the different plants. The more important ones in progress now are said to be those on electric furnace practice, core practice and facing practice. The group decided to expand the scope of its work and to provide for greater activity on the part of its committee on new uses for steel castings. For this purpose W. J. Corbett was engaged as industrial engineer to be associated with R. A. Bull, research director, in the increased activities of the group in its comprehensive research work. Mr. Corbett's engineering training was supplemented by several years of experience in plants of the American Steel Foundries, also in the steel foundries of the Watertown Arsenal and the Erie Forge Company. Mr. Corbett's headquarters will be at the group's central office, 639 Diversey Parkway, Chicago.

Securities Company Organized

A new plan has been announced for the promotion of thrift among the employees of the General Electric Company. This is in addition to the present plan under which the employees may become holders of the stock of that company. To further the new plan the General Electric Employees' Securities Corporation has been organized.

The new corporation will issue 6 per cent bonds to employees, on the installment plan, paying an additional 2 per cent on them as long as the holder remains in the employ of the company. Seven of the fifteen members of the board of directors will be representatives of the employees, elected by the bondholders. Each $10 par value of such bonds of the new corporation will have one vote for these directors. Eight directors will be named by the company. The new corporation will issue $5,000,000 of 6 per cent fifty-year bonds and 10,000 shares of no-par-value capital stock. The proceeds from the sale of the stock and the bonds will be invested by the company in the securities of light and power companies and of holding companies in which the General Electric Company itself is financially interested. In other words, the idea of the investment trust will be followed, with the employees as participators in the profits through their holdings of the securities of the trust itself.

Long Island Places Order

Because of a large increase in traffic, the Long Island Railroad, which handles probably the heaviest suburban traffic in the world, has just purchased from the Westinghouse Electric & Manufacturing Company forty motor car equipments, twenty trail car equipments and four baggage mail car equipments. The baggage cars will be equipped with type 308 D-7 field control motors and electric-pneumatic control.

To take care of the increase in power demand when this new equipment is put into service it has been necessary to increase the substation capacity of the railroad, and an order has been placed, also with the same company, for one 4,000-kw. and one 3,000-kw., six-phase, 25-cycle, 650-volt converter with the necessary transformers. The entire order amounts to more than $500,000.

Metal, Coal and Material Prices

Metals—New York	Feb. 20 1923
Copper, electrolytic, cents per lb	16.00
Copper wire base, cents per lb	18.125
Lead, cents per lb	8.10
Zinc, cents per lb	7.60
Tin, Straits, cents per lb	42.625
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$6.70
Somerset mine run, Boston, net tons	4.125
Pittsburgh mine run, Pittsburgh, net tons	2.75
Franklin, Ill., screenings, Chicago, net tons	2.55
Central, Ill., screenings, Chicago, net tons	1.625
Kansas screenings, Kansas City, net tons	2.50
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft	7.30
Weatherproof wire base, N.Y., cents per lb.	17.50
Cement, Chicago net prices, without bags	$2.20
Linseed oil (5-bbl. lots), N.Y., cents per gal.	99.00
White lead, (100-lb. keg), N.Y., cents per lb.	13.125
Turpentine, (bbl. lots), N.Y., per gal	$1.50

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Rolling Stock

Citizens Traction Company, Oil City, Pa., has ordered six new cars for use in Franklin and Oil City. They will be of a type similar to the Birney one-man cars now in service.

Interstate Public Service Company, Indianapolis, Ind., will place contracts in a few days for the buffet and parlor cars to be operated from Indianapolis, Jeffersonville and Louisville and referred to previously in these columns. These cars, it is said, will mark a new standard of comfort on the interurban road.

Chicago, South Bend & Northern Indiana Railway, South Bend, Ind., will replace immediately the eight cars recently destroyed in the carhouse fire in South Bend by five motor cars and two trailers which have arrived from Cleveland, Ohio. From this city they were piloted under their own power over the various interurban lines which connect South Bend with the East.

New York & Long Island Traction Company, Long Island City, N. Y., suffered the loss by fire of a car shed in Hempstead, L. I., on Feb. 18. Three service cars and eleven enclosed passenger cars were destroyed. Five of the cars were leased from the Brooklyn Rapid Transit Company and one from the Bridge Operating Company. The company is now conferring with the Long Island Railroad on plans to provide adequate service along this route in future. Until these plans are completed, no decision will be made by the company as to replacing the equipment or rebuilding the carhouse.

Louisville (Ky.) Railway has orders placed for a large number of one-man cars, deliveries on which have started. So far it has received twelve new cars of this type, which have just been placed on the Chestnut Street line. Within a period of thirty days the company has lost a total of fifty-four cars, having lost thirty-five in the Fourth Avenue carhouse fire, seventeen in the fire on Feb. 16 and two demolished, one when struck by a freight engine at Fifteenth and Magnolia Streets on Jan. 19, and another on Feb. 12, when a heavy passenger train struck a car at Fourth and A Streets. These losses have been referred to previously in these columns.

Track and Roadway

Scuth Covington & Cincinnati Street Railway, Cincinnati, Ohio, is in the market for 100 tons of groove and 100 tons of T-rails.

Chicago, South Bend & Northern Indiana Railway, South Bend, Ind. will soon begin work on improving the south side right-of-way along Lincoln Way West in Mishawaka, Ind.

Los Angeles (Calif.) Railway will soon start work on the rebuilding of the Grand Avenue line from Pico to Jefferson with new ballast and ties. Reconstruction jobs on Main and Hoover Streets have just been completed.

Seattle, Wash.—The City Council finance committee has recommended the sale of bonds to finance repaving and relaying of street car tracks on Jackson Street, between First and Third Avenues. Total cost, which the street car lines will absorb, is $150,000, and City Engineer J. D. Blackwell has asked the Council's advice on how to obtain the money. All the remaining funds in the depreciation reserve fund, $56,000, have been appropriated by the committee at the request of Superintendent of Municipal Railways D. W. Henderson for relaying the track on Westlake Avenue North, from Mercer to Fulton Streets, at a total cost of $99,406.

Power Houses, Shops and Buildings

Georgia Railway & Power Company, Atlanta, Ga., is now building its new Moreland Avenue substation, which is to be finished by September. The cost is estimated at $150,000.

Charlottesville & Albemarle Railway, Charlottesville, Va., has installed and put in operation its new 1,500-kw. G. E. turbine. The company will now purchase and install one 750-hp. 225-lb. working pressure boiler with stoker.

Northern States Power Company, Fargo, N. D., as part of its $80,000,000 ten-year hydro and steam power construction and development will start work on a new terminal substation in Minneapolis. The station will serve the downtown and northwestern sections of the city.

Boston (Mass.) Elevated Railway has awarded a contract to the National Engineering Corporation of Boston for the construction of a three-story, 41 x 140 ft. concrete storage addition on George Street, Somerville, Mass., for its own use. The structure will cost about $80,000.

Trade Notes

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., recently received an order from Frank C. Roberts & Company, consulting engineers, for electrical apparatus for an iron and steel rolling mill in Spain.

Hall Brothers' Cedar Company, Coeur d'Alene, Idaho, has announced the removal of its general office from Jacksonville, Tex., to Coeur d'Alene, Idaho. The company will engage in the manufacture and wholesaling of western red cedar posts, poles and piling.

National Railway Appliance Company, New York, N. Y., announces its appointment as Eastern agent for the Lind aluminum field coils handled by the Economy Electric Devices Company, Chicago. All inquiries may be directed to the company's office, Grand Central Terminal, 452 Lexington Avenue, New York.

W. W. Reddie has been appointed assistant to the manager of the industrial department of the Westinghouse Electric & Manufacturing Company, according to an announcement made by W. S. Rugg, general sales manager of the company. He will be in charge of the railroard shop, metal working, machinery manufacturers, and material handling machinery sections of the department. Mr. Reddie has long been active in promoting the use of new motor and control applications in railroad and metal working shops and in development of electric arc-welding equipment.

Conveyors Corporation of America, Chicago, Ill., has announced the acquisition from the Green Engineering Company, East Chicago, Ind., of all rights to the Green steam jet ash conveyor. The transaction, which became effective Feb. 1, 1923, gives to the Conveyors Corporation of America all the patterns, patents and manufacturing rights pertaining to the Green conveyors. All orders for replacement parts and extensions to the Green conveyor will be filled by the Conveyors Corporation of America. The acquisition of the Green conveyor does not in any way affect the personnel or policies of the Conveyors Corporation.

Professional Notes

McClellan & Junkersfeld, Inc., New York, N. Y., announce that Renshaw Borie is associated with them in their work of engineering, construction and management and is in charge of their Philadelphia office.

Cloyd M. Chapman has become affiliated with Dwight P. Robinson & Company, Inc., as consulting materials engineer. Mr. Chapman, who has been active in the work of the American Society of Testing Materials and the American Concrete Institute, will in the future represent Dwight P. Robinson & Company in the committee work of these societies.

Stevens & Wood, Inc., 120 Broadway, N. Y., announce that the engineering and construction business formerly conducted by Wood Hulse Yates Company, Inc., has been taken over and the personnel increased by the acquisition of associates of wide experience. The members of the firm are R. P. Stevens, president of the Republic Railway & Light Company, and B. F. Wood, former chief engineer of the United Gas & Electric Engineering Corporation and actively engaged in the engineering business in the company of B. F. Wood, Engineers, Inc. The new firm announces that it will give personal attention to all engineering and construction work, including investigations, reports, appraisals, designs, railroad electrification, terminal and shop facilities and port and harbor works and will supervise financing, operation and management of utility and industrial properties. The identification of Mr. Stevens with such engineering practices will in no way interfere with his connections with the Republic Railway & Light Company.

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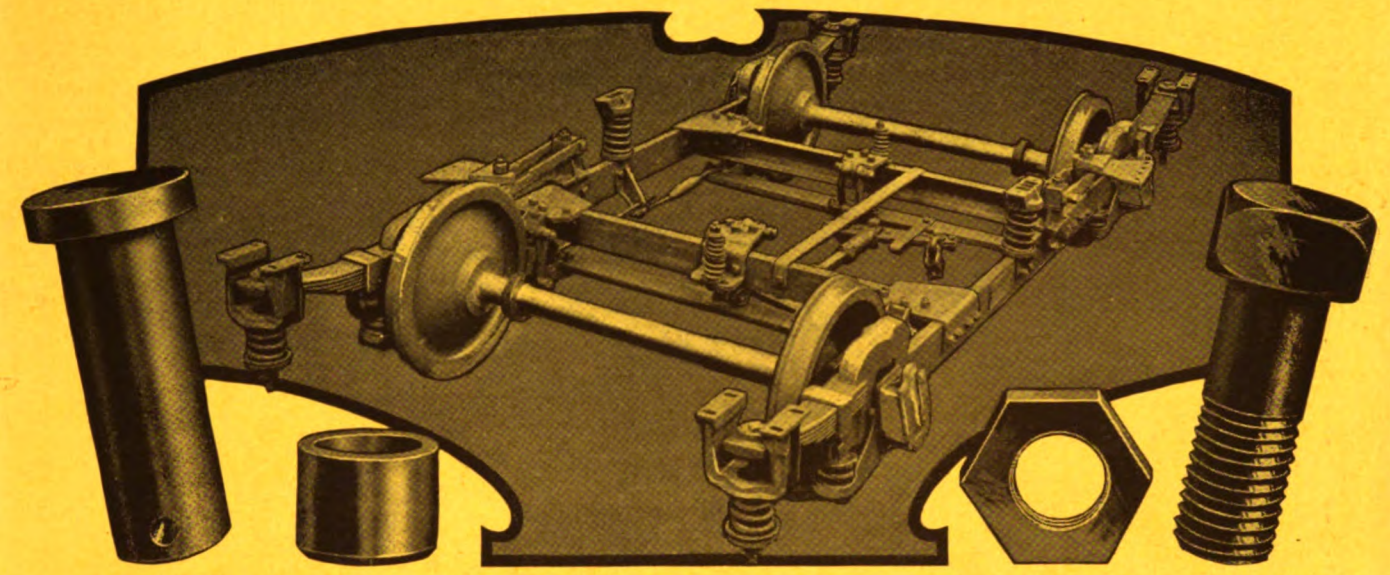
BRILL No. 79-E TRUCK
Standard For Birney Safety Cars



Solid-forged Sideframes—Annealed
Fold-over Gusset Plates—Annealed
Brake Pins and Bushings—Case Hardened
Brake Rigging—Safety Design

Nothing has been omitted in the development of this now well established member of the Brill truck family which would prove beneficial to its economical maintenance, efficient or safe operation.

Every precaution has been taken to guarantee the most satisfactory operation under the light-weight Birney Safety Car; its solid-forged side frames and fold-over gusset plates are annealed, all brake pins and bushings are case hardened for wear, and the brake rigging is so designed that in case any pin should fail it would still be possible to apply the brakes and bring the car to a stop. In addition to this the Brill springs are manufactured according to the standard A. S. T. M. Specifications.

These important characteristics of the Brill No. 79-E Truck have had an important influence upon the success which this truck has achieved as the standard for Birney Safety Car.

THE J. G. BRILL COMPANY
PHILADELPHIA, PA.
AMERICAN CAR CO. ST. LOUIS MO. — G. C. KUHLMAN CAR CO. CLEVELAND, OHIO. — WASON MANF'G CO. SPRINGFIELD, MASS.

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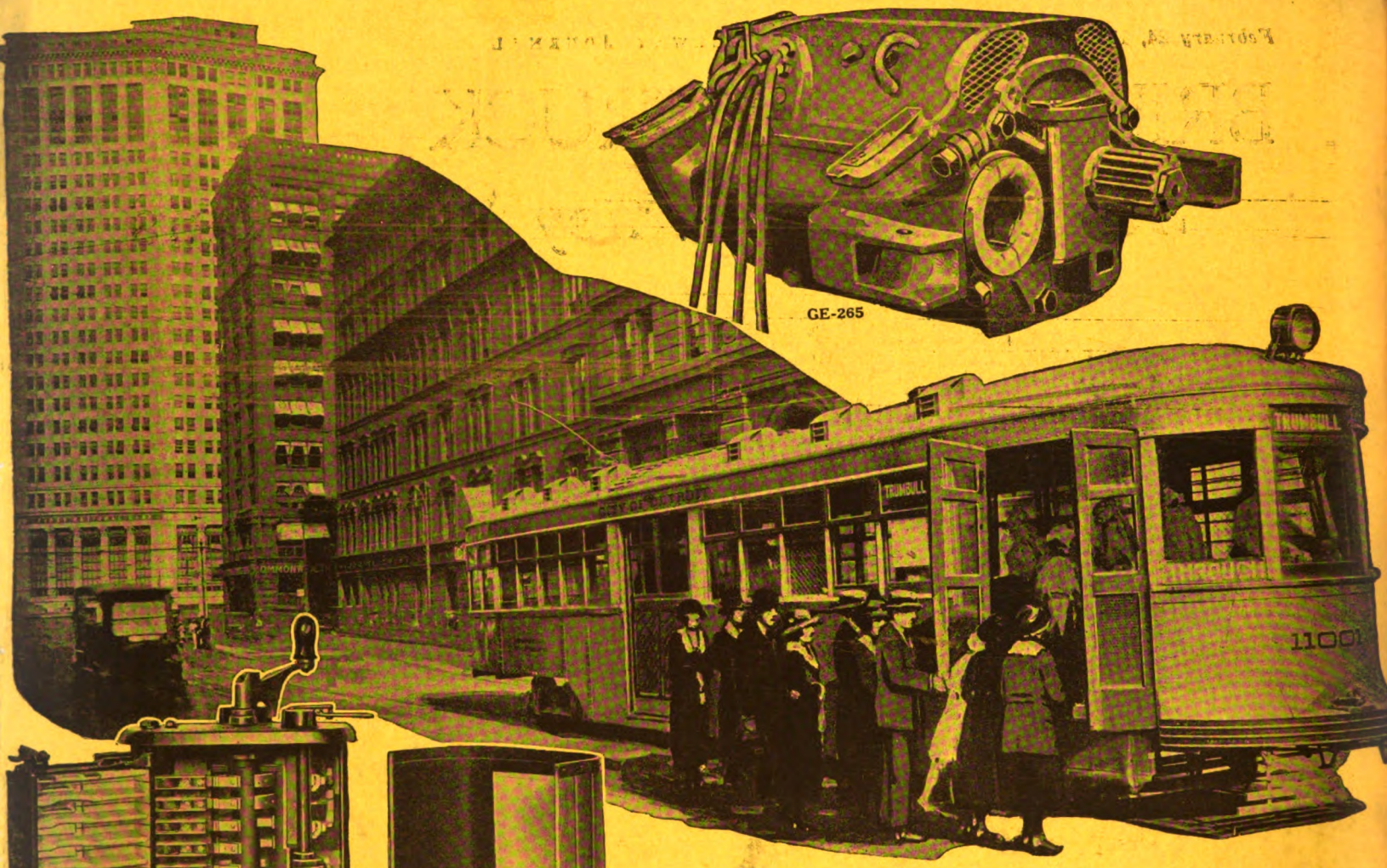
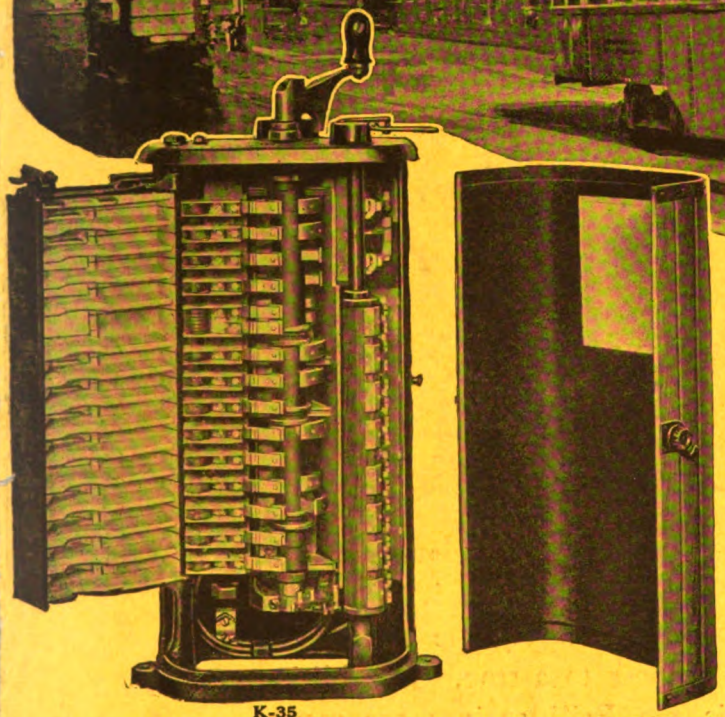
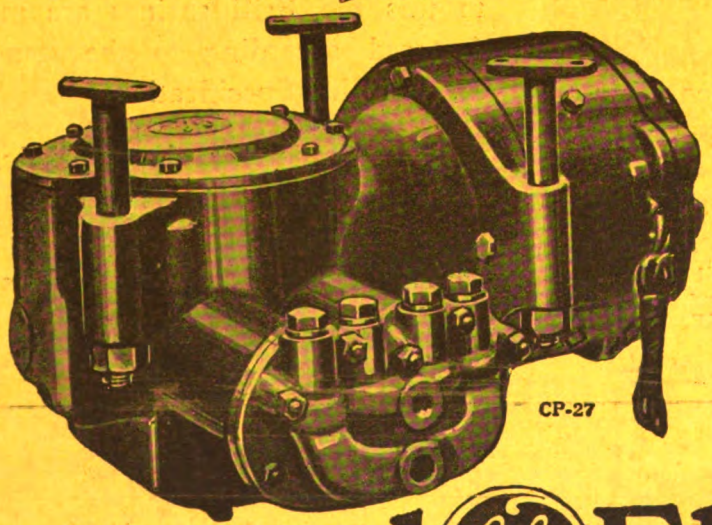


GE-265



K-35



CP-27

Detroit's Light-Weight Cars

The re-habilitation of the Detroit Street Railway is being undertaken with the most modern equipment. GE-265 Motors, K-35 Controllers and CP-27 Compressors are on 200 new, light-weight double-truck cars now in operation. The same motive equipment on 50 other cars has given this road successful service for more than a year.

MEMBER AERA

General Electric Company

General Office
Schenectady, N.Y.

Sales Offices in all large cities

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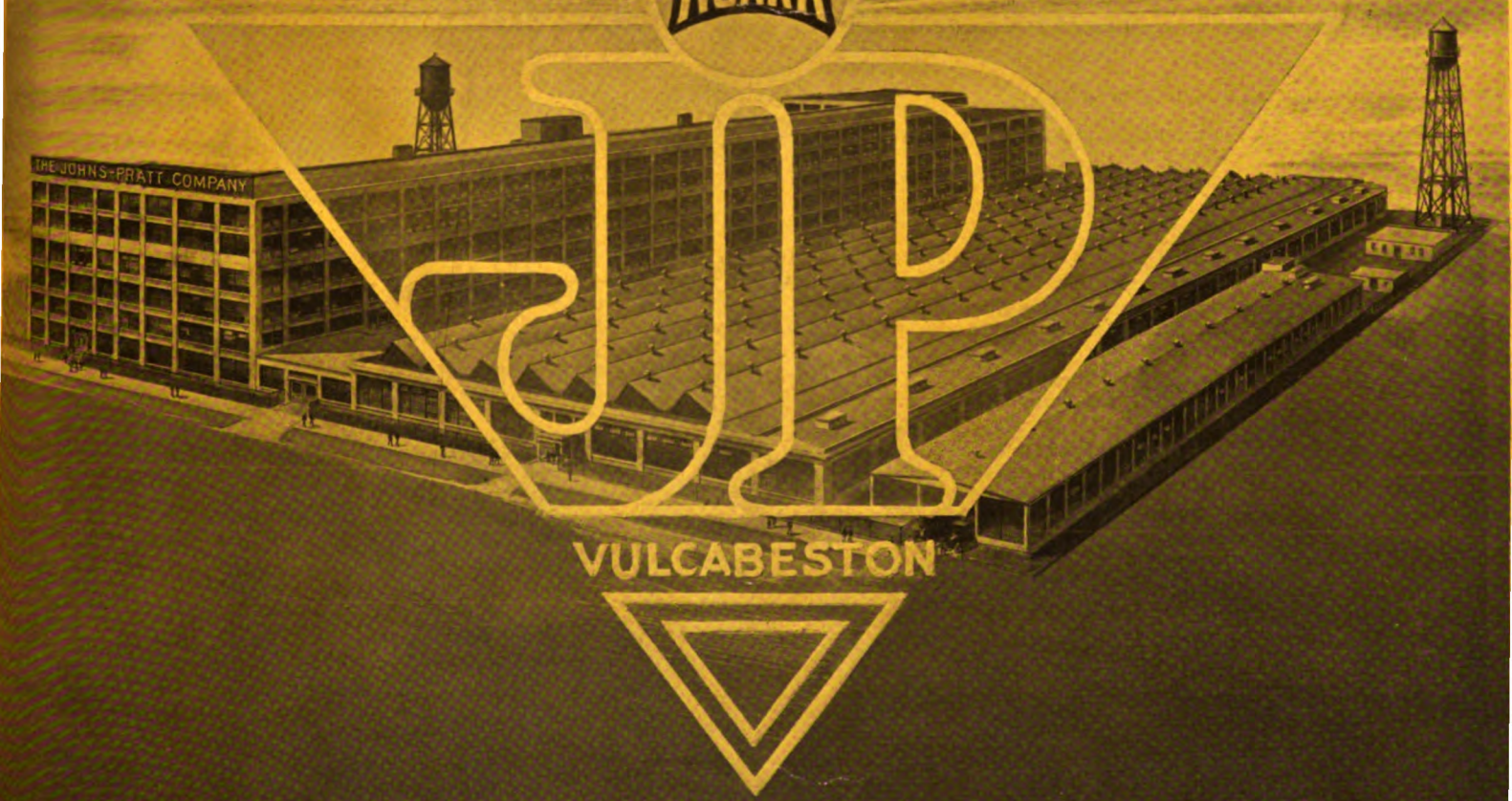
25-176

ELECTRIC RAILWAY JOURNAL

PROTECTION NOARK SERVICE



Here's Our New Home

Floor space of old plant 130,000 square feet. Floor space of new plant 375,000 square feet (and ample room for expansion). Nearly 200% increase. We take this occasion to express our thanks to all our friends and customers who by demanding Johns-Pratt products in ever-increasing volume have made the acqusition of this plant a necessity. With the added facilities it affords, we pledge the continued maintenance of Johns-Pratt standards of quality and our best endeavors for still better service.

THE JOHNS-PRATT COMPANY, Hartford, Connecticut

BOSTON (9) 161 Summer Street	NEW YORK 41 East 42nd Street	PHILADELPHIA Franklin Trust Building	PITTSBURGH Bessemer Building
CHICAGO 35 South Desplaines St.	CLEVELAND Engineers' Building	ST. LOUIS Boatmen's Bank Bldg.	SAN FRANCISCO Call Building

NOARK FUSES AND PROTECTIVE DEVICES — VULCABESTON PACKING AND INSULATION — JOHNS-PRATT MOLDED PRODUCTS

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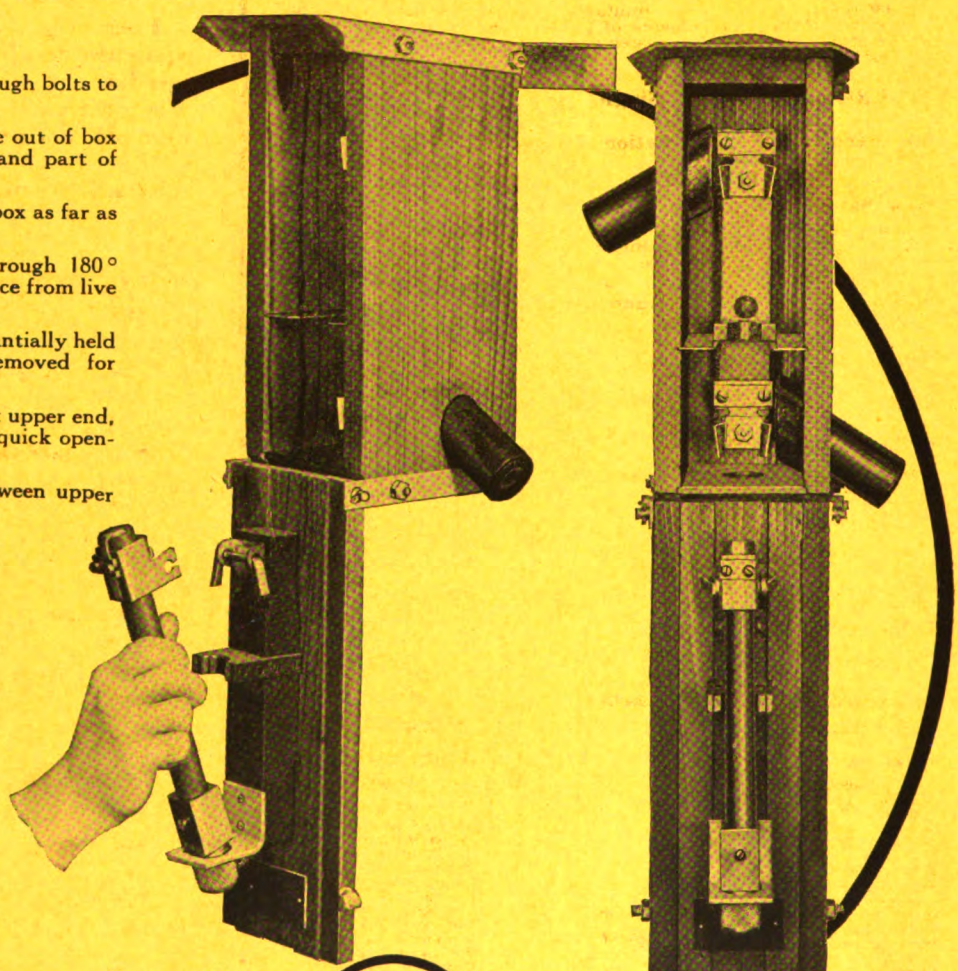
New ! Better! Safer !

The Type OD Safety-First Fuse Box for circuits up to 7500 volts.—Ideal for protecting outdoor distribution transformers.

Here are 10 Reasons Why:

1. Compact, substantial box with through bolts to prevent warping.
2. One-piece metal top keeps moisture out of box and forms the mounting bracket and part of simple latching device.
3. Mounting bracket at top puts the box as far as possible below the line wire.
4. Bottom-opening door, swinging through 180° allows re-fusing at maximum distance from live parts.
5. Fuse tube of white bone fibre substantially held on mounting bloc, yet easily removed for re-fusing.
6. Fuse link, with decreased portion at upper end, assures blowing at that point, and quick opening of the circuit.
7. Barrier in box prevents arcing between upper and lower contacts.
8. One-piece base and outlet bushing of moulded insulation material prevent the charring of base.
9. Projection of the fuse into the outlet bushing causes hot gases to expand into the outer atmosphere instead of into the box.
10. Very high interrupting capacity is obtained because of features (7) and (9).

During periods when power is not used such as in grain elevators during winter months, the fuse tube may be removed and the fuse box closed, thus disconnecting the transformer from the line and preventing no-load losses.



Removing Fuse Tube

Door Dropped

Catalogue Supplement I-B goes into details, ask for it.

Westinghouse Electric & Manufacturing Company
East Pittsburgh, Pa.

Westinghouse

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ELECTRIC RAILWAY JOURNAL

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Company, Inc.

HENRY W. BLAKE and HARRY L. BROWN, *Editors*

Volume 61 | New York, Saturday, March 3, 1923 | *Number* 9

Trying to Keep Detroit Sold on Municipal Ownership

THE first report of Walter Jackson on the municipal system in Detroit has been made public and is abstracted elsewhere in this issue. Called in as a consultant to investigate and state for the benefit of the public with what degree of good management the municipal railway has been conducted thus far, and perhaps make recommendations for improvement, this first section seems to be little more than a means of giving publicity to the opinions and work of the municipal railway engineers. Mr. Jackson's function in this particular report seems to be more that of a publicity expert than a true consultant, for there is little of his own opinion expressed except for corroboration of the statements of the system's own engineers. Granting that the track engineering is good, to which fact the ELECTRIC RAILWAY JOURNAL gave credit at the time (issue of July 23, 1921, page 121), good engineering does not alone make municipal ownership a success. The critical time will come when politics begin to creep into the direction of the property.

But withal, credit must be given to the city administration in Detroit for realizing that there is an element of public relations in the public utility business even though municipally owned, and that in particular right now there is need to keep the people of Detroit "sold" on their decision to have municipal ownership. If Mr. Jackson's future installments show actual facts on the financial results and the real costs of car rides, including what may be derived from taxes, such figures and facts will be of much more interest to the Detroit public.

Continuous Progress Is Being Made in Electric Railway Accounting

DURING the past ten years the science of electric railway transportation has been revolutionized by the development of the one-man car. In electric railway engineering there have been almost, if not quite, as great developments through the use of higher potentials in transmission, the introduction of automatic substations, the adoption of effective motor ventilation and other improvements. Not all electric railway men realize, however, that side by side with these changes in other departments there have been equal advances in the science of electric railway accounting. To understand it one has only to recount the many new problems which have been thrust on this fundamental branch of the industry during the past decade. He will then appreciate how great a change has been wrought by our associates, the accountants.

Ten years ago, for instance, little was known of such subjects in electric railway operating as accounting for depreciation on a scientific basis, of cost accounting and of budget making. A knowledge of each of these now may be considered as almost essential in economical operation. The proper methods to be followed in valuation were also still unsolved. Many problems connected with the income tax, now satisfactorily settled, were then unknown. These matters have been largely lost sight of in what is perhaps the more spectacular development of other branches of the industry. They are brought out, however, in an interesting article on another page of this issue, contributed by M. W. Glover of Pittsburgh. Mr. Glover calls attention in the course of the article to the need of active co-operation in the Accountant's Association by every electric railway accountant. This plea could well be enlarged to include those in every department of an electric railway because, after all, every department must be closely allied with the accounting department if most efficient operation is to be expected.

Rail Joint Test Enthusiasts Are Making Progress

THE approaching tests on welded rail joints are rapidly taking on tangible form. Attendants at the meeting of the committee on this subject, held in Washington two weeks ago, witnessed the sample tests and were pleased with the way the work was done. Obviously if sample tests can be performed satisfactorily, the carrying out of a comprehensive program is simply a question of organization. The facilities of the laboratories of the Bureau of Standards, the University of Illinois and Purdue University will be drawn upon for the routine tests. The reputations of these institutions are a guarantee that the work will be well done.

The testing program divides itself into two parts. Of these the first comprises the application to rail joints of familiar and fairly well standardized tests. There is nothing novel or experimental in subjecting a rail joint to a bending, tensile, impact or electrical conductivity test. Such tests are made in scores of laboratories, yielding results of a high degree of accuracy. In fact, the safety of modern engineering work is predicated upon researches made with the highly developed testing machines of Olsen, Emery, Riehlé and others.

Data for rail joints obtained with standard testing machines will be valuable for comparison of different types of joints and different ways of making up each. They do not, however, exactly duplicate the conditions under which rail joints are used. Hence, the second part of the committee's program will comprise service tests, or approximations to these as close as can be devised.

The service tests will prove in many ways the most interesting because they will involve many novel features. They will require a lot of development work.

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The repeated impact tests will bring out the effects of vibration in the joints, and the results obtained with the rotary service test machine will serve as a general check upon all of the other tests. In fact, the greatest value of the long-continued service tests will be to determine the factors of safety and the limitations which must be observed with the quicker and simpler tests. Presumably when a reasonable number of the more elaborate tests have been made, it will be possible to make a fair estimate of what a joint will do, without waiting in future for the tedious routine necessarily involved in the service tests.

Two Decades of Engineering Achievement

THE American Electric Railway Engineering Association is to be congratulated upon having reached the mature age of twenty years, for it was organized in Cleveland on Feb. 16, 1903. The mere reaching of such an age is not necessarily a cause for congratulation, but in this case the making of a notable record has gone along with the accumulation of years. The original name of the association was the American Railway Mechanical & Electrical Association, and among its first officers were two Detroit United Railway men, Thomas Farmer, president, and S. Walter Mower, secretary.

The Cleveland organization meeting, of course, did not just happen. It was the outcome of a lot of discussion among electric railway engineers as to how they could best organize for helpfulness to each other and to the industry as a whole. At the Detroit convention of the American Street Railway Association in the fall of 1902 the plan really got a start and the organization meeting was planned. Among those who were interested in getting the enterprise launched, in addition to the officers already mentioned, were H. H. Adams, Baltimore, Md.; R. E. Danforth and Alfred Green, Rochester, N.Y.; W. Roberts, Akron, Ohio; C. F. Baker, Boston, Mass.; D. F. Carver, Cleveland, Ohio, and perhaps a dozen others.

The new association was just off the ways when the American Street Railway Association undertook actively to reorganize itself, under the direction of the late W. Caryl Ely, for more aggressive and effective work. A part of the reorganization plan was the bringing into affiliation with the parent association of several electric railway societies, including that of the engineers, which had sprung up in response to a demand for opportunity for specialized discussion. Consequently at Philadelphia, on Sept. 25, 1905, the A.R.M.&E. Association affiliated with what had become the American Street & Interurban Railway Association, and took on the complicated name of the American Street & Interurban Railway Engineering Association. After laboring under this hardship for five years the association, at Atlantic City in 1910, changed its name to the present one, coincident with the simplification of name of the parent body.

At first the association had to find itself; to tackle a job that would bring out its best efforts. During the fifteen years preceding its organization the cities of the country had been largely provided with electric transportation. There was thus a vast store of experience to draw upon. The task to which the association addressed itself was the codification of this experience. It was necessary, however, to begin with generalities, practical ones to be sure, but the work gradually took on a more specific character. Through a process of evolution it has become highly organized under the elaborate committee system of today.

From the early days the importance of developing uniform specifications and other standards was recognized as the primary task of the association. A steady effort has been, and continues to be, made in this direction with great success, although the use of the association standards is still not as widespread as might be wished.

In its first few years of activity the association was obliged to work out its problems by itself, these problems being, or seeming to be, of a peculiar nature. As time went on, however, the wisdom and economy of close affiliation with other organizations has been seen. Today the Engineering Association is doing some of its best work in co-operation with other associations which are especially well qualified to furnish the technical data needed, and which in turn are glad to avail themselves of the experience of the electric railway engineers.

During its two decades of life the Engineering Association has seen the electric railway industry go through its period of greatest expansion. In this it has taken an important part. Now the country is fairly liberally supplied with electric railway facilities, and the live engineering questions relate to intensive development of traffic with the aid of new equipment better designed to yield the maximum of good service. Never has there been a more excellent chance than now for the Engineering Association to show what it can do in a practical way. There is thus reason to believe that the third decade of association history will be as fruitful as its predecessors in contributing to technical advances in transportation.

Street Congestion Aiding Solution of Newark's Traffic Problem

A SIGNIFICANT change of public sentiment is shown in the letters received by a leading newspaper in Newark, N. J., in reply to its appeal for suggestions to solve the city's traffic problem. Ever since the birth of the jitney business several years ago, the great majority of bus routes in Newark have paralleled the trolley tracks on the same streets. The fact that this was an unwise and uneconomical duplication of service did not seem to influence public opinion, which resisted vigorously every attempt to place the buses on separate streets. Recently, however, the congestion has grown so great in the center of the city where several lines of trolleys and numerous bus routes use the same streets, that the people have begun to realize the necessity for some change. The strong sentiment in favor of the removal of the jitneys to streets where no trolleys are operated probably does not indicate any sudden preference for the street railway as a means of transportation, but it does show that public opinion in Newark is tending toward a broader view of the city's traffic problem, and will support a reasonable and impartial solution. In other words, where it may sometimes seem that it is practically impossible to bring the public to see in advance that some measure advocated by the local railway is for the public's own best interest, the developments as time elapses are likely to be such that they force the people to "discover" this for themselves.

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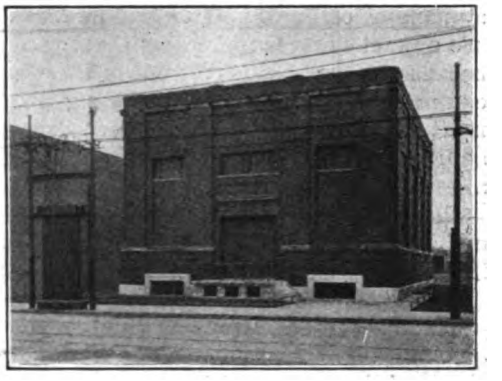
Heights

St. Clair



Collinwood

Three Automatic Substation Buildings in Cleveland

Automatic Substation Experience in Cleveland—I

In This First Section Are Given the General Considerations Leading Up to the Trial of Automatic Control in City Service, the Main Design Features of the Buildings and a Brief Discussion of the Equipment that Is Employed

By L. D. Bale
Superintendent of Substations, the Cleveland Railway

THE automatically controlled substation, as developed upon the property of the Cleveland Railway, has been carried to a successful result. Based on the experience had, the company has definitely decided to adopt this type of station for all future power requirements wherever applicable. In fact, the immediate program of the power department contemplates several additional automatic substations, among which are both one and two unit plants.

When it is recalled that the existing three automatic substations on the Cleveland property represent the first instance where full automatic control has been attempted on a large city system; also that they have the distinction of being the first two-unit plants of relatively large capacity to be constructed, it is something to say that the results obtained from these pioneer installations have been, indeed, gratifying. It may also be appreciated that the development of these installations presented many new problems, and that, on the whole, it was an intensely interesting study.

At the time the control for these stations was designed utilization was naturally made of such equipment as had proved reliable and was in service in many automatic plants then in operation. This also applied to the method or scheme of connections. It was necessary, however, in several instances, to develop new equipment, and to devise new methods of connections to meet the special requirements brought about by the type of system these stations were to serve and by peculiarities of control met with in this type of station.

Among the most important instances where special development was necessary were: (1) An arrangement guaranteeing a greater degree of insurance against service interruptions, which resulted in the necessity of development along the lines of refinement of control. (2) A system of protection of air-blast transformers against air failure which at the same time would make equipment so involved by air failures available for peak-load operation. (3) The development of higher capacity contactors, etc., required by the existence of larger current values than have hitherto been experienced in automatic converter substations. (4) The presence of two converters in one plant brought about some new development work. However, this phase of control was accomplished, in the main, by making additions to existing relays and by adding interlocks.

As is invariably the rule when a venture is made into new fields with time-tried equipment, a number of the standard devices failed under conditions of service required of them, thus making still further development necessary. The sequence of operation of the control has been changed, in some cases numerous times. In fact, in certain instances, portions of the scheme have been actually reversed until finally a point was arrived at where a sequence of operation has been evolved that, in the estimation of those familiar with the development, may be depended upon to function with perfect satisfaction under any emergency that may arise in the operation of a substation upon an urban system, where uninterrupted service is demanded.

Necessity for Additional Power Facilities

There existed, before the addition of the present automatic substations, three territories throughout which difficulty was being experienced in maintaining schedules by reason of inadequate power supply. This condition was primarily due to increase in traffic, and was further augmented by the new schedules which called for higher speed together with additional trains. In one instance an entirely new line was being constructed (the Cleveland Interurban Railway). These territories were outside of the 2-mile distribution limits of the then existing sources of power supply, and the potential drop during peaks was in most instances excessive.

To rectify this condition by increase in feeder copper from existing plants was impractical, not only from the

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standpoint of the investment to be made in copper, plus the annual charges and losses thereby accruing, but also because this scheme involved an increase of conversion equipment in existing surrounding plants. The alternative to the additional copper plan was necessarily additional power facilities located within the territories affected.

The fact that these areas were widely separated eliminated the possibility of one plant supplying all involved territories. The nature of the problem, therefore, resolved itself into the utilization of small power producing centers, provided this could be accomplished economically. A study was accordingly made of this phase of the matter with the result that the adoption of the automatically controlled substation was decided upon.

be retired shortly by the utilization of additional converter substations. Whether this will be accomplished entirely by automatic plants, or whether a manual station will be utilized together with two or three automatic plants, will hinge upon the decision of a local matter having an important bearing on the subject of the economical power which is to be supplied to the territory that is involved.

Contracts were let for building and equipment, and the first automatic station, known as the Heights substation, was put in service in August, 1920. Before this station was ready for operation the demand for additional power became so acute, in this particular territory, that a temporary substation of 1,000 kw. capacity had to be constructed to supply increased

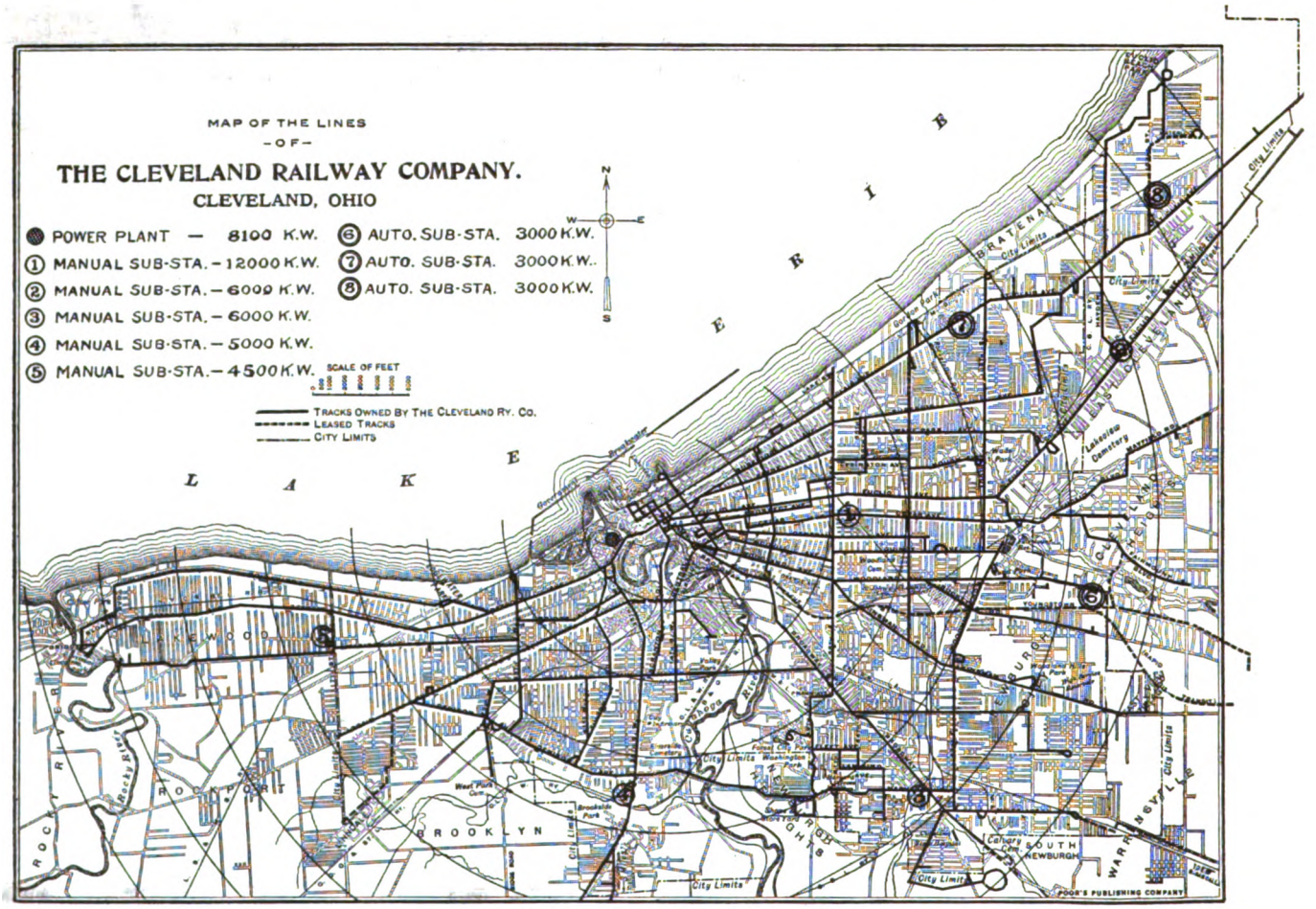

Fig. 1—Map of Cleveland Railway System Showing Locations of Substations

Further study of the subject brought out the fact that as far as the territories in question were involved the two-unit station proved to be the most desirable, taking all conditions into account. The most important of these were land values, building costs and restrictions, d.c. feeder system, reserve capacity (both in converter equipment and in alternating-current feeders) and, above all, a power source having the highest possible degree of reliability obtainable.

With the automatic plants in operation, the total substation installed capacity amounts to 42,500 kw., consisting of twenty-seven 1,500-kw. synchronous converters and two 1,000-kw. converters. In addition, there is one steam-driven 600-volt d.c. plant of 8,100 kw., bringing the total system capacity to 50,600 kw. By referring to Fig. 1, distribution of this equipment over the system will be noted. The steam-driven plant is to

potential to portions of the most important lines leading through the territory. This temporary substation was, of course, abandoned when the Heights automatic substation went into operation. The second station to be placed in service (April, 1921) was that known as the St. Clair substation, which was closely followed by the Collinwood substation in June, 1921.

Design of Buildings to House Automatics

In planning the buildings for these pioneer automatic installations, lack of precedent and insufficient time to make the necessary exhaustive study of the absolute requirements of a building to house equipment of this type in urban service caused the adoption of the standard manual type of building in all details wherever practical.

These plants are fireproof, the only combustible ma-

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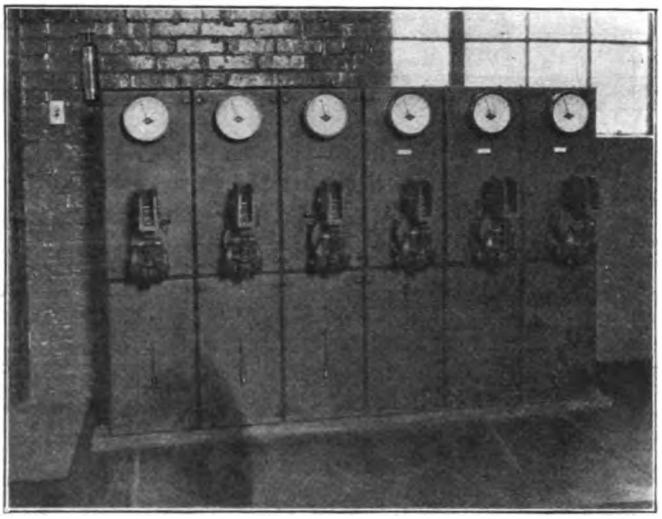
terial used in the construction being the insulating wood base upon which the switchboard slate and supports are mounted. Steel window frames fitted with wire mesh glass are used throughout. All doors are of hollow steel construction. The large door observed in the front elevation of the St. Clair and Collinwood substations provides not only an ordinary entrance door to the plant but one which can be utilized as a material door also. The door structure, measuring approximately 10 ft. square, is provided with side channels and is equipped with a 1-ton chain falls. When it becomes necessary to move bulky objects in or out, the entire door structure may be hoisted into the clear. The rail around the entrance platform is also readily removable, thus forming an unobstructed path for the moving of large heavy objects. In the case of the Heights substation sufficient room was available in the rear of the building to install the customary steel rolling door for material entrance. The exteriors of the buildings are sufficiently different in appearance to break the monotony of a set design and were planned to conform with surrounding buildings in each individual case.

By referring to Fig. 2, it will be noted that the buildings are arranged in conformity with the standard layout for manually operated stations on this system. Special features were introduced to care for ventilation of converters and current limiting resistances. Likewise, rearrangement of steel was made to accommodate the crane and to furnish a balcony upon which to place current limiting resistances used in d.c. feeder and converter circuits.

The subject of proper ventilation of substation buildings has, in general, seldom received special attention in the past. This phase is, however, of importance when considering automatic stations, and especially so when the station is in urban service. This is true not only because of the larger capacity involved in city work, but also because of possible interference with, or entire cutting off of, the supply of air for natural ventilation of the building by surrounding structures. There is also the limitation placed upon the customary "wall opening" method of ventilation in city work because of the necessity, in some cases, of confining equipment operating noises to the plant itself, or approximately so. The matter of ventilation of metropolitan automatic substations must receive serious thought, for with poor ventilation resulting in high temperature, not only will the rating, and in some cases the life, of the various

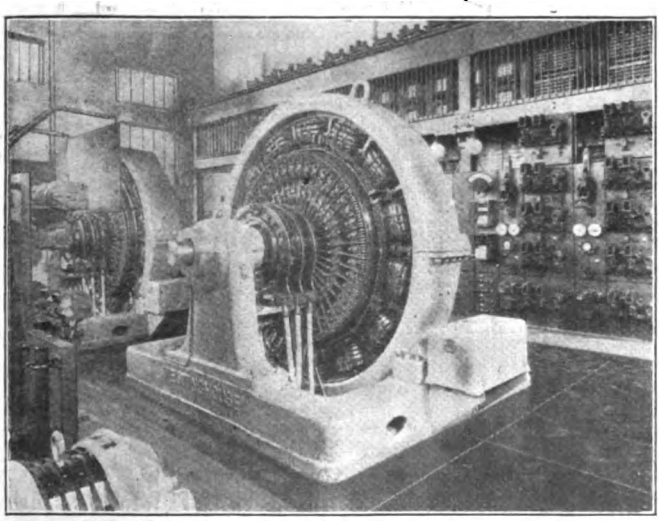


Standard Cleveland Railway Automatic Drainage Panels

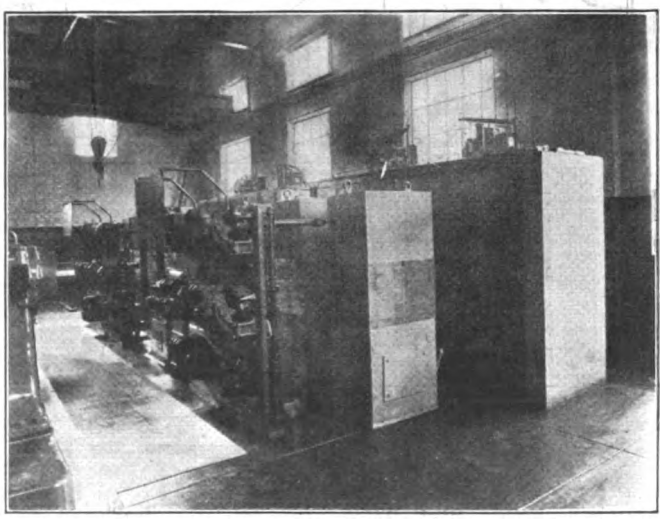
pieces of equipment involved be affected, but the reliability of the station as a whole might also be endangered by the untimely operation of any one of the thermal devices constituting part of the equipment.

In the study of this problem in Cleveland, numerous ventilation charts were prepared for illustrating the course of air current throughout the plant. A glance at the charts (Figs. 3 and 4) will suffice to indicate that the laws of natural ventilation are rendered almost entirely inoperative. It will be noted that the circulation of air in the basement under the converters is from front to rear of the building, carrying out the warm air from the converters in its passage through. Any tendency for the cool air to rise and enter the converter is repelled by the blast of warm air thrown off by the converter armature. On the main operating floor it will be noted that the air currents resolve themselves into a series of eddies or whirlpools, and that unless they approach the roof ventilators within approximately 12 in. they are not affected by the natural draft of these devices. Four of these ventilators are located in the roof, each 30 in. in diameter.

No difficulty has been experienced in the present plants due to the relatively high room temperatures attained during unusually warm summer days, notwithstanding the presence of the air-blast transformers, except with thermal relay equipment that was funda-



1,500 Kw. Rotary Converter, with Total Load Meter and D.C. Converter Contactor Panels



A.C. Starting Panels, with Transformers and Oil Breaker Structures

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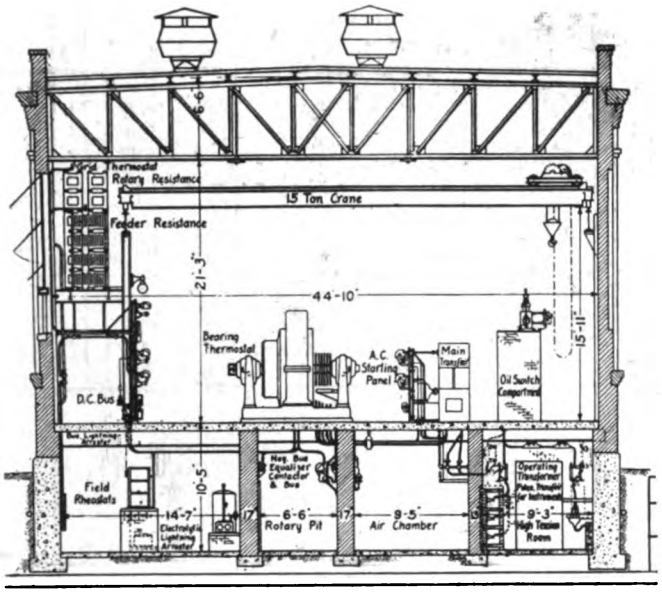


Fig. 2—Standard Automatic Substation Layout in Cleveland

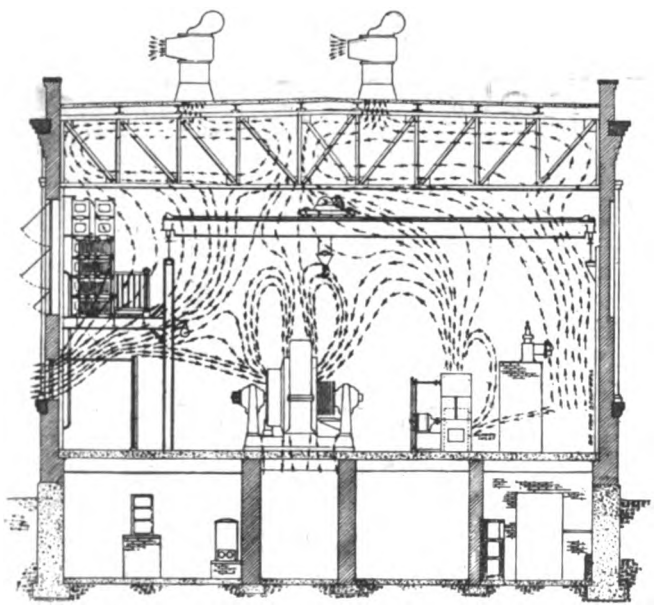
mentally wrong in its application, and has since been redeveloped. However, it is realized that, if the plants were located in close proximity to or possibly adjoining near-by buildings, trouble could be expected. Adequate ventilation of plants of this type can, without doubt, be accomplished by adopting forced draft. This, however, involves additional equipment, which is not desired. At the same time, it is realized that there will be some plants so located that forced draft will have to be resorted to in order that proper ventilation may be obtained.

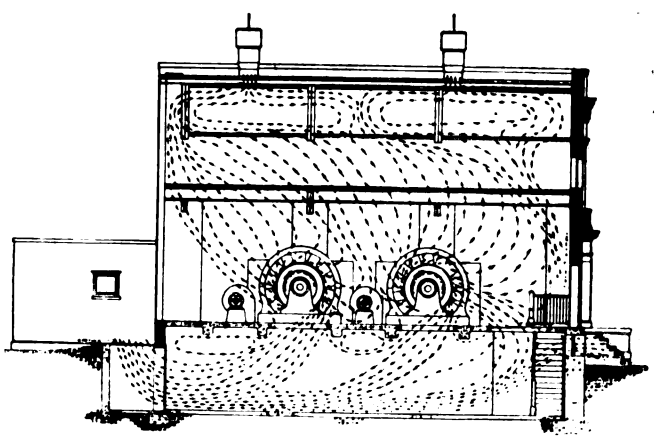
Equipment Installed in the Cleveland Automatic Stations

The three automatic substations are of 3,000 kw. capacity, made up of two 1,500-kw. synchronous converters each. The converters are of the type developed for and known as the Cleveland Railway standard. The first of these converters was placed in operation in Cleveland in 1912, at which time the four original manually operated plants were constructed. Nine 1,500-kw. converters and two 1,000-kw. converters were purchased at that time. Since then four additional 1,500-kw. converters have been added to the original four stations, and in 1917 the Cedar substation was built, containing eight converters of the same design, type and capacity. The standard converters which have been described upon previous occasions are of 1,500 kw. capacity, 60 cycles, 514 r.p.m., six-phase, fourteen-pole, 600 volts d.c., compound wound and equipped with interpoles. These converters, it will be recalled, were especially designed, utilizing interpoles, heavy armatures, etc., to insure satisfactory operation with fluctuating d.c. loads. During the ten years since the first converter was put into operation, these machines have given such perfect satisfaction regarding reliability and economical operating characteristics that, when the question of converter equipment for the new automatic stations was broached, the railway would not consider any converter other than that built upon the specifications of the standard. As a result, the converters being used in the automatic plants are identical with those on the remainder of the system, with the addition of flashboards on the commutator ends and such apparatus as was necessary for automatic operation.

Each of the two converters in these plants is complete with three single-phase, 11,000/410-volt, 60-cycle air-blast transformers connected in delta, and having 8.4 per cent impedance each. The secondaries of the transformers are provided with ½ voltage tap for a.c. converter starting. Each group of transformers is supplied with air by a 15,000-cu.ft. blower, induction-motor driven, receiving energy from the main transformers. These two blowers exhaust into a common air chamber. Each blower, having sufficient air capacity, can be relied upon to protect the entire group of transformers from overheating in the event of the failure of one of the blowers to operate. Under normal conditions each blower is operated only when its particular converter operates. To prevent discharge of air from the air chamber in a reverse direction, through a blower not in operation, each blower is equipped with a damper arranged to close automatically when the blower ceases to deliver air.

The alternating-current supply for these stations is obtained through two underground 11,000-volt, 60-cycle, grounded, neutral lines. Either of the feeders has sufficient capacity to supply both converters with energy. These feeders are normally tied in parallel through the a.c. bus at the substation end. By this arrangement either of the a.c. feeders may be disconnected from service, either through routine operation or by reason of trouble occurring upon them, without interfering with the continuity of service of the plant. Each a.c. feeder





Figs. 3 and 4—Ventilation Charts for Cleveland Substations

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is protected at the generating end by inverse time-limit overload relays, while at the substation end instantaneous reverse power relays are installed, only. Each a.c. feeder is connected to the a.c. bus at the substation through a 600-amp., 25,000-volt, electrically operated oil switch, remote controlled from the a.c. line panel by the customary manual type of control switch. These oil switches are, therefore, not automatic in their action except by reason of the operation of the reverse power relays in the event of line failure.

The arrangement of the two principal control boards is indicated in Figs. 5 and 6. Referring to Fig. 5, showing the main board, it is noted that the first panels encountered at the right of the board are the two incoming a.c. line panels. These are complete with various recording and curve drawing instruments, together with the reverse power relays.

The next panel (3), is known as the sequence panel. This carries, in addition to the low-voltage relay (1), various switches through which control of the operating circuits of the converters is obtained. Also, means are had on this panel for reversing the operating sequence or schedule of operation of the converters; that is, causing one converter to be "lead-off" and the other "follow-up," or vice versa, this schedule being varied at given periods. The fourth panel contains relays used in connection with remote, supervisory control and indication. The fifth and sixth panels contain equipment for automatic control of the converters.

Panel 7 contains relays for the control of the shunting contactors for the d.c. converter current-limiting resistance of both converters. Through the use of these relays synchronized action of the corresponding d.c. converter shunting contactors of both converters is also secured, thus eliminating the possibility of pumping of contactors with the resulting interchange of load between converters during overload periods.

Panels 8 and 10 each carry the shunting contactors for the d.c. converter current-limiting resistance.

On panels 9 and 11, known as the converter meter panels, is mounted, in addition to the d.c. ammeter, d.c. wattmeter, reactance volt-ampere indicator and three relays, a carbon circuit breaker. This breaker is

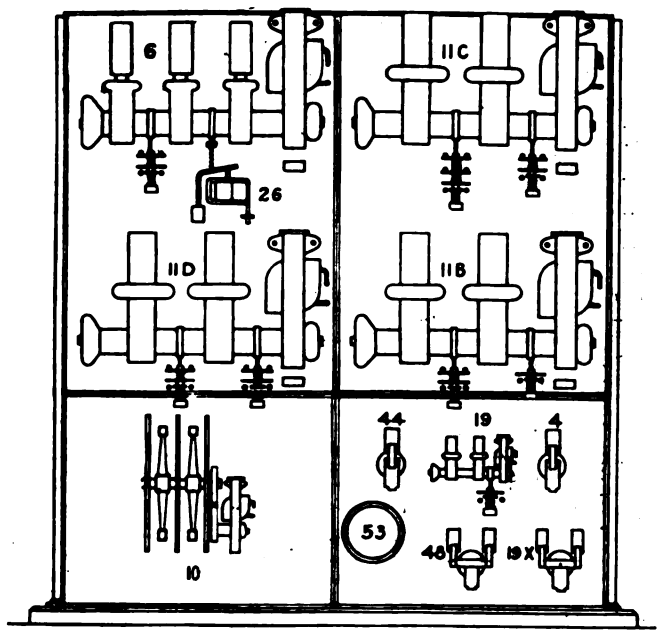

Fig. 6—Alternating-Current Starting Panels for Rotary Converter

equipped with a trip coil in connection with the speed-limiting device of the converter, and its one function is to disconnect the converter from the d.c. station bus in the event of overspeed, an interlock, in connection, shutting down and locking out the converter when the breaker operates. This breaker is hand reset and is also used as a safety measure during periods of inspection.

Panel 12 is a total load panel, and is equipped with a differential indicating voltmeter, a curve drawing graphic station voltmeter and a curve drawing graphic station ammeter. The last mentioned instrument will be dispensed with when the power indication system is in operation. Panel 13 is one of the nine standard outgoing d.c. feeder panels. The present method of control of these panels is not acceptable on the system, and will give way to a scheme of remote control, of which mention will be made later.

Mounted apart from the main board are the a.c. con-

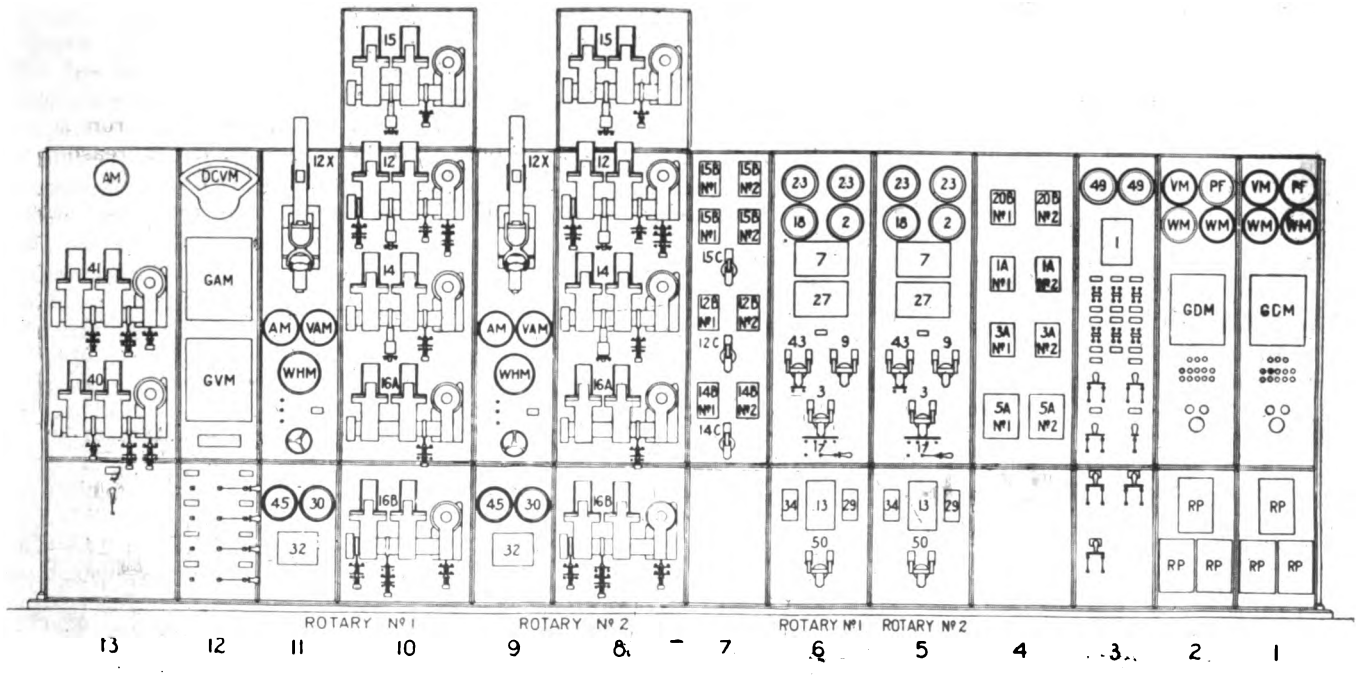

Fig. 5—Main Control Switchboard in Automatic Substation

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TABULATION OF RELAYS, CONTACTORS, ETC.

1. Undervoltage d.c. relay for initial starting.
2. Low voltage delay a.c. relay, preventing unnecessary starting after closing of relay 1.
3. Master relay.
4. Starting contactor relay, controlling contactor 6.
6. A.C. converter starting contactor, ½ voltage tap.
7. D.C. polarized motor relay for converter potential correction.
9. Field contactor relay, controlling field reversing contactor 10.
10. Field reversing contactor.
11-a, b and c. A.C. running contactors.
12. D.C. converter contactor.
12-a. D.C. overload converter relay, controlling contactor 14.
12-b. D.C. overload converter master relay.
12-c. D.C. overload intermediate relay.
12-x. Shunt trip coil, operating carbon circuit breaker, also shunting out master relay 3.
13. A.C. converter underload relay.
14. D.C. converter resistance shunting contactor.
14-a. D.C. overload converter relay, controlling contactor 15.
14-b. D.C. overload master relay.
14-c. D.C. overload intermediate relay.
15. D.C. converter shunting contactor.
15-a. D.C. overload relay, controlling contactor 16-a.
15-b. D.C. overload master relay.
15-c. D.C. overload intermediate relay.
16-a and b. D.C. converter resistance shunting contactors.
17. S.p.d.t. knife switch for changing from automatic to non-automatic operation.
18. Reverse phase and low voltage a.c. relay.
19. A.C. relay, controlling contactors 11-a, b and c.
19-x. Relay, shunting starting contactor relay 4.
20. Oil breaker between a.c. bus and primary of transformers.
20-a. Latch coil for breaker.
20-c. Operating coil for breaker.
21. A.C. relay, controlling 22.
22. A.C. relay, controlling energy for breaker operating coil 20-c.
23. A.C. overload relays.
24. Overspeed device on converter.
25. Bearing thermostats.
26. Field reversal limiting relay.
27. Delay relay.
27-s. Contacts of No. 27 relay which close if converter does not complete cycle of operation in given time, or if there is a sudden overload making it necessary to bring on the second converter.
27-t. Contacts of No. 27 relay which close when load drops to predetermined low point and remains there for the time setting of the relay.
28. Thermal relay for converter grid resistance.
29. Replica thermal relay for shutting down converter in the event of sustained overload.
30. Lockout relay.
30-r. Reset coil for relay 30.
31. Brush operating mechanism.
32. D.C. reverse current relay.
33. Thermal relays for feeder grid resistance.
34. Replica thermal relay for starting second unit.
37-a and 38-a. Sequence switches.
39. D.C. equalizer contactor.
40. D.C. feeder resistance shunting contactor.
41. D.C. feeder contactor.
42. Air pressure relays for protecting air blast transformers against air failure.
43. Relay for starting second unit in the event of failure of first unit or overload.
44. Shunt field protection relay.
45. Phase balance relay.
48. Temporary lockout relay in connection with air pressure relays 42.
49 and 50. A.C. power failure protection relays.
53. Non-starting protection relay.

verter starting panels (Fig. 6), as is the case with the 110-volt control battery and motor generator charging set panels.

These stations are also equipped with standard Cleveland Railway negative drainage panels (illustrated in an accompanying photograph) for controlling the negative drainage of various subterranean structures. The operation of these panels is such that all contactors close upon the starting of the first converter in the house and open when the last machine ceases operation. Connection between the negative bus and the various underground metallic structures is completed upon the closing of these contactors. In the majority of cases current-limiting resistance is installed in the drainage circuit.

It will be noted, referring to Figs. 5 and 6, that the various items making up the automatic control are given numbers. If it is desired, reference can be made to the tabulation of relays, contactors, etc., thus identifying any of them.

The second section of this article, to be printed shortly, will give a comprehensive discussion of the scheme of operation, showing how each part of the control-equipment functions.

Warning the Automobilist

TEN safety suggestions have recently been sent in the form of a letter to some 20,000 automobile drivers in Albany and vicinity by the Union Traction Company of Albany. The suggestions follow:

1. Make sure trolley car is not coming when starting out from the curb, and give proper warning before starting if car should be near.
2. Do not trail trolley car too closely.
3. Cross crossings cautiously.
4. Be watchful of trolley car making curve so as not to be hit by the swing of rear end.
5. Avoid parking cars near trolley curves in narrow streets so as not to be caught "in the pinch."
6. Avoid speeding to get ahead of trolley when other cars are parked at the curb.
7. Avoid crossing in rear of trolley car. Other cars, unseen, may be coming in the opposite direction.
8. To get ahead of trolley car, make sure it is well to the rear before cutting in front.
9. Observe the law and do not pass trolley while it is taking on or discharging passengers.
10. When parking at curb in narrow streets, be sure there is plenty of room for trolley to pass.

Elevated Structure Abandoned

THE elevated structure of the Kansas City Railways, connecting Kansas City, Mo., and Kansas City, Kan., after thirty-six years of service has been abandoned due to the failure of one of the 60-ft. longitudinal supporting girders. This structure had been used as the roadbed for the street railway systems of both cities and was an important link in their rapid transit system. The member in question was of the conventional open girder type, built up of angles. The failure was no doubt due to the rusting through of the lower angles or tension members of the girder. The city engineers of both cities, together with the engineers of the operating company, made a careful inspection of the entire structure, after the initial sag was discovered, and reported it unsafe for travel. A new structure of reinforced concrete and steel is contemplated to replace the old structure.

New Plan for Providing A.E.S.C. Funds

A NEW grade of membership in the American Engineering Standards Committee has been approved by its executive committee through which it is expected that $50,000 extra annual income will be secured. The new members will be known as "sustaining members"; they will be asked to contribute one-thousandth of 1 per cent of their gross annual incomes or 1½ cents per $1,000 of aggregate value of corporate securities. A new information service will be created for the benefit of these members. Heretofore the committee has been financed entirely by dues from the nine technical societies and seventeen national trade associations, which, with seven government departments, constitute its present membership.

During the year 1922, according to the report of the state inspector of hulls and brakes at San Francisco, the number of passengers crossing San Francisco Bay on the Key Route ferries was 15,551,624. This is an increase over the 1921 figure, which was 14,996,988. This report shows 1922 to have been the busiest year since 1915, the year of the Panama Pacific International Exposition, when the Key Route tramway, boat and train system carried 16,677,421 passengers.

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What Accountants' Association Has Done

A Past-President of the Accountants' Association Lists a Number of the Important Achievements of the Association, Points Out Some of the Problems Ahead and Urges All Accountants to Take an Active Interest in the Work

By M. W. Glover
General Auditor West Penn Railways

THE importance of accounting and its value to the electric railway industry is not fully realized or appreciated. Andrew Carnegie cannot be classed as a theorist, but was a successful, practical business man. He recognized the importance and value of accounting and made the statement: "There is not a science or class of men on whom the business of the world is more dependent than the science of accounts and accounting."

At the 1915 session of the Accountants' Association, P. V. Burington, Columbus, Ohio, presented a paper reviewing the activities of the Accountants' Association and called attention to some of the problems which at that time had been brought before the association for discussion. He called attention to some remarks by Paul R. Jones, then auditor of the Doherty organization, in connection with the importance of the accounting department.

> In recent years certain factors have raised the auditing department of the public utility organization from a purely clerical status to that of one of its most important departments.

In the call for the organization meeting held in Cleveland, March 23, 1897, the following appears: "Headquarters will be at the Hollenden Hotel, which has made a rate of $3 per day, American plan." At the present time this seems almost unbelievable.

From the time the Accountants' Association was organized in 1897 up to the present, the work of the association has been devoted to the objects for which it was formed. The following is taken from Article 2 of the constitution of the association adopted in 1897 and amended in 1910:

> The object of this association shall be to bring together those engaged in the accounting department of urban and interurban railway companies and the electrified sections of steam railway companies for the interchange of ideas, to promote the adoption of a uniform system of accounts, and to improve the work of the accounting department.

Apparently an impression exists in some quarters that the work of the Accountants' Association was over when it adopted a uniform system of accounts. This erroneous impression should be corrected, as it is not true that the association has completed its work. In fact, the adoption of a uniform classification of accounts is merely the first step in accomplishing the purposes for which the association was organized. In a recent article on the subject of "Lack of Uniformity in Electric Railway Accounting" attention was called to the fact that the adoption of a uniform system of accounts does not necessarily mean that all companies which have adopted this system are handling their accounts in a uniform manner, and the desirability of uniformity in accounting practices is emphasized.

It will be noted that the first object of the association is "to bring together those engaged in the accounting department of street railway companies for the interchange of ideas." This was undoubtedly placed first, with the thought that before any results could be obtained, those engaged in the accounting departments of electric railway companies must first be brought together, to interchange ideas and to discuss problems of mutual interest. The informal discussions, as well as the prepared papers presented at the various conventions of the Accountants' Association, cover a large number of accounting problems, and many of the papers presented represent the expenditure of valuable time and study. Every electric railway accountant should be glad of the opportunity afforded by the association to meet others, some of whom have been in the accounting departments of electric railways from the time the old horse car lines were electrified, and it is a matter of congratulation that accountants have always been pleased to discuss accounting problems with their brethren and to give them the benefit of their experience in handling many intricate and difficult problems, which arise from time to time.

From the organization of the Accountants' Association to the present time the published minutes are filled with valuable information and data which cannot fail to prove of assistance to any electric railway accountant, no matter how long he has been handling accounts or what system of accounts he may use. Some of the subjects which have been discussed at conventions of the Accountants' Association are of vital importance to all electric railway accountants, and if they do not take advantage of the opportunity afforded by attending conventions of the association and meeting others engaged in accounting work for electric railways they are losing an opportunity which would be eagerly sought by many engaged in other lines of business.

TESTIMONY ON VALUE OF ASSOCIATION

The following remarks taken from the addresses of presidents of the association are interesting:

1898—H. L. WILSON: "Accounting is now looked upon as a much more important branch of the business than was the case a few years ago, and we must make it the aim of this association to make it still more important each year." In other words, day by day in every way we are getting better and better.

1900—C. N. DUFFY: "The annual conventions give the members an opportunity of meeting each other, interchanging ideas, learning from each other and acquiring knowledge and experience which could not be obtained in any other way."

1901—W. F. HAM: "I cannot conceive how any one who has attended these conventions, participated in the meetings and mingled with the other members, could fail to be benefited by it, with the possible exception of the man who has a 'perfect system' and 'knows it all.'"

1902—H. C. MACKAY: "Let me remind you that we each and all owe to the association and to the companies we represent prompt and faithful attendance at all meetings."

1903—H. J. DAVIES: "One of the most beneficial features of our annual meetings is the exchange of ideas in conversations among ourselves outside of the regular meetings."

1906—W. B. BROCKWAY: "I believe, positively, that as

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you work for the interests of this association, so will you benefit in knowledge and other ways."

1909—R. N. WALLIS: "I wish to call attention again to the fact that the main value to the individual in these convention sessions lies in the thorough discussion of the subjects presented."

1912—P. S. YOUNG: "The scope of the accountants' work in the business world is continually broadening, and nowhere is this more apparent than in the electric railway business."

1913—J. H. NEAL: "In all modern big business it is gradually becoming a maxim that a business is no better than its accounting department."

1920—I. A. MAY: "Cost accounting has been developed in the large manufacturing industries to a fine art, and my message to you is that our association develop cost accounting in our industry in advance of the requests that are bound to come to us for this kind of information."

COMMITTEE WORK THOROUGH

Most of the work of any association which meets in convention once a year must be done through its committees, and the Accountants' Association has been able to secure as members on its committees those who are willing to give sufficient time to committee work, in order that the reports might be of value to the association. Some of the committee reports and the discussions following their presentation have brought out many important features of accounting work, and members of the committees, who have done the most work, frankly admit that it has been of great benefit to them personally. Any accountant who honestly investigates the activities of the Accountants' Association and will take part in these activities will never regret it. He will feel that his time has been well spent, and the experience gained will be of material benefit to him personally as well as to the company which he represents.

The Accountants' Association intends to continue active work along the lines for which it was organized, and those accountants who have not taken an active interest in the association in the past will find that they have been the losers and those who have given time and work to the association will profit.

TOPICS DISCUSSED AT RECENT MEETINGS

The following are some of the subjects which have been discussed at conventions of the association and serve to illustrate the important matters relating to the accountants of electric railway companies which have been given attention by the association.

Statistics. The JOURNAL recently contained a short editorial on "Getting Useful Information Out of Masses of Statistics." The usefulness of statistics depends entirely upon their accuracy, and as most statistics originate from information compiled in the accounting department, it is very important that accounts be kept on a uniform basis, in order that statistics may be of sufficient value to justify their cost. Realizing the importance and necessity for statistics, the Accountants' Association has devoted a considerable amount of time to this subject on its programs. In 1898 an article on "Statistics, Their Use and Abuse" was presented by E. D. Hibbs; in 1903 W. M. Steuart presented a paper on "Census Statistics and Standard Form of Electric Railway Accounting"; in 1906 a paper by A. Stuart Pratt on "Use of Curves in Statistics" was presented and discussed; in 1909 a paper on "Interurban Statistics" was presented by S. C. Rogers; in 1911 a paper on "Statistics of Cost of Electric Operation on Steam Railways" was presented by A. B. Bierck; in 1913 an article on "Statistical Units Used in Analysis of Electric Railway Accounts" was presented by J. A. Emery; in 1915 George B. Willcutt presented a paper on the "Value of Statistics to Executive and Accounting Heads"; in 1916 W. E. Jones presented a paper on the subject of "The Statistician"; in 1919 an article was presented by C. R. Bitting on "The Preparation of Accounting and Statistical Data in Connection with Rate Cases."

Depreciation. This is a most important subject from an accounting standpoint and was so recognized as far back as 1897. In that year a paper on this subject was presented by H. C. McJilton; in 1906 another paper on the same subject was presented by R. N. Wallis, and in 1914 Robert Sealy presented a paper on "Accounting Treatment of Depreciation." In addition to these papers, depreciation has been discussed in connection with various committee reports and the subject is now being handled by the committee on a uniform classification of accounts.

Relation Between Accountants and Other Departments. This is an important subject and was covered by a paper in 1897 by P. V. Burington, in 1909 by W. B. Brockway, and in 1922 by E. D. Dreyfus, the latter paper referring particularly to the relations between the accounting and engineering departments.

Construction and Operating Budget. The budget system, which has been in use for some time by a few large utility organizations, is a subject of vital interest and, so far, has not been adopted by many electric railway companies, but the importance of this matter has been realized by the Accountants' Association. At the 1922 convention a very interesting address on this subject was delivered by Harry A. Snow, assistant comptroller of the Detroit Edison Company. This address has been published in pamphlet form by the association because of the importance of the subject and to comply with requests received for information on it. The association is preparing to develop this subject and has appointed a committee to study it and make recommendations as to a satisfactory budget system for electric railway companies.

Cost Accounting. The subject of cost accounting has been given considerable prominence in recent years and an address on this subject was presented at the 1921 convention by J. H. Bowman, C.P.A., of New York City, and at the 1920 convention a paper on "Cost of Service Accounting" was presented by H. J. Davies. In addition other papers have been presented from time to time on the subject of arriving at the proper unit costs, as the system of accounts for electric railways was not intended primarily as a cost accounting system.

Taxes. Accounting for taxes, both federal and state, has become a most important subject. It seems that, instead of simplifying the computation of taxes, taxing authorities attempt to complicate the provisions of tax laws, so that it is now necessary for nearly all large corporations to employ tax experts in handling their tax accounts. The question of taxes has been given attention by the Accountants' Association and is one of the live subjects to be discussed at future meetings.

Many other important accounting subjects have been discussed at the conventions of the associations, and when it is considered that the membership of this association consists of accountants who have been engaged in public utility accounting work for many years, the advantages of membership in the association cannot be overestimated. But in order to receive the benefits which may be secured through the association, members must take an active interest in its work.

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During its twenty-five years of existence, the Accountants' Association has proved its worth to the electric railway industry, and its members intend to continue working in future along the lines which will prove of most benefit to the industry. The science of accounting has developed in recent years, and its importance is being realized more and more by the executives and owners of electric railway companies. If the association continues its activities in the future on the same lines as in the past, it will be recognized as one of the most important branches of the parent association, and its members will be held in esteem by all who are interested in the success of the electric railway industry. The members of the Accountants' Association are therefore urged to interest themselves in its welfare and to attend the conventions, with the assurance that they will benefit by meeting others engaged in accounting departments of electric railways and by a discussion of subjects which are of interest to every electric railway accountant.

Good Record for British Single-Phase Electrification

THE London, Brighton & South Coast section of the Southern Railway, Great Britain, has in operation a total of 70 miles of line electrified on the single-phase system at 6,700 volts. In a recent paper before the Institution of Civil Engineers, H. W. H. Richards, traction engineer of the railway, gave a summary of the results of twelve years of electrical operation. He said that the original bow collecting gear is still in operation, with slight modifications. The gear springs are set to maintain a pressure of 12 lb. of the bow strip on the contact wire with the latter at a height of 16 ft.

The motors used are of the Winter-Eichberg single-phase compensated repulsion type, which were satisfactory electrically but showed some mechanical weaknesses. These have been largely eliminated. Mileages up to 250,000 have been obtained with the split gears used, and double this mileage is expected with the solid gears. Little trouble has been caused by the transformers, of which there are seventy-one of the 310-kva. type in use. After ten years of service the sheet insulation between high and low-tension windings was replaced.

Gun-metal liners have been placed on the truck pedestal guides and other points of considerable wear so as to keep all clearances at a minimum. The Westinghouse automatic air brake, combined with clasp brakes and automatic slack adjusters, permits a rate of braking of 3 ft. p.s.p.s. to be made, and the brakes to be released in three seconds. General overhaul of motor coaches occurs after 60,000 miles have been made, or about every one and one-half years. The trail coaches are permitted to run for a period twice as long between overhaulings.

The effect of corrosion caused by steam locomotive smoke is seen in the fact that renewal of catenary and "dropper" wires is, in the non-steam traffic section, only 10 per cent of that in the sections where there is heavy steam traffic.

During 1921 the average energy consumption was 75.8 watt-hours per ton-mile. The number of coach-miles operated was nearly 6,000,000. The average distance between stops was 1.14 miles, the average running speed 24.36 m.p.h. and the schedule speed, including stops, 22.11 m.p.h.

Merchandising Transportation Abroad

Some of the Features on Which Greater Stress Is Laid than in America Are Destination Signs, City Waiting Stations, Attractive Rolling Stock and Overhead System

BY J. KAPPEYNE
Consulting Engineer, Syracuse, N. Y.

WHILE the economic conditions and the attitude of the public toward electric street railways are not alike in Europe and in this country, some of the methods employed abroad to merchandise transportation and secure the good will of patrons may be of interest to operating properties in this country.

Thus, the first view on page 368 shows three distinct ways used on the trolley cars in Amsterdam to indicate the car route. First there is a route number (No. 14), conspicuously hung within the bow-shaped current collector. A variation in the first figure distinguishes the main car lines of the system, while a variation in the last figure indicates a different destination or terminal of the same main line, as in the case of short routing or of split lines. The route number is duplicated by a hood marker, shown at the right in the same illustration, and this marker is illuminated at night.

In the center of the hood is the usual route sign, which is square, oblong (as in the picture), circular, oval, diamond shaped, or of other outline and embodies a combination of two colors, such as red and green, red and yellow (as in the picture), green and yellow and so forth. Each shape represents a main route, similar to the first figure of the route number, while a variation in the coloring indicates a different destination, corresponding to the last figure of the route number. The shape and coloring of this illuminative route sign is duplicated in a marker at the right of the platform vestibule roof (at the left in the view). The route description is repeated on the side of the car roof on a board painted the same double color as the route sign. This double indication of routing insures correct advance information about the routing of an approaching car under nearly all possible conditions.

This same information, that is route number, route sign and route description is repeated at important traffic points on the car stop signs, as shown in the second view, and at waiting stations, third view.

Such route indication permits inspectors, policemen and others to give concise but nevertheless specific information as to the proper car to be taken. It also facilitates the condensing of instructions on transfers, time tables, public railway guides and similar useful information pamphlets. Above all, it clearly identifies the particular car in the mind of the intending passenger long enough in advance to permit him to be prepared to board that car with the self-satisfaction of knowing its certain destination and routing.

Another method of merchandising transportation service to prospective patrons was observed at congested loading points in Paris. A box, provided with paper tickets numbered consecutively (see fourth illustration), is attached to the trolley pole at a convenient height. During rush hours, each waiting passenger helps himself to one of these tickets. When the next car comes along, the conductor allows the passenger with the lowest numbered ticket to board first and thus

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Routes Are Clearly Marked in Amsterdam by Car Signs and Numbered Poles

enables him to secure a seat if one is available. In this manner, the principle of first come first served is applied, with the result that the usual pushing and crowding at the car entrance is practically eliminated.

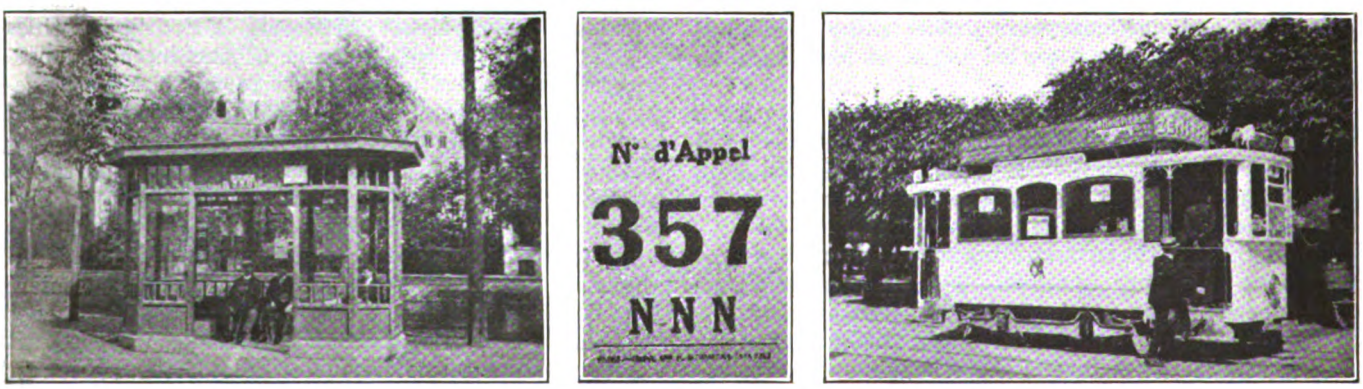
This method of loading has all the advantages of queue loading, but it eliminates the obnoxious feature of the latter of people having to stand in line while waiting. It has a wider field of usefulness, being applicable in cases where normally the number of waiting passengers would not warrant queue loading. Ticket loading is especially adapted, however, where the definite stopping place of the particular car is not predetermined, as in the case of multiple berthing, or of a near-side stop for converging car lines. It has the further advantage over queue loading in that it is self-instructing, as those slow to learn are being penalized.

A further catering to the comforts of one not yet a passenger, in quite common use in many cities on the Continent, is evidenced by the number of attractive, glass inclosed, waiting stations erected, as shown in the third view. These are often installed in the heart of the city at important transfer points and provide for news stands, boot blacking, parcel checking, candy and flower shops. They also serve as a convenient depot for transfers, extra car tickets, report blanks, etc., for the use of inspectors. Usually a company telephone and a public pay station will be found there.

In this country, the erection of waiting stations is usually confined to interurban lines, outside of the built-up area. Although traffic congestion and narrow streets, found in most business districts of our cities, militates against the establishment of such stations, with proper co-operation from city officials and interested property owners, suitable locations could probably be found in a surprising number of instances, where the construction of convenient waiting stations would result in greater comfort to waiting patrons.

Apparently many street railway managers abroad are believers in selling transportation "neatly wrapped and done up in an attractive package." The rolling stock, for example, is usually painted a pleasing color, such as pale blue, light olive green, cream color and others. The windows are broad and kept scrupulously clean and the brass fittings bright and shiny. More frequent use is made of ornamental trolley poles than in this country. In Antwerp I noticed ornamental combination arc light and trolley poles carrying flower pots with red geraniums. It may be that the providing of cream-colored cars, shiny conductor bells and flower-decked trolley poles is not directly remunerative, but a more general application in this country of attracting the car rider by a pleasing appearance of the property used is worthy of serious consideration.

Evidently the value of advertising within as well as without the cars is appreciated abroad, as shown in the fifth view. Monitor and dash advertising are common, and the company reserves the more conspicuous advertising space inside the cars for its own use. Here it displays maps showing the car system, lists of stopping places and transfer points, time-tables, company rules affecting the public, picturesque views of points of interest reached by street car, safety warnings, police regulations, etc. Much of this matter serves effectively as means of merchandising transportation.



Amsterdam Waiting Station—Paris Queue Number—Lucerne Car With Monitor Deck Advertising.

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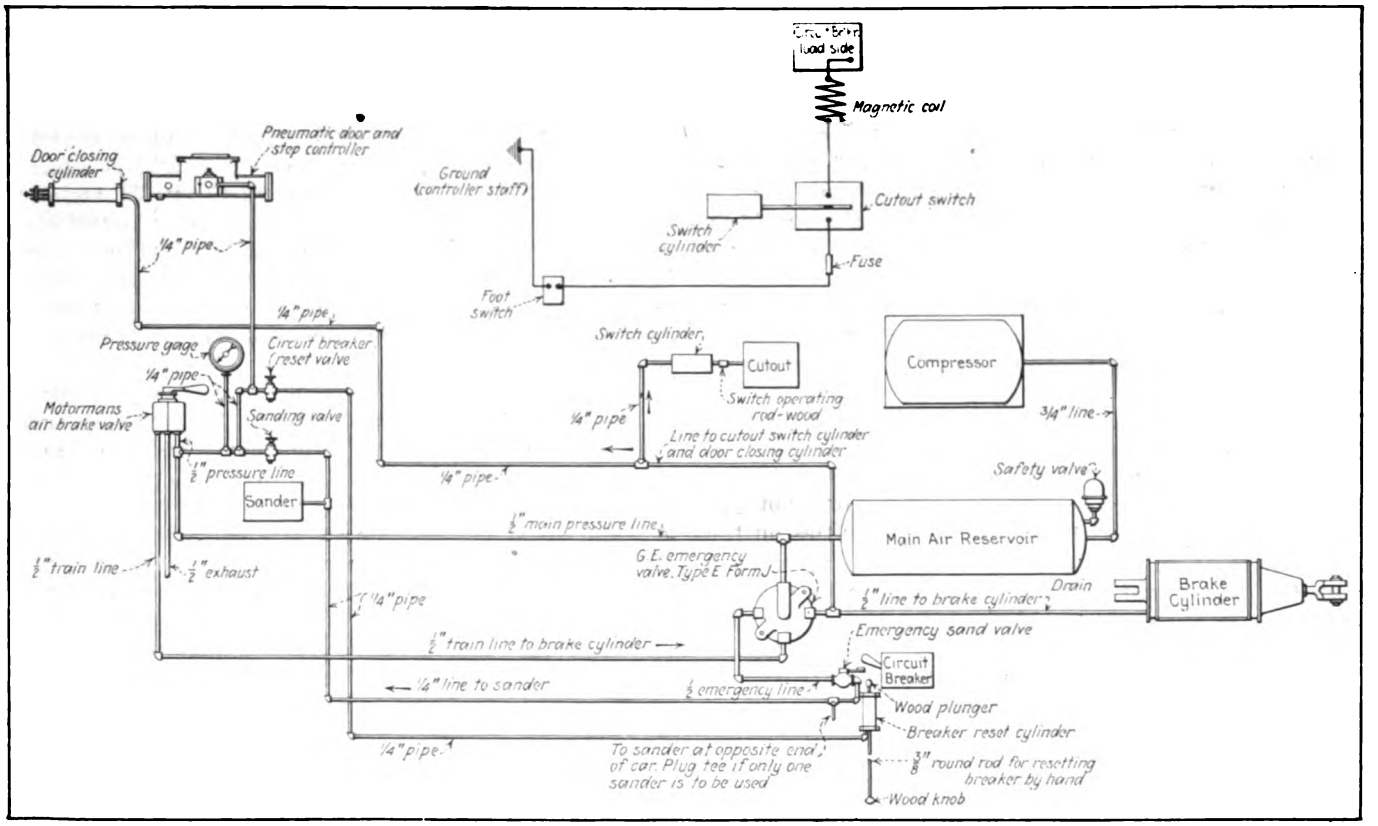
New Safety Devices Developed in Tri-Cities

Scheme of Control Operates Electrically Instead of by Air Valves—Devices Claimed to Be Simple and Comparatively Inexpensive in First Cost and Maintenance

THE city railway service of Rock Island, Ill., has been operated entirely with converted one-man cars since March 1, 1922, and that of Davenport, Iowa, since June 15, 1921. A total of 128 double-truck cars of these two properties of the Tri-City Railway were changed over for one-man operation by the addition of a system of safety devices developed by John Sutherland, master mechanic. Forty cars of the Michigan Railway used in Lansing, Battle Creek, Jackson and Kalamazoo have also been equipped.



At Bottom, Piping Diagram for Single End Control. At Top, Wiring Diagram of Magnetic Control Circuit

Complete protection, reliability, low first cost and low maintenance expense, ease and cheapness of installation are the advantages claimed for the new development. The protection is obtained with several units that are positive in operation and simple in construction. A trip coil on a circuit breaker located underneath the car is actuated through a single control circuit using live current and connected with the controller handle. The plunger of this trip coil kicks out the breaker whenever the operator removes his hand from the controller, unless his foot is held on a floor switch. The controller handle and floor switch are in series with a cutout switch operated from the brake cylinder air pressure, so the circuit can be kept open by any one of these three contacts alone. Door protection is taken care of by connecting to the door engine valve an air cylinder operated by the brake cylinder pressure. To open the doors with the brakes off the operator must turn the door handle against a 40-lb. spring in the air cylinder. With the brakes on, the spring is compressed by the air entering from the brake cylinder, allowing free operation of the door control.

To describe the action of the safety devices, take a car in the shop with the pole down and no air in the reservoir. The operator puts up the pole and then pushes open the doors, which are released because the door engine with no air pressure offers no resistance. The compressor switch is closed and after the air pressure reaches 40 lb. or more the circuit breaker on the platform can be closed. It is in series with the one under the car controlled by a magnetic coil, but has a setting 100 amp. higher. An application of the brakes from the brake valve operates a cutout switch, thus making it unnecessary for the operator to hold down

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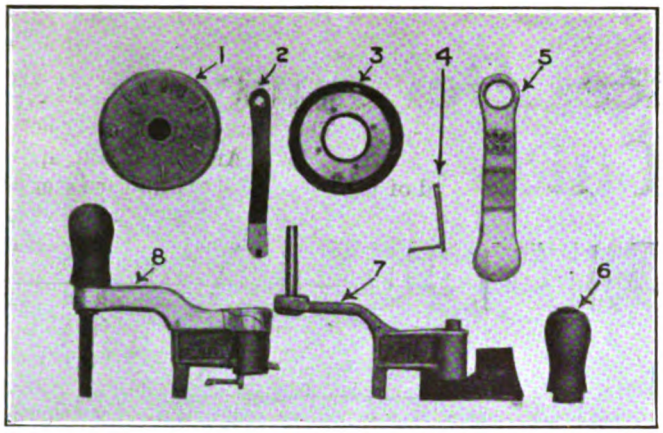
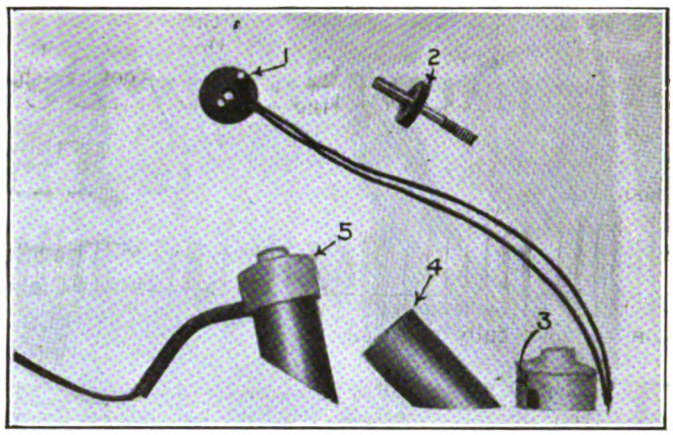


Dead-Man Handle and Unit Parts

(1) Aluminum cap; (2) spring steel arm; (3) contact ring; (4) contact finger; (5) controller handle cap; (6) wooden knob; (7) brass controller handle; (8) assembled handle.



Foot Switch and Parts

(1) Fiber pin disk; (2) plunger with contact ring in position; (3) aluminum cup; (4) steel shell; (5) assembled switch ready for installation.

either the controller handle or foot switch. By releasing the brakes the doors automatically close.

The door control cylinder is identical in design with the cutout switch cylinder and both are piped from the brake cylinder. The control device on the door has a link sliding on the door engine valve rod so that when the brakes are released the spring tension holds a link against a collar on the rod, making it difficult for the operator to turn the short door lever against a 40-lb. pressure. When the car comes to a standstill after a brake application, the operator must keep the air brake valve set so as to permit air to travel from the pressure line to the train line. Thus a constant pressure is maintained in both the air-brake and the door-closing cylinders.

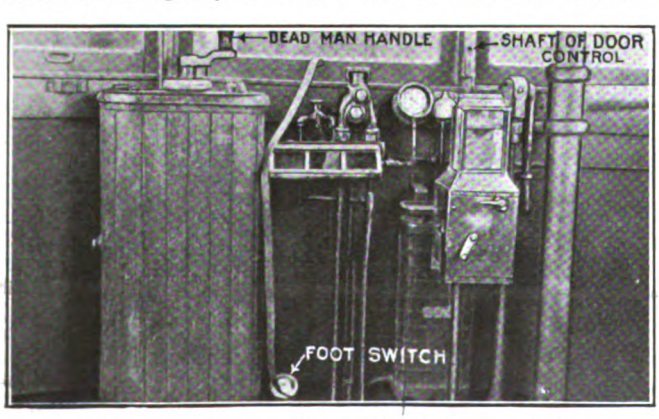
This releases the door and step mechanism so operator can easily turn the handle controlling the door-engine air valve. When the brakes are released just before starting the car, the air pressure in the door-closing cylinder is also released. A spring around the piston stem forces the piston back to its normal position and pulls the door-operating mechanism back to its original position. It should be noted that the control cylinder does not open the doors whenever the brakes are applied, but it does close them on release of the brakes.

When the circuit through the magnetic coil is closed, as upon release of the controller handle, the coil plunger strikes the breaker trip plate and the breaker, inclosed in a fireproof box underneath the car, opens. The breaker handle opens the emergency sand valve and holds it in the open position against the spring pressure. This permits the air to travel to both sanders. At the same time the emergency air line is opened and an immediate brake application results. Thus the car is brought to a sudden stop if the control circuit is allowed to close for any reason, and the full air pressure having built up in the brake cylinder, the door engine valve is again released.

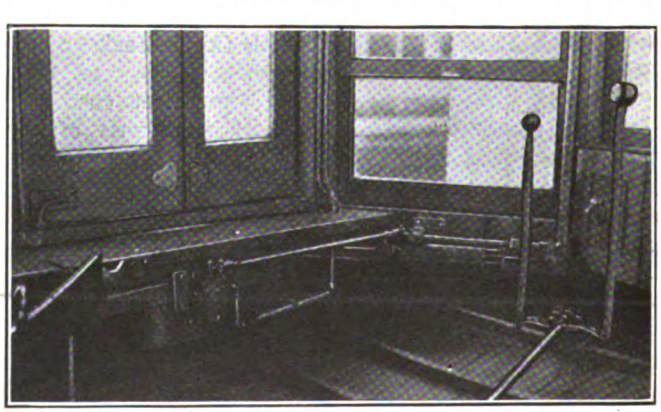
The circuit breaker must be reset at once to close the emergency sand valve and allow the air pressure in the emergency line to build up until the valve resumes its normal position. A reset valve located convenient to the operator actuates a plunger that forces the breaker handle back to the operating position. If there is no air in the reservoir, the breaker can be closed by hand by means of an extension of the reset rod protruding to the side of the car.

The Tri-City cars are double ended, but only one door handle 4 in. long is allowed per car. On changing ends the operator removes this little handle and the brake valve and reverser handles. The controller handle remains attached. A convenient refinement of the device is a rod under the bumper on each end with which the operator can close the door after himself and keep the car warm should he leave the car for any reason at the end of the line. This appurtenance is operative only when the 4-in. handle inside the car is in place. Thus no one familiar with the trick can open the rear door from the outside. The feature was obtained by using a rod joining into a pipe for operating the door valve. The rod and pipe are connected only when the 4-in. handle is screwed through a slot into a hole tapped in the rod.

In operating the cars equipped with this type of safety device the men become accustomed to keeping one foot on the floor switch or holding onto the controller handle.



Operating Platform Showing the Arrangement of Safety Control Devices



Cylinder Controlling Door Engine Valve Located on Front Bulkhead

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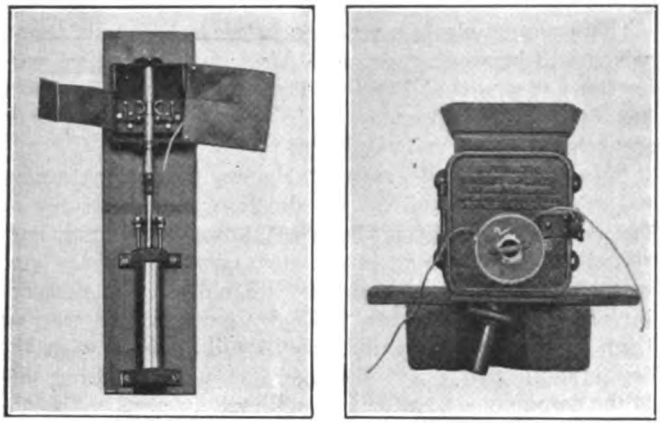
The cutout switch breaks the circuit through the magnetic coil when the car is stopped, thus allowing the operator to release the controller handle and foot switch.

Several of the accompanying illustrations show the location of the various elements. With the door engines over the doors, the control cylinder was placed over the dash window. The cutout-switch cylinder is placed under one of the front seats. Were there room on the bulkhead the same cylinder could be used for both purposes. One of these switches, mounted on a board, ready for installation, is shown herewith. With the spring in the cylinder fully released, the contact rod takes the position shown and the electrical contact is made through the two hinged brushes. With sufficient air pressure the brass sleeve on the rod is pushed away and the two brushes are thus held apart with the wooden rod.

Details of Controller Handle and Foot Switch

The adapted controller handle and the foot switch, which constitute the remaining devices controlling the circuit breaker operation, are illustrated, also showing the assembly and the detail parts. The controller handle is designed so that a very light pressure on the handle holds open the circuit. A positive action has been obtained with a vertical movement of the knob of about ⅛ in. A standard handle (2) is stripped as shown and an L-shaped contact finger (4) designed to pass through a groove machined in the controller shaft with ample clearance. The end of this finger can make contact with a brass ring mounted on a larger fiber contact ring (3) that is screwed to the controller cover.



At Left, Unit Assembly of Switch and Cylinder Operated from Air Reservoir Pressure. At Right, Circuit Breaker Adapted by Addition of Trip Coil

Engaging the upper end of the contact pin is a steel arm bent to slightly less curvature than the controller handle and one end of which is bored to pass over the knob pin. In this position the bend in the controller handle acts as a fulcrum for the steel arm, which is counterweighted on one end to overbalance the effect of the wooden knob. An aluminum cap (5) is fitted over the assembly and another cap (1) is applied over the contact ring. The controller points are indicated on it to replace those ground off the cover when the ring was screwed on. The completed handle has only three moving parts.

Another view shows the foot switch, which normally is held closed by a spring. The shell (4) is cut from 3-in. steel tubing, one end at a 45-deg. angle. The inside is bored to a slightly larger diameter to form a shoulder, against which is inserted a fiber disk. This acts as the lower guide for the plunger (2), while a similar disk with two contact pins fits into the top. The circuit between the contact pins is completed by a brass ring on the plunger disk. The inside of the steel shell is insulated with a micarta tube. An aluminum cap is screwed onto the end of the plunger shaft and it extends over the tube far enough to prevent the entrance of snow or water. Another view shows a standard circuit breaker adapted for tripping with a magnetic coil that is attached to the cast-iron box.

The cost of applying the safety equipment, including labor and material, averaged less than $600 per car. The patents for this method of protection for one-man operation are held by John Sutherland, master mechanic of the Tri-City Railway properties. The devices are manufactured and sold by Nic Le Grand, Inc., Rock Island, Ill.

Would "Sell" Detroit Municipal Railway to Detroit People

Consultant Uses Opinions of Municipal Railway Engineers for Report to Give Publicity to Faults of D.U.R. Track, the Rehabilitation Work Done and Merits of the New Construction

THE first of what is presumably to be a series of bulletins prepared by Walter Jackson, consultant, apparently for the purpose of keeping the people of Detroit sold on their municipal railway system, has been made public. This bulletin is printed in the form of a four-page leaflet under the heading of "What Was and What Is on the Street Railway System." A subheading explains that the report is an "analysis by a technical specialist of the conditions and practices on the city's own system prepared that the general public may intelligently watch developments and adequately gage the policies being executed." Further explanation of the report is set apart in a box as follows:

"The purpose of this report is to present an analysis of the operation of the Department of Street Railways, City of Detroit, along the following lines:

"1. The condition of the property when taken over from the Detroit United Railways; first, as regards the degree of deterioration; second, as regards the character of construction, equipment and practices regarded as good by the predecessor organization.

"2. The condition of the property today; first, as regards the extent of rehabilitation; second, as regards the character of construction, equipment and practices regarded as good by the successor organization.

"3. A comparison of the municipal standards with the practices and tendencies of the American electric railway industry at large.

"4. Suggestions that may tend to make the Department of Street Railways of the City of Detroit the most capable mass transport concern in America."

The report then takes up a discussion of the physical condition of the track which was taken over from the Detroit United Railway. The report of the engineer of the municipal system to the general manager of the municipal system is drawn upon for extensive quotations about the disrepair of the D.U.R. track. A summary is then given of the extensive trackwork done during 1922 from May 15, the day on which the property was taken over, up to Dec. 31, 1922, in bringing the D.U.R. system

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up to operating physical standard. This summary was as follows:

New track construction (ft. of single track)	5,539
Track reconstructed (ft. of single track)	49,449
Falk cast-weld joints replaced	2,890
Tons of steel used for special work renewals	1,055
Track repaired (ft. of single track)	70,469
Pavement replaced, sq.yd.	42,641
Concrete foundations replaced, cu.yd.	1,811

"From this greatly condensed statement," the report goes on, "it will be apparent that the track and paving needed early and earnest attention if service was to be given with any degree of reliability. Track reconstruction is the most costly work an electric railway has to face, so that it is not to be wondered at that the Detroit United Railway refused to spend thousands of dollars for a new crossing if it could bump along until the end of its expected departure from city operation. Had the purchase negotiations moved faster, the property would have been in correspondingly better condition for safe and comfortable operation."

Discussion of D. U. R. Construction

As to the standards of track construction used by the Detroit United Railway, Mr. Jackson has this to say:

"Any kind of equipment, no matter how good, has to be cared for to give smooth service. We know that during the last two or three years of its tenure, the predecessor company naturally did no more than it could avoid doing and with this policy no one can find fault. However, a different question arises when we consider the character of construction in itself and ask whether it represented the best types available for the job. In other words, were the track standards of the Detroit United Railway the best standards—if we assume that the company had continued to operate with the usual degree of care in upkeep and renewal of the structure."

Here follows a summary of the mileage of each type of D.U.R. track taken over with the corresponding comment of the municipal railway engineer as to its faults. Mr. Jackson adds the comment that "From the foregoing it will be seen that while the concrete and wood tie construction adopted as a Detroit United standard conformed to the ideas of many track engineers, the use of such construction with a non-waterproof paving led to a deterioration that may have been hastened by neglect in the last uncertain years but which appears to have been inevitable in any case. At any rate, the experience of the Detroit United Railway has been the strongest reason for the use of the much different track construction described hereinafter."

Similarly, the practice of cast welding the joints is criticised with the comment that the D.U.R. "seems to have been one step behind the latest developments of the art." The report then takes up a discussion of the type of track construction adopted by the municipal railway and quotes articles and editorials from the ELECTRIC RAILWAY JOURNAL at length to establish the merit of the municipal construction work.

Reference is made to the matter of rail corrugation, which forms an answer to some critics who have associated corrugation with the rigid type of construction used by the municipal system. The report points out that a stretch of 6 miles of open track with wooden ties, constituting as flexible track as one could desire, had developed corrugation. It also brings out that the railway's engineer made the telling point that the corrugation in rigid track had been confined to the 100-lb. section of rail, whereas if it were a condition due to stress of car operation, one would look for it in the 91-lb. and 93-lb. sections first. It is then pointed out that no one knows the dominant cause of corrugation. Finally Mr. Jackson indorses the Detroit Municipal construction in this manner:

Indorses Construction Used by City

"The combination of steel ties, concrete foundation, electric welded joints and compressed concrete paving is the last and best word in track construction of the rigid or monolithic type. This construction does not oppose the modern tendency toward monolithic street paving but works with it. The department's design actually reinforces the rest of the paving, whereas the so-called flexible track using wooden ties and block paving would tend to break up adjacent paving owing to the up and down movement of heavy cars running over wood."

The report is then concluded with the following comments:

"If any electric railway is entitled to relief from the paving burden, it is one like the Department of Street Railways because the latter has adapted itself completely to the type that is best for all other users of the public highway.

"The use of electric welding between the rails themselves and between rails, steel ties and mechanical connections means that the Department of Street Railways has taken more precautions to avoid electrolysis than any other electric railway in the world.

"No other electric railway has made such extensive use of the 'best quality' standards or specifications of the American Electric Railway Association, nor constructed track with such a modern array of labor, time and nuisance-saving appliances. Finally, a big advance in labor policy has been made by grading the men so that the more capable individuals will remain with the department throughout the year instead of drifting into other employment and thus making it necessary for the track division to break in too large a number of new men.

"A patchwork policy may give the older track three or four years more of useful life; a reconstruction policy will settle the track question for a generation. The answer lies with the public."

The Readers' Forum

We Strive to Merit This

HARRISBURG RAILWAYS COMPANY
HARRISBURG, PA., Feb. 26, 1923.

To the Editors:

I want to take this opportunity of congratulating you on your Feb. 24, 1923, issue of the ELECTRIC RAILWAY JOURNAL.

This is one of the best issues, to my mind, that the ELECTRIC RAILWAY JOURNAL has ever placed before the public and you are to be congratulated for the articles that it contains and the general make-up. In fact, I think you have set a standard by this issue that will mean a considerable amount of work on your part to maintain during the year. This is really an issue that should be placed in the hands of every operating man in the industry in the United States. C. F. CRANE,
Assistant to the President.

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Americanization Work Proving Successful

Intensive Effort Among the Employees on the Insull Properties Results in Practically All of Them Becoming Citizens

AMERICANIZATION work among employees of the Chicago, North Shore & Milwaukee Railroad, Chicago Elevated Railroads and other public utility companies under the direction of Samuel Insull, Chicago, has established a record believed to be unique among the industries of the country. For the last eighteen months intensive Americanization effort has been carried on among the employees of the six public service companies, with a result that today practically all employees are either American citizens or have declared their intentions of becoming such and have taken out their first naturalization papers.

A report just made to Mr. Insull by the joint committee in charge of the Americanization work shows that on Jan. 1 the aggregate number of employees on the payrolls of the combined companies was 24,214, and of this number, 22,270, or 91.97 per cent, were American citizens. Those who were in possession of their first papers and who will gain the full rights of citizenship within the next few months number 1,893, or 7.82 per cent. Only fifty-one or 0.21 per cent were not citizens or had not taken out first papers. Some of those who had not yet declared their intentions of becoming citizens expected to do so within a few weeks.

The report shows that out of 5,488 employees of the Chicago Elevated Railroads, 5,107 were citizens, 379 had taken out their first papers and only two were non-citizens. The Chicago, North Shore & Milwaukee Railroad had 1,350 employees, of whom 1,231 were citizens, eighty-seven had taken out their first papers and thirty-two were non-citizens, most of whom expected to apply for their first papers within a short time.

Back of these interesting statistics is a record of intensive Americanization work, which in reality, to a large extent, was education of the foreign-born employees to speak, read and write the English language and do simple problems in arithmetic. As the work advanced, its scope was broadened to include instruction in the science of government and the meaning of American citizenship.

North Shore Line Benefits Particularly

The most difficult of the situations encountered in this Americanization program fell to the lot of the Chicago, North Shore & Milwaukee Railroad. Trackmen employed by that company were largely aliens, as is usually the case with workers doing this class of labor. Altogether, fifteen nationalities were represented, with Croatians and Italians predominating. At the time the work was undertaken, few of them could read or speak the English language and some of them could not even read or write their native language. They lived mostly in camps located at various points along the right-of-way, so that making them American citizens presented a problem altogether different from that of any other company in the group.

As usual, these men were hired through labor agencies. After a brief survey of the situation it became apparent that little in the way of improvement could be accomplished by the customary practice of working through foremen and labor agencies. It was a difficult problem to carry on Americanization work under these conditions as it was not a simple proposition to convince employees that they should become American citizens. It was a question of educating them to make them fit for citizenship by instruction in the English language.

The first step was orders from Britton I. Budd, president of the company, discontinuing the practice of keeping labor in boarding camps maintained by contractors and the establishment of a system of company camps constructed and maintained to attract the better class of men and keep them contented. The commissary was improved, baths were provided, close attention given to cleanliness about the camp and a Y. M. C. A. secretary was employed to keep after their recreation.

After a further study of the situation it was decided that although this work was a step in the right direction, a systematic course of education should be established to assist these foreign-born employees in becoming citizens. The magnitude of this task will be more readily comprehended when it is understood that the first survey showed that 90 per cent of the men were not citizens, over 30 per cent of them could not speak English, 75 per cent could not read it, and 25 per cent could not read or write their own language. The ages of the men ranged from eighteen to sixty years and averaged thirty-six years.

The company engaged an experienced instructor to direct the work and he was assisted by men in the organization. Schools were fitted up in buildings belonging to the company at various locations along the line. Classes were held on specified evenings at different locations most convenient to the men.

The first step was instruction in English. Later, as the work progressed, English was supplemented with simple courses of study in grammar, arithmetic and government. The instruction was associated with the work the men were actually doing. For example, in arithmetic, a problem like this would be given: If 250 ties are unloaded for renewals in track and 65 ties have been renewed, how many ties are left? This system of instruction promoted interest and enlarged upon the value of the work to the men. Motion pictures were used often as a method of keeping the study interesting.

Beginning late in 1920, two hourly classes were held on two evenings of each week, excepting for two months during the summer, when the program was confined to pictures and recreational pastimes.

As an indication of the interest taken in the work by some, one man over forty years of age, who, though many years in this country, had not learned the English language, said to an interpreter at the close of the first lesson: "I would rather learn English than have $1,000."

After several months of this intensive educational work a certain day was set as "first paper day," upon which all foreign employees who had not yet declared their intentions of becoming American citizens could do so. Arrangements were made to receive the applicants at the courthouses in Waukegan, Ill., and Kenosha, Racine and Milwaukee, Wis., and the day was made a gala occasion. As a result of this, the number of employees among the trackmen who were not citizens dropped from 90 per cent to 27 per cent.

The educational work proved such a success that it is being continued. A school has been started for foremen and all who desire to become foremen. Safety classes are also held and accidents have been reduced to a minimum as a result of education of this sort.

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Association News & Discussions

Mr. Lieb Talks About Coal Situation

Representative of the Utilities Points Out the Causes of the Problem and Discusses Remedial Measures, Showing How the Expansion of Utility Service Tends Toward Solution

AT THE February luncheon meeting of the New York Electrical League on Feb. 28, John W. Lieb, vice-president New York Edison Company, and chairman of the joint fuel committee representing the national electric light and power, railway and gas interests, addressed the meeting on the outlook in the coal situation. His primary intent was to set forth the way in which the electrical industries have been affected by conditions in the coal industry and how they are serving the nation in the conservation of fuel and simplification of its distribution.

Working in this direction, he first undertook to show the essential importance of the utilities, presenting some statistics as to the magnitude of the investment and the great importance of their service to the public. He laid great stress upon the fact that the electric, gas and street railway utilities must function and that for the public good, they should be placed beyond any danger of failure to obtain adequate quantities of proper fuel.

Mr. Lieb reviewed the great difficulties the utilities have had during the past few years in getting coal with which to keep up continuous operation, and how the critical conditions in the coal market have practically nullified the effect of coal contracts and have forced abandonment of any pretense of holding to any minimum specification on coal analysis. To show how more extended use of central station energy would tend to improve the problem of coal distribution, as well as its conservation, Mr. Lieb said that isolated power plants consumed in 1922 about 20 per cent of the total coal mined. This was compared with 6.7 per cent of the total which was consumed by the utilities, indicating the high fuel economy of the utilities when the relative outputs of electrical energy are compared, since these utilities generate annually more energy than the aggregate produced by all isolated industrial plants.

Turning to the mining operations, Mr. Lieb said that there was an increase of 154 per cent in the number of mines operated in 1920 compared with the number in 1910, with an increase in annual capacity to over 800,000,000 tons, while the actual demand reaches only from 500,000,000 to 600,000,000 tons. This great excess development of new mines as compared with output has seriously interfered with healthy conditions in the coal business. The resultant irregularity of production has been great; thus, in Illinois, in 1921, the average number of days per mine worked was only 131, and for the country as a whole in that year it was 149 days. Similarly, the amount of labor available at the mines is excessive. About 74,000 men were employed in Illinois in 1921, when 42,033 men could have performed the service by working a more reasonable number of days in the year. For the whole country in the same year, 663,000 mine workers were employed, producing only 415,000,000 tons, while in 1910 to produce 417,000,000 tons only 556,000 were required.

In addition to this increase in number of miners employed, the average annual output per mine decreased from 71,559 tons in 1910 to 38,612 tons in 1920. This would of course involve a serious increase in overhead costs per ton for much of the coal produced. Under any conditions the irregularly employed men of the coal regions, plus the extra expense of non-steady production at the mines, is reflected in the excessive prices of coal, which have to be borne by the ultimate consumer.

Railways Seriously Affected by Overdevelopment of Mines

Mr. Lieb then discussed the effect of mine and railroad strikes on the supply of coal during the past few years and commented on the enormous fluctuations in price. Continuing, he said that the opening up of an excessive number of mines previously referred to had had its reflection on the railroad situation, making it necessary for the railroads to divide their available cars among over 2,900 mines in 1918 and 6,800 more mines in 1920 than would have been necessary had the average production per mine in these years been maintained on the 1910 basis. Gathering the increased tonnage from a largely increased number of mines calls for vastly increased motive power, coal car supply and manpower from the railroads to serve them all.

The number of cars called for based on the rated ability of the mine to produce coal kept pace with the increased number of mines until for the year 1920, cars were ordered in sufficient number to load over 830,000,000 tons—56 per cent more than the total consumption of the country. In the latter part of 1922, cars were called for at the rate of twice the annual consumption of the country.

While it is stated that the railroads have provided in 1920, as compared with 1911, an increase of 42.5 per cent in tonnage capacity of coal cars, 55.1 per cent in new motive power and tractive effort, and have provided 40 per cent increased investment in road and equipment, it is nevertheless true that car shortage did dislocate the steady flow of coal to the consumer, and it may be said, generally speaking, that car shortage periods are closely related to and are the result of labor trouble in both coal and transportation industries.

Mr. Lieb said that the inadequacy of car supply is also intimately related to the system of mine ratings for car assignments and it is expected that the federal coal commission may bring forward valuable suggestions.

Remedial Measures Considered

Turning to remedies that have been proposed to stabilize the coal business, Mr. Lieb said that as yet the United States Coal Commission, after several months of intensive study, has not been convinced that a proper solution has been found. One important group of those interested advocate in essence that the situation be allowed to work itself out without external government or other interferences. Their contention is that the coal industry, under the ordinary laws of competition and of supply and demand, was as stable prior to the war and as satisfactorily operated as any other industry. They claim that the recent difficulties are an aftermath resulting from war conditions, and that these will rectify themselves with time. They believe, if unrestrained by artificial means, that the excessive development of mines will be reduced in the natural course of business through the less efficient schemes worked out by competition. This in turn will cause the excess mine labor to enter other pursuits. The result of such a natural movement would, they say, tend to increase the steadiness of the workings

Forthcoming Meetings of Interest to Electric Railway Men

March 12-14—Oklahoma Utilities Association, Oklahoma City, Okla.
March 22—New England Street Railway Club (annual meeting), Boston, Mass.
March 14-15—Illinois Electric Railway Association, Chicago.
March 19-21—American Railway Association, Engineering Division, Chicago.
March 22-23—Wisconsin Utilities Association, Milwaukee, Wis.
May 7-10—Chamber of Commerce of the United States, New York.
May 15-17—Southwestern Public Service Association, Ft. Worth, Texas.
June 27-29—Central Electric Railway Association, Cedar Point, Ohio.

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of the mines remaining and give steadier employment to the miners. All of this would mean greater economy and lower cost of production.

The second suggestion which Mr. Lieb said had been made is that the government itself purchase and operate the mines. This plan, although vigorously and continuously promoted by a group of the more radically inclined, has been quite universally condemned by the public on the ground that government ownership and operation have not proved either efficient or economical and experience with the railroads under government management has not been such as to encourage further experimentation in that direction.

It is more or less self-evident that under government operation at least a large proportion of the mine officials and probably workmen would hold their positions not primarily upon merit, but in many cases because of their individual political affiliations and influences. It has usually been found, Mr. Lieb said, that the public is better served and better protected under the natural laws of business than through governmental interference and political control. Several bills have already been introduced in Congress having to do with the various phases of governmental control. Thus, one bill provides that long-time coal contracts may be recorded with the Interstate Commerce Commission and that when crises arise, a mine shall supply its recorded contracts with coal before it supplies other customers. Another bill provides that anthracite coal shall be graded into classes and that coal operators and dealers will be subject to penalty for shipping or selling coal which is not in conformity with the grade represented or contracted for.

Finally, plans have been proposed whereby, through the extension of the storage of coal by all users, the seasonal variation of prices of coal and possibly seasonal variations of freight rates, by conservation of energy in the use of coal, and by simplifying its distribution, conditions can be materially improved.

Railroads Should Store Coal

Mr. Lieb then discussed the advantages of storage and pointed out that the utilities have long been practicing this measure in an extensive way. In fact, it was the storage of coal by the utilities in advance of the strike of 1922 which practically saved the situation. Mr. Lieb said that larger storage capacities for all coal users, to be filled in times during the year when transportation facilities are best available, would do much to prevent the present unsatisfactory fuel conditions. The railroads themselves should, in as great measure as possible, haul and store the coal for their own needs. They use approximately one-third of the bituminous coal consumed, and thus they are in an excellent position to aid to a much greater extent than in the past in stabilizing both the coal industry and their own operations through such methods.

Further, Mr. Lieb pointed out that the mines can in a certain measure promote storage which would prevent irregular daily production output from the mines, caused by variations in daily car supply. In many locations a coal pocket holding from one to two days output may be installed at a moderate expense and so arranged as to discharge directly into the railroad cars with little additional equipment and no additional handling. Such a storage should enable the mine to run continually at least five days per week and the slight additional cost would be largely overbalanced by improved showing in the overhead per ton of coal produced. The overhead expenses go on while the mine is idle.

These expenses amount to about 40 per cent of the total cost of the coal on the car. Those mines which have installed storage of this kind find that under most conditions the car supply is equalized and that definite advantages result from the practice.

A greater application of electrical equipment in coal mines would also tend to improve the situation, the speaker said. As to the possibility of locating electric generating stations at the mine mouth, Mr. Lieb said that this was possible only in comparatively few cases. The project of pumping coal through a pipe line has been considered by many engineers and its feasibility has been shown, at least theoretically. A proportion of 50 per cent by volume between material and water can be maintained. At 10 ft. per second, which is not excessive, a 14-in. pipe would carry over 7,000,000 tons of coal per year, and this delivery is independent of the length of the pipe. He said that at the present time it is estimated that the cost of delivering a ton of coal, including fixed charges from Scranton, Pa., to the New Jersey side of the Hudson would probably not exceed 50 cents a ton, to which would have to be added the ordinary charges for lighterage and handling in the Port of New York. Mr. Lieb also touched upon the working out of super-power systems as tending to solve the problem.

Mr. Lieb concluded his address by an appeal for the necessity of state regulation. Referring to the great possibilities which the utilities offer in conserving coal and simplifying its distribution, he said that it will be impossible for them to develop or give good service to the public if subjected to the harassing interferences of all of the municipal or minor political establishments through which they may extend and in which they operate. Nor will such a consummation as the public desires and the companies wish to provide be possible unless state-wide regulation of a broad and equitable character is maintained and the laws and rulings governing the utilities are of a helpful and stable character and such as to attract the large quotas of capital which it is necessary to obtain each year to provide for the rapid extension of the public utilities in order that they may serve the public adequately, efficiently and economically.

Association in Maryland

THE Maryland Utilities Association is the latest utility organization, the initial meeting having been held at the Engineers' Club in Baltimore on Feb. 20 and 21. The morning of Feb. 20 was devoted to a general meeting, and in the afternoon the association divided into three sections: Electric, gas and water. On Thursday evening there was a banquet at which the speakers were Governor Ritchie of Maryland, W. R. Voorhis, vice-president American Water Works & Electric Company and Senator Orlando Harrison. On the morning of Feb. 21 there were also section meetings with papers and addresses. More than 170 delegates were present.

The officers of the new organization are as follows: President, Hon. Emory L. Coblentz, Frederick; vice-president, Charles O. Culver, Salisbury; secretary and treasurer, H. T. Connolly, Annapolis. The board of directors consists of six members as follows: Joseph W. Lynch, Hagerstown; Luther D. Shank, Centreville; A. N. Tawes, Crisfield; T. E. Bullock, Baltimore; George W. Woolford, Cambridge, and Louis H. Palmer, Baltimore.

Mr. Coblentz, the new president, is chairman of the board of directors of the Potomac Public Service Company.

C.E.R. Accountants Meet at Lima

FOUR excellent papers were presented at the forty-fourth meeting of the Central Electric Railway Accountants' Association, held in Lima, Ohio, Feb. 23 and 24. The authors were Robert R. Peery and J. B. Mahan, Terre Haute, Indianapolis & Eastern Traction Company; A. R. Baxter, Indianapolis & Cincinnati Traction Company, and A. W. Heath, Chicago, South Bend & Northern Indiana Railway. Abstracts of these papers will be published in a later issue.

The following officers were elected for the coming year: President, Karl A. George, auditor Northern Indiana Power Company, Kokomo, Ind.; first vice-president, L. W. Van Bibber, auditor Indiana, Columbus & Eastern Traction Company, Springfield, Ohio; second vice-president, J. P. Longon, auditor Cincinnati & Dayton Traction Company, Dayton, Ohio; secretary-treasurer, L. E. Earlywine, Traction Terminal Building, Indianapolis, Ind.

The executive committee elected comprises: H. F. McColgin, auditor passenger receipts Interstate Public Service Company, Indianapolis, Ind.; John Cummings, auditor Wheeling (W. Va.) Traction Company; Tudor W. Jones, auditor Union Traction Company of Indiana, Anderson, Ind.; H. O. Weimer, auditor Winona Interurban Railway, Warsaw, Ind.

It was decided to hold the midsummer meeting at Cincinnati, Ohio, July 27 and 28. There will be a one-day session in Cincinnati and the association will make a trip by river packet from Cincinnati to Louisville, Ky., and from Louisville to Indianapolis by the Interstate Public Service Company's line.

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Wisconsin Utilities Association

THE Wisconsin Utilities Association, which includes the gas, electric and street railway companies, will hold its annual meeting on March 22 and 23 at the Hotel Pfister, Milwaukee. The Wisconsin State Telephone Association will hold its sessions at the Wisconsin Hotel, March 21, 22 and 23. A joint session of both associations will be conducted at the Pfister on the morning of March 23. It is expected that nearly 1,000 utility men will be present.

The program for the joint session will include reports from J. P. Pulliam, Milwaukee, president of the Wisconsin Utilities Association; Arthur Taylor, Rhinelander, president of the Telephone Association; John A. Pratt, Madison, secretary; Bruno Rahn, Milwaukee, chairman gas section; C. R. Phenicie, Green Bay, chairman electric section; B. W. Arnold, Oshkosh, chairman electric railway section; A. E. Gerg, Fond du Lac, sales section; and C. E. Kohlhepp, Milwaukee, accounting section.

James P. Barnes, Louisville, Ky., and John B. Malig, New Haven, Ind., will make the principal addresses. Group luncheons of executives, engineers, accountants, superintendents, advertising and sales men will be held at noon. Several other speakers whose acceptances have not as yet been received will be on the general session program.

Chairman B. W. Arnold announced the following program for the electric railway section:

"Education of Electric Railway Employees," by Edward J. Blair, Chicago.

"Pneumatic Operation of Car Doors and Steps," by Oscar Broten, Chicago.

"Maintenance Problems of Track and Overhead," by Albert A. Oldfield, Oshkosh.

"Automobile Street Car Collision Statistics," by R. M. Howard, La Crosse.

"Selling Transportation," by F. W. Shapport, Chicago.

"Business Ethics," by Oscar Stotzer, Milwaukee.

The papers will be discussed by Dudley Montgomery, Madison; C. E. Warwick, Green Bay; Nels Rasmussen, Wausau; Clyde Hedges, La Crosse; John St. John, Cedarburg; A. J. Goedjen, Menominee; C. C. Shockley and J. A. Phelan, Rockford; Joe Jessart, Green Bay; H. G. Menger and J. H. Lucas, Milwaukee.

American Electric Railway Association Convention

It has been decided that the 1923 convention of the American Electric Railway Association shall be held at

Atlantic City

during the week commencing

October 8

and that there shall be an exhibit of the apparatus and equipment available for use of the electric railways.

American Association News

Heavy Traction

THE Engineering Association committee on heavy traction met in New York City on Feb. 20, to review the progress made to date on the several assignments. The committee learned with satisfaction that the American Association executive committee had made an appropriation to provide for a careful revision of the committee's bibliography on heavy traction. This work will be assigned to an expert on indexing, and the committee will supplement his work by bringing the bibliography up to date. The committee feels that this is one of the most important pieces of work to which it can address itself, as a reliable and permanent index to important articles in the field will form the basis for research in this subject and will reflect credit on the association.

The committee devoted particular attention to self-propelled vehicles, which was the subject of a comprehensive report by the 1912 committee. In view of the renewed interest in self-propelled rail cars the committee will bring the data of the earlier report up to date by sending out a comprehensive questionnaire to all known operators of these vehicles. The list will be compiled with the co-operation of manufacturers, an extended list of which has been compiled. The questionnaire will be complete enough to permit a study of the operating conditions of the rail-car lines, as well as the details of the vehicles. The investigation will cover steam, oil, gasoline and electric motive power.

At the meeting progress was reported regarding the compilation of data on American and foreign electric locomotive development, and on the digesting of the results of the work which the committee has performed during recent years.

The meeting of the committee was attended by Sidney Withington, New Haven, Conn., chairman; J. M. Bosenbury, H. W. Coen, J. C. Davidson, and J. V. B. Duer, Norman Litchfield and L. S. Wells.

On the Steps of the Executive Offices of the White House

The party of electric railway men at the White House who were received by President Harding at the time of the Midyear Conference of the American Electric Railway Association in Washington, Feb. 16. The news of this and the names of the men were published in the Feb. 17 issue of ELECTRIC RAILWAY JOURNAL, which contained the full report of the meeting.

Committee on Welded Rail Joints

SUPPLEMENTING the report of the meeting of the committee on welded rail joints and of the executive committee, given in last week's issue of this paper, the following additional information will be of interest to electric railway men:

At the meeting there was considerable discussion as to the way in which the joints which are to be submitted for tests should be made up. It was decided that joints for straight track should be made under service conditions wherever possible, and in cases where this is not possible a detailed description of the actual condition is to be furnished to the committee. The test joints are to be made early this spring.

The tensile and conductivity tests are to be made at the United States Bureau of Standards in Washington, the drop tests at the University of Illinois, Urbana, and the bending tests at Purdue University, Lafayette, Ind.

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Maintenance of Equipment

Cleaning Armature Coils by Boiling

THE problem of cleaning used armature coils has been one that has puzzled most armature-room foremen and master mechanics. Aside from the time and labor required by the scraping method, the danger of damaging the coil through the use or misuse of a sharp tool also arises. With the old method, two men, usually helpers, would strip what mica was possible from the bars and then scrape the remainder off with putty knives or special chisels.

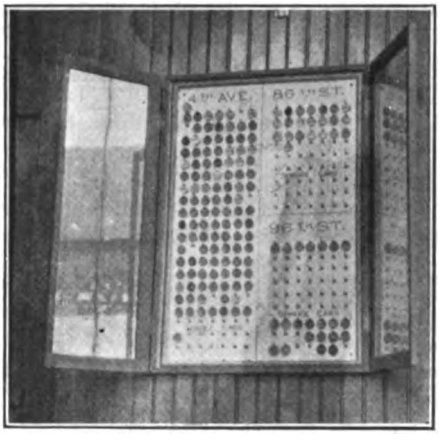
In a new process, as used at the shop of the Metropolitan West Side Elevated Railway, the coils are stripped as before. They are then placed in a boiling vat heated by steam. A solution of "Okite" and water, 5 lb. of Okite to 10 gal. of water, is used as the cleaning agent. Boiling for five hours, wiping with a soft cloth and drying in an oven is all that is necessary. No damage is done to the coils and much labor is saved. This process has been used on commutator segments with equal success and a corresponding saving in labor. From information obtainable, labor time required for hand scraping a set of coils is forty-eight man-hours, that is, two men working three days, while that required for the boiling process is one and one-half man-hours. The one and one-half hours for one man represents labor time required to strip coils, handling to and from boiler, wiping, handling to and from oven, and preparing for tape machine. This means a total of six and one-half hours from start to finish of process compared with three days for two men in the old process. It has been found that coils and bars subject to this process take tinning more readily than scraped ones.

Old Compressor Motors Useful

IN THE maintenance shops of the Eastern Massachusetts Street Railway in Fall River the corner occupied by the blacksmith contains several interesting stunts. One is the way in which two retired compressor motors are used in connection with the forge. One of these drives a fan which furnishes the draft for the fire and the other drives the fan which draws off the smoke through the hood. The two motors are controlled through a single switch, so that both drafts are always furnished simultaneously and there is only one operation to bother about. The blacksmith has his supply of coal in a bin out of doors, with an opening through the wall handy to the forge. This opening is closed with a slide.

Board Shows the Location of Cars

THE accompanying illustration shows a type of board that is mounted on the wall of the master mechanic's office for the New York & Harlem Railroad. This is adjacent to the master mechanic's desk and indicates the location of all cars under his supervision. The board is divided so as to indicate the various shops, and the cars are indicated by 1-in. diameter fiber tags which have the car number stamped on them. These have a small hole so that they can be hooked over small hooks on the board. These tags are also used to show other information than the car numbers. Thus, the painting of the cars is indicated by changing the color of the tags as the cars are repainted, and where cars are renumbered the old number is placed on one side of the tag and the new number on the other. Space on the board is provided so that service cars are kept separate from passenger cars. The board has glass doors and when mounted on the wall presents an attractive appearance. It is a great convenience for keeping track of the location of cars.



Board Shows Location of Rolling Stock

Roller-Link Chain Found Economical on Conveyor

MORE than seventeen years ago the Market Street Railway, San Francisco, opened a rock quarry at Daly City, one of the outlying districts reached by the system, where rock has been quarried and crushed ever since for the ballasting and paving done by this company. As first installed, the 120-ft. continuous bucket elevator used in elevating rock from the crusher pit to the top of the bunkers was operated on a malleable iron chain. The heavy duty proved too much for this type of chain and the plant was subject to frequent shut-downs while the chain was being repaired.

When breaks occurred at the top the elevator was precipitated into the pit below, and in the absence of facilities for overhead tackle the only means of reassembly was to take it apart into five-bucket sections, which one man could carry up the ladder. By this slow process the elevator was again assembled from the top down.

In 1906 the original chain was replaced with a steel double-link chain in which each unit consists of two links with the shaft or pin encircled by a bushing and a roller, known as a steel-thimble, roller chain. This type of chain has been in practically continuous service for sixteen years, and though the first cost was comparatively high, the advantage of avoiding delays due to breakage and the low maintenance cost have made this type of chain highly economical in the long run.

The manufacturer has long since discontinued making this particular size of chain, but replacements are readily made up in the shop of ⅝ x 1½-in. links, punched cold from strap-iron. Special pins are used with bushings and rollers cut from cold rolled tubing of two sizes. Links are made up as needed so as to keep a supply always on hand.

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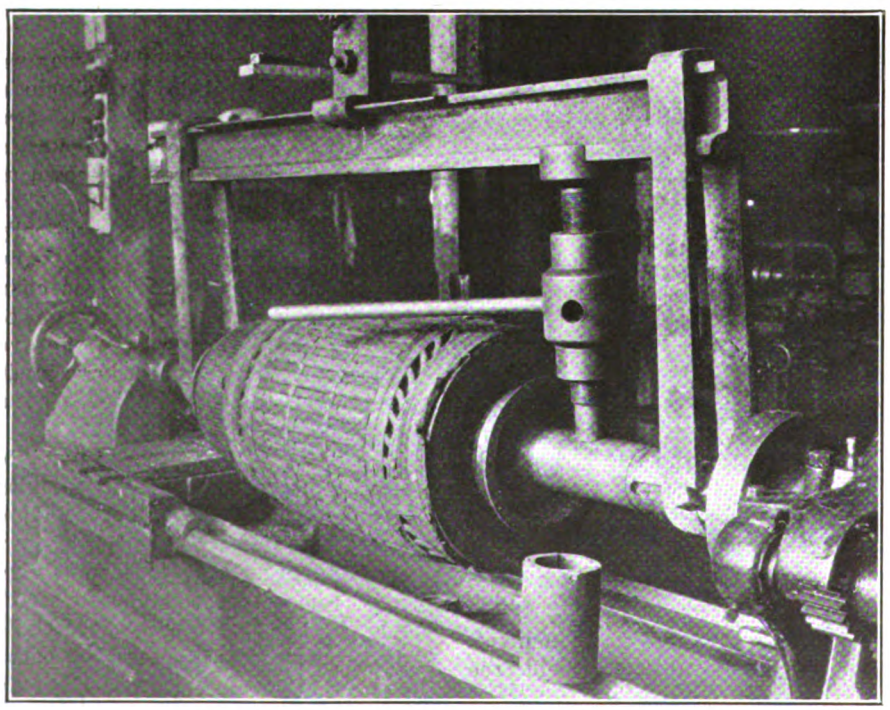
Straightening Bent Armature Shafts

THE armature shafts of railway motors sometimes become bent due to the breaking of pinions or to some abnormal condition. The accompanying illustration shows a rigging used by the Eighth Avenue Railroad, New York, N. Y., for straightening its armature shafts. The armature is first placed in the lathe centers and is chalked to indicate the place where the shaft is sprung. The rigging used for straightening is then attached with the armature still remaining in the lathe.

The equipment used for the straightening consists of a 60-lb. plain girder rail which extends lengthwise of the armature. Over the ends of this are placed two stirrups which pass around the end of the armature shaft. A clamping support is fastened to the middle of the plain girder rail so that the entire equipment can be suspended from a chain hoist. When the rigging has been brought up tight so as to take out all slack at the stirrups and to remove any strain from the lathe centers a screw jack with right and left hand threads is used for the straightening. A collar is placed over the armature shaft on the pinion seat or taper so that the stirrup will not slip. The jack is placed between the point where the shaft is bent and the girder rail. The jack used by the Eighth Avenue Railroad has twelve threads to the inch, and sufficient pressure to straighten the worst cases can be obtained by using a rod approximately 3 ft. long for the turning of the jack. As the most severe strains come at the pinion end of the armature shaft, this end is the one which is usually bent.



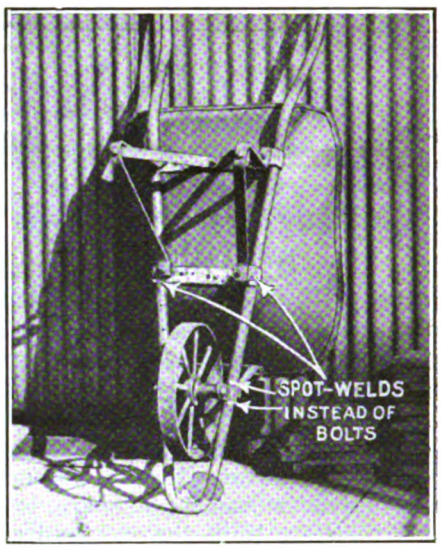
Straightening an Armature Shaft of a Railway Motor

Spot-Welded Fastenings Improve Wheelbarrow Design

REPAIR of wheelbarrows in the shops of the Market Street Railway, San Francisco, drew attention to the fact that frequent breaks were due to a weak spot in the 1-in. wrought iron pipe frame where holes are drilled for the bolts that hold the frame together. In making renewals pipe of extra heavy thickness is used and instead of drilling holes for bolts at the weak point a collar is there spot-welded onto the pipe. Thus, by eliminating four bolt holes, the resultant construction is considerably stronger and more serviceable than equipment purchased new.

On the wheelbarrow shown in the accompanying illustration only the pan and the wheel were bought for the purpose, all the other parts being made up from material previously made up from material salvaged from obsolete or worn out equipment.

Work of this sort would be economical only during slack time and with comparatively low-cost labor. However, it is pointed out that when men have been in the mechanical department long enough to earn a pension, minor work of this character fits the case very well and becomes profitable for both employer and employee.



Wheelbarrow Framework Constructed in Railway Shop

Making Thermit Compromise Welds

THERMIT compromise rail welds can be made in the track or in the shop. Where large quantities are desired of the same style, it pays to obtain special patterns and mold boxes in order to facilitate the making of the weld. Where, however, only a few are required or where various combinations are required a wax pattern can be applied directly to the rail and the mold rammed against it. The wax pattern should conform as closely as possible in shape to the aluminum pattern ordinarily supplied for rail welding and is easily shaped by hand.

A very simple and efficient way of making a wax pattern is to melt the wax in a suitable pan to a liquid stage, 1 in. thick. This is allowed to cool until the top surface has become solid. The lower part will still be plastic. This is cut into strips 2 in. wide and is applied around the rail ends.

The wax will be sufficiently soft to be easily manipulated by hand to the desired shape and thickness for the weld. It is advisable to imbed a cord about ¼ in. thick in the wax, leading from the riser to the heating gate. This cord can be pulled out, leaving a vent hole, which greatly facilitates the melting of the wax during the preheating. A regular sand mold can then be rammed around the wax pattern, using wooden patterns for pouring gate, riser and heating gate.

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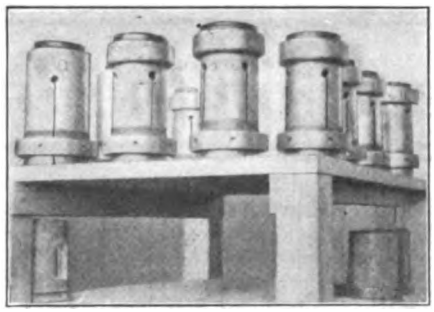
The preheating melts out the wax and leaves the mold ready to receive the Thermit steel as soon as the rails are red hot. The rest of the operation is the same as in the case of the regular rail weld.

The quantity of Thermit required can be calculated from the weight of the wax used in the pattern. It is best to weigh the wax before starting and weigh what is left over, the difference being the amount in the pattern itself. Allow 20 lb. of Thermit rail welding mixture to each pound of wax.

Large Assortment of Self-Centering Chucks

THE accompanying illustration shows a rack with eleven self-centering chucks for holding armature bearings while they are being machined. These are used in the shops of the United Railways of St. Louis, where equipment for about 125 cars is maintained. The rack is adjacent to the lathe used for turning armature bearings and the type of chuck used is the same as described in the ELECTRIC RAILWAY JOURNAL for Jan. 20, 1923, page 129.



A Rack with Various-Sized Chucks Is Located Conveniently to the Lathe

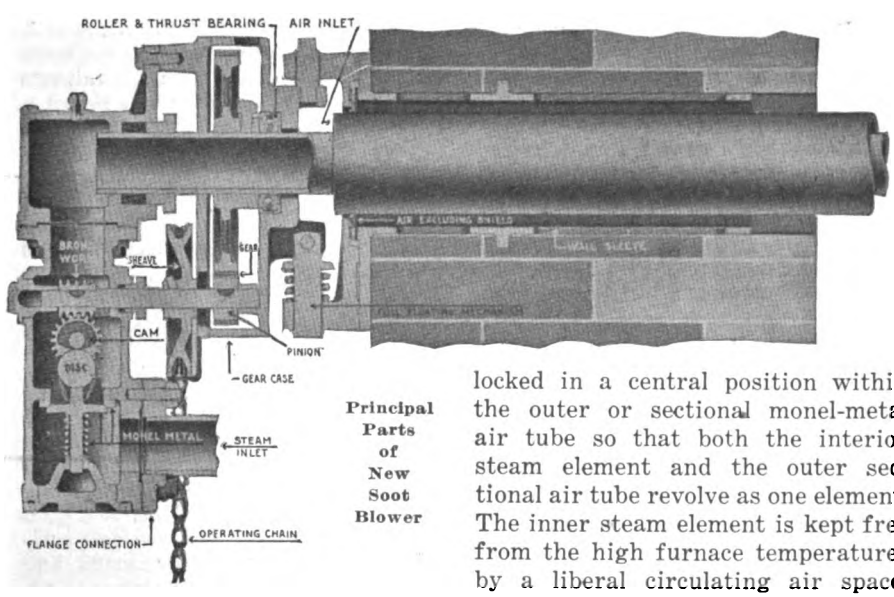
New Equipment Available

Improved Mechanical Soot Blower

IT IS common practice to overload boilers continuously and force them over high peaks during emergencies. Because of this they must not only be provided with sufficient combustion space but the boiler tubes must be kept clean. Since the furnace temperature ranges all the way from 2,000 to 2,800 deg. F. it is plain that the problem of developing a soot blower element that will stand up under this high temperature is important.

Most of the steam is generated in that portion of the boiler where heat is most intense, directly "in sight of" the fire. It is absolutely necessary that the tubes in this portion be kept free from soot. To keep these tubes clean one or more soot-blower elements must be placed close enough to reach and thoroughly clean them all. This means that these elements must be able to resist unusually high temperatures. The Bayer Company, St. Louis, Mo., has developed a revolving soot-blower element that overcomes the temperature difficulty by use of monel metal and has other valuable features.

The interior steam element is locked in a central position within the outer or sectional monel-metal air tube so that both the interior steam element and the outer sectional air tube revolve as one element. The inner steam element is kept free from the high furnace temperatures by a liberal circulating air space. Likewise, the outer monel-metal sectional air tube is kept at a comparatively low temperature by the cooling effect of the circulating air passing through and within it.



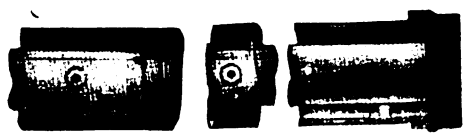
Principal Parts of New Soot Blower

Recently it was pointed out by the manufacturers of monel metal that there are eight widely used commercial metals: Copper, zinc, aluminum, iron, steel, lead, bronze and monel metal. Of these metals, acid destroys copper, zinc and aluminum; oxygen corrodes iron and steel; heat weakens lead. Monel metal resists all of these destructive forces, resists nearly all acids as well as oxidation and is able to resist hot sulphurous gases in the combustion chamber.

For these reasons, a sectional monel-metal protecting tube called an "air tube" and monel-metal nozzles are used on this new blower. The danger of oxidation of the air tube is thus eliminated and the nozzles will not corrode, nor will they wear away because of wire drawing. To take care of expansion, ample space is provided for each nozzle where it projects through the outer tube. The outer tube, also, is joined together by means of expansion sleeves to allow for expansion and contraction.

An additional feature of the Bayer blower is the valve-in-head construction. By placing the valve in the head time is saved for the operator and it automatically opens and closes at the proper points with the rotating of the element.

A cap at the bottom of the blower head gives access to the valve mechanism. This cap is easily removed and replaced. The two stuffing boxes in the blower can be readily packed without disturbing any other part and the valve is so located in the blower head that steam condensation cannot accumulate above the valve.



The elements can be rotated in either direction, which is an exclusive feature and another advantage. The steam jets are blown within a predetermined arc, making it impossible to blow except where necessary.

The entire head is free to expand or contract with change in temperature and with the expansion and contraction of the boiler walls or the pipe lines. Working parts are protected from the grit and dust of the boiler room by the head casing.

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The News of the Industry

New Plan Submitted

International Railway Head Proposes Contract Providing for Operation Under Service-at-Cost

Herbert G. Tulley, president of the International Railway, Buffalo, N. Y., has submitted to Mayor Frank X. Schwab and members of the City Council an outline of a proposed city-company contract providing for a service-at-cost system on the Buffalo lines of the International. The plan would re-establish the basic 5-cent fare with free transfers, but the fare would be based upon a sliding scale, dependent upon receipts, with a 7-cent fare and a 1-cent transfer as the maximum rate.

Administration of the city-company contract would be under the direction of a transit commissioner to be appointed by the Mayor, the salary and expenses of the office to be paid by the traction company. The plan of President Tulley provides that the rate of fare would be governed by the status of a proposed fare regulation fund similar to the Cleveland plan. The fund would be $500,000. When the fund reaches $750,000 fares would be reduced, but to no lower than 5 cents, and when the fund drops to $250,000, the rate of fare would go up, but to no higher than 7 cents with a 1-cent transfer.

Nine per Cent Return Asked

The standard rate of return to the International under the proposed contract would be 9 per cent per annum. The valuation of the company would be determined with cost of additions and betterments added. All extensions would be built with city money, the company to pay the city the interest and sinking fund charges. There would be no special franchise tax and no charge for snow removal or paving to be paid by the company. It is estimated this saving to the company from the elimination of these charges would be more than $1,000,000 a year.

No part of the company's interurban revenues and no part of the interurban expenses for wages of crews or maintenance of equipment would be included under the contract. All accounts would be kept as specified by the Public Service Commission and the surplus to be credited to the proposed fare regulation fund. All deficits would be made good from the fare regulation fund. Any disagreement between the city and company under the contract would be adjusted by a board of arbitrators, one member appointed by the city and one by the company, these two choosing the third, and the expenses of such a board would be divided between the city and company.

Members of the City Council with the exception of Frank C. Perkins, Commissioner of Public Affairs and the Socialist member of the board, have refused to comment upon the plan until they have made a careful examination of all phases of the situation. Mr. Perkins, however, says that by not charging the company any paving costs, snow removal expenses and franchise tax, the International would have the best of the bargain.

Buffalo newspapers are divided in commenting editorially upon the plan. The *Commercial* says the plan is too much like the cost-plus plan in effect during the war, while other newspapers believe that much is to be gained by the city under such a contract.

Trainmen's Wages Increased in Milwaukee

An increase of 5 cents an hour in the wages of all trainmen employed by the Milwaukee Electric Railway & Light Company since May 1, 1921, went into effect on Jan. 1, 1923. The men employed since May 1, 1921, will now receive the following wages:

CITY OPERATION

Conductors	Cents
First year	45
Second year	47
Third year	49
Fourth year and thereafter	51
Motormen	**Cents**
First year	50
Second year	52
Third year	54
Fourth year and thereafter	56

All men will now receive time and a half for more than ten hours work.

The city trainmen, both conductors and motormen, who were in the employ of the company prior to May 1, 1921, continue to receive their former rate of wages which is 50 cents during the first year, 53 cents during the second year and 56 cents during the third year and thereafter. The majority of these men have been receiving 56 cents an hour and now are receiving that rate. The interurban men receive 2 cents an hour additional over city rates and the one-man car operators and city bus operators receive 5 cents an hour additional. In addition all men receive a bonus which varies according to the revenue, freedom from accidents, amount of power saving and a number of other factors.

The scales previously mentioned were fixed after negotiations between the company and committee of employees selected by secret ballot representing the transportation employees of the Employees' Mutual Benefit Association of the company. These negotiations are conducted semi-annually, thus permitting of frequent adjustments of wages and working conditions to meet increases or decreases in cost of living.

Plans Unification

Railroad Commission Wants Survey of Los Angeles Railway Systems to Eliminate Traffic Congestion

The California State Railroad Commission recently made an official request to the City Council of Los Angeles asking the municipal authorities to advise the commission of its desire to take part in the preliminary work looking toward a survey of the lines of the Los Angeles Railway and the Pacific Electric Railway under the contemplated plan for the unification of the two properties. The same communication was also sent by the commission to both railway companies setting forth the purpose of the proposed survey.

In the commission's activities during the past three years in its service surveys of the railway transportation problem for the city of Los Angeles it developed several months ago that the commission offered a suggested plan of the unification of the two railways.

Unified Operation Suggested

When a survey of these two lines has been completed and a valuation of the properties fixed it is expected that the commission will finally recommend one of three plans:

That the Pacific Electric Railway purchase the Los Angeles Railway lines that actually serve as "feeders" to the Pacific Electric Railway company's system of local lines in the Hollywood district of Los Angeles; that the Los Angeles Railway acquire the Hollywood lines of the Pacific Electric, or that the city of Los Angeles purchase the Hollywood lines of both companies.

The unified operation of the two railways in Los Angeles is suggested by the commission for the purpose of relieving the present traffic congestion.

The surveys of the two systems to be conducted by the commission's engineers are under agreement with the railways and in co-operation with the Board of Public Utilties. The proposed surveys by the commission are to be at the expense of the railways. The commission intends to hold a conference for the purpose of discussing these issues just as soon as an agreement of all concerned to the proposed study and survey is received by the commission.

On Feb. 10 the Board of Public Utilities held a hearing on the matter of transportation conditions in the Hollywood district and various associations from Hollywood petitioned the board to take the necessary action to better the service. Demands were made for extension of the Los Angeles Railway lines into the Hollywood district. The question was again reviewed as to who had the power to order these lines extended, as it had been previously con-

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tended that only the railroad commission had such power and not the Los Angeles Board of Public Utilities. It was also urged upon the board that prompt action be taken to obtain transfers between the cars of the two railways.

HOME RULE TALK AGAIN

In the matter of fares charged, as discussed at the hearing before the board, Commissioner Kennedy of the board stated that it was the plan in the near future to circulate petitions with a view to taking out of the hands of the commission the power of fixing the rates of fare as charged on the local lines in Los Angeles. The city held this power at one time, but some years ago voted at an election an amendment to its charter placing such responsibilities and powers with the commission. Commissioner Kennedy stated that when this power is returned to the city the Board of Public Utilities would see that there is no discrimination in the fares.

The City Council plans to take immediate action regarding the survey of transportation, having referred the invitation of the commission on this matter to the Board of Public Utilities.

At various of the recent motor bus hearings and hearings on the transportation conditions in Los Angeles it was brought out by the board that the matter of unifying the two railway properties could not be taken under advisement until the proposed survey of the properties had been concluded by the Railroad Commission.

Company Will Take Further Action

Decision of the United States Circuit Court of Appeals in San Francisco recently denying a rehearing of the Puget Sound Light & Power Company's so-called specific performance suit against the city of Seattle will be opposed by the company in one more action. The suit was to compel the city to pay the bonded indebtedness of its car line—and interest—on the bonds from the general funds of the city if necessary rather than from the earnings.

J. B. Howe, attorney for Stone & Webster interests, states the company will sue for a writ of certiorari in the United States Supreme Court within the next three months. If the writ is granted the case will again come up for review.

The original action by the power company was brought in the United States District Court. Judge E. E. Cushman of that court held for the plaintiff that the city be required to meet the bonded indebtedness on its car lines from a special fund maintained for that purpose, even at the expense of the city's general fund. The city appealed to the United States Circuit Court of Appeals and the ruling of Judge Cushman was reversed. The company then appealed for a rehearing. This has now been denied in the San Francisco court.

Governor's Measure Presented

Right Would Be Conferred on Cities to Regulate Utilities in Their Boundaries

Governor Smith's own feature bill, which is supposed to embody a solution of the home rule regulation of public utilities in New York and afford a panacea for all local civic ills, is embodied in a measure introduced in the New York State Legislature on Feb. 27. This measure has been drawn in accordance with recommendations contained in the Governor's initial message to the Legislature and confers almost mandatory jurisdiction upon all cities of the State to regulate their own public utilities — mandatory that they assume such responsibility of jurisdiction, unless by a resolution of its governing board, approved by the Mayor, such city elect to have the public utilities in the city regulated by the State Public Service Commission.

The newly created bodies are to be called "city public utilities commissions." Christened with this official title, their term of office and compensation are left to the judgment of the governing board of each city, which may, if it see fit, require an existing body or officer within such city, not necessarily an appropriate body or officer, to act as such a city utilities commission.

This is the bill which has been under discussion for the past two weeks and has been all ready for introduction a couple of times, but each time has been withdrawn for repairs, once at the suggestion of corporation counsels from the up-state cities. Now it is in such shape as to be satisfactory to the larger up-state cities, especially Buffalo and Syracuse.

MUNICIPAL OWNERSHIP PROVISION INCLUDED

The notable feature of the bill is it allows local regulation of all of that portion of a utility lying wholly within a city, except that the power is reserved to the State Public Service Commission of establishing and enforcing through rates or charges for services rendered whether alone or in conjunction with any other corporation by any utility not wholly within a city; to prescribe a uniform system of accounts; to require the filing of schedules and tariffs; or to approve the issuance of stocks or bonds by all public utilities.

As the Democrats see the bill through their political spectacles absolute authority is conferred by the measure upon each city to regulate each and every public utility to the extent that the utilities operate within the boundaries of such city. A statement made by the proponents of the bill says:

> The measure gives to cities in the broadest possible sense optional home rule of public utilities, but provides if the governing board of a city does not wish to function under the law, or wishes to regulate one or more, but not all utilities within such a city, it may pass a resolution with the approval of the mayor, specifying just the kind of utilities it elects not to regulate, if any, and whatever utilities it elects not to regulate, the state commission will regulate as now provided. A city may change the regulatory jurisdiction of the utilities operated within its boundaries at any time, either from state to city or from city to state.
>
> These are the salient provisions of the bill. Other provisions provide the machinery for the transfer of jurisdiction, records and documents from the state to city commissions and their return to the state commission in the event that jurisdiction over a utility ceases to rest with the city utilities commission.
>
> The city functioning under the provisions of the proposed law is not obliged to set up an expensive additional governmental machine, but the governing board of such city may authorize any established agency of government therein, such as the corporation counsel, to exercise such prerogatives, or it may itself assume to perform the work of carrying out the provisions of the law.
>
> In the city of New York, the city public utilities commission does not have control over transit facilities or systems as in such city a special bill takes care of that subject. In all other cities the city public utilities commission has jurisdiction over service, rate of fare, facilities and everything in connection with the operation of that part of a public utility corporation within the limits of such a city, not specifically exempted and reserved to the state public service commission.

The public service committee of the Senate of the New York State Legislature will hold a hearing on the following administration public service commission bills on March 14: Senate Print No. 688, the New York City Transit bill by Mr. Walker; Senate Print No. 833 by Mr. Twomey, amending General City Law, permitting municipal ownership of public utilities; Senate Print No. 834 by Mr. Twomey, reorganizing public service commission and divesting it of certain present powers; Senate Print No. 835 by Mr. Twomey, amending Public Service Commission Law, generally.

Messrs. Emmons and McCarter to Lecture at Princeton

President C. D. Emmons and Past-President Thomas N. McCarter of the American Electric Railway Association have been appointed joint lecturers on "America's Electric Railways," under the Cyrus Fogg Brackett Foundation in Applied Engineering Technology at Princeton University during the college year 1923-1924. They will speak on the broad phases of the electric railway industry, with some reference also to the opportunities in this industry for the university trained men. This year's program of the lecture committee includes leaders in public utilities and engineering. The lecturers will include, besides Mr. Emmons and Mr. McCarter, D. D. Barnum, past-president of the American Gas Association; Alexander S. Lyman, general attorney, New York Central Railroad; J. J. Carty of the New York Telephone Company; Henry I. Harriman, August Belmont, Ralph Modjeska and C. E. Adams.

The date for the joint lecture on "America's Electric Railways" has been set for Jan. 8, 1924, at Princeton. The committee invites the American electric railway industry to contribute to Princeton such exhibits relating to the industry as the association, through its member companies, may care to have prepared and to present.

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Will Consider Subway for Philadelphia

Mayor Appoints Committee of Three—Philadelphia Rapid Transit Suggests Plan

On Feb. 24 Mayor Moore of Philadelphia appointed an advisory committee of three engineers to study the various rapid transit plans that have been proposed for the city and report on the routes which, in their opinion, will best answer the present needs of the city and take care of future growth. A report is requested by April 15. The instructions of the Mayor say, in part:

> You will proceed immediately to an examination and survey of the plans of the Broad Street subway, delivery loop and other authorized high-speed lines as heretofore prepared by the Department of City Transit, to the end that on or before April 15, if possible, you will present to me, for submission to Council and the people, a report that will fully cover a comprehensive high-speed system, adequate to the present and future needs of the city, including any revision or modification thereof, or addition thereto that may be desirable.
>
> In the course of your inquiry, and with due regard to the necessities of our growing population, urban and suburban, I suggest that you set apart certain days to hear citizens, including the representatives of transit companies, who may wish to be heard with respect to existing plans or revisions or modifications thereof.
>
> You are advised that the Philadelphia Rapid Transit Company has been in conference with the Department of City Transit, in an endeavor to co-operate in the event it should become a bidder for operation of the lines when completed. You will, therefore, I trust, invite such information or suggestions as this company may have to offer, reserving, of course, the city's rights in the matter of operation should it fail to obtain an operating agreement, and remembering always that the money spent upon construction is public money, and that it is being spent primarily for the city's welfare and development.
>
> You are asked to complete your examination and survey within the limited time mentioned, so that contracts may be let and work begun upon new lines at the earliest possible date after sufficient time has elapsed for consideration by Council and the people.

The committee is composed of Dr. Milo R. Maltbie, Morris Llewellyn Cooke and Francis Lee Stuart.

Dr. Maltbie, chairman of the commission, was a member of the Public Service Commission of New York, first district, from 1907 to 1915, and has been a consultant and expert on public utilities since then. He has recently been adviser to the city of Philadelphia on its municipal gas system.

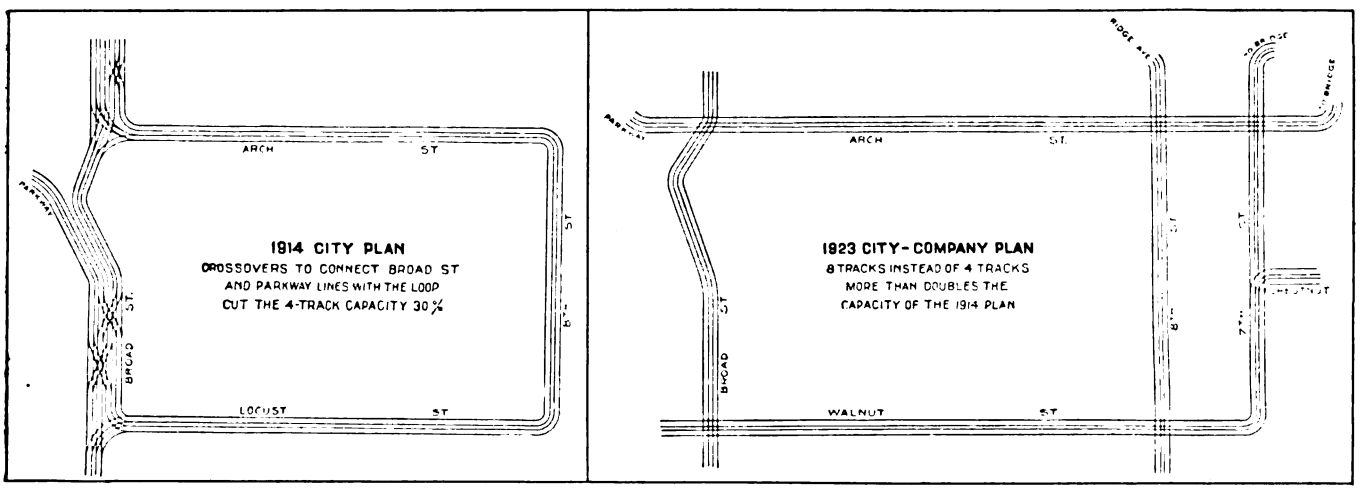
Mr. Cooke was director of the Department of Public Service of Philadelphia in 1915.

Mr. Stuart was chief engineer of the Erie Railroad from 1905 to 1910 and chief engineer of the Baltimore & Ohio from 1910 to 1915. Since then he has acted as consulting engineer on various projects, including the Port Development Commission of Baltimore and the Port Authority of New York.

It is realized by all that the increasing size of Philadelphia and the growing congestion on its narrow streets make some plan for improved rapid transit service necessary. The completion of the Frankford Elevated and its lease by the city to the Philadelphia Rapid Transit Company has given an impetus to the development of further rapid transit lines.

For many years a subway under Broad Street has been considered a necessary feature of any comprehensive rapid transit plan; such a line forming a north and south traffic artery corresponding to the present east and west rapid transit line on Market Street. A Broad Street transit plan was brought out in 1913, when A. Merritt Taylor was Transit Commissioner and recognized the fact that the Broad Street line must form the trunk of any high-speed system designed adequately to serve Philadelphia. In 1915, during Mr. Taylor's term of office as Director of the Department of City Transit, a short section of such a subway was begun under City Hall at the intersection of Market and Broad Streets. Two years later, in 1917 and 1918, short sections of subways, totaling about 900 ft. in length, were built under Arch and Locust Streets. These latter were to have been part of a "downtown loop" which Mr. Taylor proposed should form an integral part of the Broad Street subway. Due to the interference of the War Department at Washington, all subway work was suspended in 1918 and before construction is resumed the Transit Commission just appointed is to advise the city concerning some technical features of the plans heretofore adopted, the merits of which have been a matter of dispute. The plan of routing all traffic around a loop in the center of the city has been criticised by the present Director of the Department of City Transit, William S. Twining, who proposes "through-routing," as in New York City, as a substitute, with a change of plan and connections of lines to correspond.

While no arrangements have been entered into with the Philadelphia Rapid Transit Company for the operation of the proposed city-built high-speed system, that company is, of course, the logical operator, and for that reason its engineers have given a great deal of consideration to the development of practicable plans. Some of the company's recommendations appear in full-page advertisements inserted in all the Philadelphia papers of Feb. 26 and called in these announcements the "city-company" plan. The partial plan shown



Proposed Subway Routes in Center of City Considered in P. R. T. Advertisement

In the advertisement of the Philadelphia Rapid Transit Company already mentioned appeared an indorsement of that plan by S. M. Swaab, consulting engineer to a group of downtown retail merchants. City officials have been quoted in Philadelphia papers, however, as saying that the city was in no way officially connected with this plan.

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Transit Bill for Detroit

Provides Increase in Bonding for Rapid Transit Purposes—Power Plant Project Proposed

The rapid transit bill introduced in the Michigan State Legislature by Representative Culver of Detroit is expected to receive rapid action in amending the home rule act of 1909 so as to permit Detroit to vote a bond for rapid transit purposes up to 4 per cent of the city's assessed valuation in addition to the 10 per cent asked for public utilities and general public improvements. The present limit is 2 per cent for public utilities and the increase is recommended by the city officials to legalize the issuance of $5,000,000 bonds to be again voted on for street railway extensions.

REAL ESTATE PURCHASE CONTEMPLATED

The primary object of the bill is stated to be that of providing a bonding limit for rapid transit apart from bonding for all other municipal purposes, opening the way for the city to finance the building of proposed subway dips and other projects.

Another provision of the bill provides for raising the present bonding limit for public utility purposes and general public improvements from 6 per cent to 10 per cent. When the rate was established the 6 per cent limit did not include the street railways as Detroit had not at that time acquired the Detroit United Railway's system or any part of it. The bill, known as the Culver-Wilcox bill, will also open the way for the city to sell real estate acquired from the Detroit United Railway and not now required in connection with the operation of the city car lines. This property is estimated to be worth between $1,000,000 and $1,500,000.

$4,000,000 FOR NEW EQUIPMENT

As the city's bonding limit has already been practically exhausted, only approximately $25,000 being available under the 2 per cent bonding limit now in effect, the increase is needed to legalize the proposed $5,000,000 issue and also to provide for the city's proposed $12,000,000 power plant, an item for which has been stricken out of this year's budget by acting Mayor Lodge. It is cited that the money for the power plant is urgently needed because the Detroit Edison Company, which furnishes the street railway department power, is now carrying its peak load, and the city could not put on any more street cars without more power being available. It has been necessary to remove the electric heaters from some of the cars in order to conserve power.

Plans have been prepared and the city has received bids on approximately $4,000,000 worth of equipment for the new power plant. The $12,000,000 bond issue is proposed for the April election, providing the amendment of the home rule act paves the way by legalizing the issue.

It is the desire of the Public Lighting Commission to progress with the new power station so as to be able to furnish service for the operation of street cars not later than July 1, 1925, by which date the cost of power service for the operation of the cars under the terms of the contract with the Detroit Edison Company will be more than $600,000 greater for the year than is paid at the present time. The net revenue of the street cars, it is cited, will be reduced in that amount plus the increased cost of additional service which will be required between the present time and July 1, 1925.

Collision on "L" in Chicago

On Sunday morning, Feb. 25, at 7:10 a.m., during the worst fog in years, a two-car North Shore Line train ran into the rear end of a three-car Evanston local elevated train, killing one passenger and injuring several. The Evanston train had made a station stop and the signal to start had just been passed when the Badger limited from Milwaukee ran into it. Service had to be suspended for two and one-half hours.

The impact broke down the platforms between the two rear cars of the Evanston local. Two passengers who were standing on these platforms were caught between the cars. One passenger was killed, the other had both legs broken. While first reports indicated that twenty-five passengers were hurt, only four were so injured that they required other than first-aid treatment.

Blame for the collision was placed on the weather condition, as the fog was in banks or clouds, the North Shore train having just entered such a bank when the trains collided.

Fifth Safety Contest On

The company's fifth safety contest was opened on Feb. 17 and will be continued until June 15, according to announcements made by the Southern Public Utilities Company. The contest will be conducted in Charlotte, Winston-Salem and Greenville, S. C., at the same time, it was stated.

The only change that has been made in the previous rules, it is reported, is that making every motorman and conductor who goes through the campaign with a clean record eligible for a prize. The prizes have been announced as follows:

To the team in each branch making the best record, $250.
To the team in each branch making the second best record, $100.
To each motorman or one-man operator who goes through the contest without an accident, $10.
To each conductor that goes through the contest without an accident, $5.

The individual prizes will be in addition to the money distributed among winners of the winning teams, it is stated. A banner is to be presented to the team making the best record in the campaign, according to announcements, and a prize is being offered for the person who writes the best slogan for the banner.

Commission Still Controls Railway

The South Carolina Railroad Commission is still supervising the railway operations of the South Carolina Gas & Electric Company at Spartanburg. There has been a falling off in traffic amounting to 15 per cent in comparison with the same average period of 1922. This decrease is apparently caused by increased unrestricted jitney competition and the very liberal use of the personally-owned automobile in daily operation.

Some weeks ago the commission took over the railway lines after the city had been without service for several weeks. The difficulty in Spartanburg dates back to December of last year when the company discontinued car service, after failure to come to an agreement with the city on the matter of bus operation. The owners of the line had advanced a plan to substitute bus operation in districts where the railway lines were unprofitable, but the city refused to agree to this.

City to Make Demands

Demands for better service, especially to the suburbs recently annexed, will be made by the city of Fort Worth of the Northern Texas Traction Company. This action will be taken by the city in lieu of further action seeking to reduce fares from 7 cents to 5 cents. The city lost its fight for reduction in fares recently when N. A. Dodge, special master in chancery held that any reduction from 7-cent fare would be confiscatory.

George H. Clifford, vice-president and general manager of the railway, declined to make any statement on the action taken by the city. He intimated that the company would await legal action to compel it to build the lines sought.

A committee of citizens has advanced a proposal that the city authorize the operation of jitneys as a measure in retaliation. Another proposal submitted is that the city take over and operate the railway.

Men Seek Wage Increase

A wage increase of 15 cents an hour for all trainmen has been asked of the Cleveland (Ohio) Railway by Division No. 268 of the Amalgamated Association. The men want the increase effective on May 1, when their present wage agreement expires. Cleveland motormen and conductors now receive 50 cents an hour for the first three months, 53 cents an hour for the next nine months and 55 cents an hour after the first year.

At the first conference between President John J. Stanley and the officers of the union, Mr. Stanley informed the men that a 15-cent increase was out of the question. Further negotiations, however, are to take place regarding the demand of the men, which also calls for changes in working conditions as well as a further wage boost.

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Financial and Corporate

I. T. S. Merger Rumors

Consolidation of McKinley Utilities with So-Called Studebaker Group Said to Be Impending

For several weeks there have been rumors in the financial district of New York of a deal in which the Illinois Traction Company was to be involved. These unconfirmed statements have gone so far as to indicate a possible change in control of the company. Although the rumors have persisted, nothing definite could be learned about them at first except that they involved possible financing in the future.

Even during the war-time period the company was able to do necessary financing, mostly in the form of debentures, at very advantageous terms, and the recent unconfirmed statements indicated that the plans under discussion included the refunding of these loans for longer terms than the original borrowing.

More recently there has come from St. Louis a statement to the effect that a consolidation is contemplated of the Illinois Traction Company and the so-called Studebaker group of utilities into a $200,000,000 utility company. Attorneys for the two sets of interests are said to be conferring about the matter and the indications are that the developments have progressed to a point where a statement will be made about the matter in the near future.

At the head of the Illinois Traction is Senator W. B. McKinley. He is the chief executive officer, but for years the details of management have been in the hands of H. E. Chubbuck, vice-president executive. In addition to the McKinley money in the enterprise the company is owned largely in Canada. The stock is listed on the Montreal and Toronto exchanges and is dealt in over the counter in the United States by a few of the public utility specialists. In the past the most prolific source of new money to the company has been from the group identified with the Sun Life Insurance Company.

The Illinois Traction is a tremendous enterprise—one of the largest holding companies in the United States operating railway, light, power and gas plants in cities in the highly developed and most prosperous agricultural district of Illinois, Iowa and Kansas. Almost 600 miles of railway are included in the system. The company is a very large handler of freight.

The capital structure of the Illinois Traction consists of $7,289,500 of 6 per cent preferred stock, $12,331,000 of common stock and $4,562,000 of debentures. Of subsidiary preferred stocks there are $16,259,000 outstanding. The subsidiaries are bonded for upward of $35,000,000. The dividend on the preferred stock has been paid uninterruptedly since the organization of the company in 1904, but on the common the recent record has been 3 per cent in 1915, 1916 and 1917, and three-quarters of 1 per cent in 1918, with none since. From a low of 14 in the period between 1914-1917 the common has advanced to around 45 at the present time.

The so-called Studebaker properties are embraced in the system of the North American Light & Power Company, of which Clement Studebaker, Jr., South Bend, is chairman of the board and William A. Baehr, Chicago, president and general manager. The company was incorporated in Maine in 1915 to acquire the securities of public utility properties. It owns and controls subsidiary operating companies in the light and power field serving a population of more than 300,000 in 104 communities in Missouri, Ohio, Illinois and also in Oklahoma. The capital stock consists of $1,445,500 of preferred stock and 193,272 shares of common of a nominal value of $5. There are also outstanding $3,785,900 of first lien 6 per cent bonds, $1,600,000 of convertible series A and B bonds and $200,000 of 7 per cent notes.

San Francisco Loss $190,866

Sum Shown After Taking Out Charter Comparison Charges—Income After Expenses, Interest, Depreciation and Accident Reserves Was $55,669

THE report of the Municipal Railway, San Francisco, Cal., for the year ended June 30, 1922, has recently been made public. It was prepared for and approved by the finance committee of the Board of Supervisors. The total revenue for the year was $2,896,115, to which was added $48,475 interest on securities, making the total income $2,944,591. The total operating expenses were $2,154,566, made up as shown in the accompanying statement. The excess of income over operating expenses was $574,936, but after charging off $519,266, or 18 per cent of the gross, for depreciation there remained only $55,669 as the excess of the income over operating expenses, interest, depreciation and accident reserves. Deducting from this charter comparison charges of $246,535 there was a deficiency for the year of $190,866. This compares with a deficiency for the previous year of $188,811 and makes a total deficiency of $475,110 for the period from Dec. 28, 1912, to June 30, 1922.

The report is particularly interesting in that it takes up the various items one by one and explains them. Thus of the depreciation reserve of $1,603,572 it says that the balance to this account represents the amount of assets available for the purpose for which the fund was created and is made up by setting aside annually 18 per cent of the gross revenue. Of this amount 4 per cent was intended to provide for accident claims and the other 14 per cent was to accumulate a fund for the redemption of bonds and to meet all charges and expenses arising on account of replacements, reconstruction and depreciation. The assets available in this fund follow:

Book value of securities in the depreciation fund	$1,406,587
Cash in depreciation fund	216,235
Total assets	$1,622,822
Less outstanding warrants	19,249
Balance available	$1,603,572

STATISTICAL DATA OF THE MUNICIPAL RAILWAY, SAN FRANCISCO, FOR FISCAL YEAR ENDED JUNE 30, 1922

	Total Amount	Per Car-Mile	Per Car-Hour
Total passenger revenue	$2,884,815.20	$0.3757	$3.5558
Total operating expenses (taxes and depreciation not included)	2,154,566.46	.2806	2.6557
Total operating earnings (taxes and depreciation not included)	730,248.74	.0951	.9001
Ratio of earnings to passenger revenue	.2531		
Total taxes and charter charges	246,535.60	.0321	.3038
Ratio to passenger revenue	.0854		
Depreciation	519,266.74	.0676	.6401
Ratio to passenger revenue	.18		
Operating expenses, depreciation and taxes	2,920,368.80	.3803	3.5096
Ratio to passenger revenue	1.0123		
Net deficit from operation	3,55.60	.0046	.0438
Ratio to passenger revenue	.0123		
*Passenger car mileage	7,677,307		
†Passenger car hours	811,292		
Platform expense (62½c. per hour, 8-hour day)	$1,078,160.45		
Number of passenger cars owned	198		
Number of work cars owned	1		
Total number of cars owned	199		
Total number of busses owned	8		
Total number of cars and buses owned	207		
Number of passengers carried—5-cent fares	57,189,579		
Government tickets—5-cent fares	44,057		
School tickets—2½-cent fares	818,504		
‡Revenue transfers—2-cent fares	350,642		
Free transfers	11,820,449		
Free pass (employees, etc.)	534,677		
Total passengers carried	70,757,908		
Number of passengers carried per car-mile		9.2165	

* Includes mileage of buses.
† Includes hours of buses.
‡ Transfers received at Fillmore and Union Streets treated as revenue transfers pending result of litigation.

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STATEMENT OF BUS LINE OPERATIONS—MUNICIPAL RAILWAY OF SAN FRANCISCO, YEAR ENDED JUNE 30, 1922

Revenues:			
Passenger revenue		$28,564	
Quartermaster tickets—77 at 5 cents	$3.75		
School tickets—16,852 at 2½ cents	421.30		
Local transfers—394,948 at 2½ cents	3,873.70	10,298	
Total revenues			$38,863
Operating expenses:			
Repairs to buses		$13,504	
Conductors, chauffeurs—buses		18,151	
Garage expenses—buses		14,958	
Tire expense—280,127 miles at 5½ cents per mile		15,406	
Depreciation—18 per cent of receipts		5,144	
Compensation insurance		786	
Total operating expenses			67,949
Net loss			$29,086
Average net loss per day			$73

It is explained that the Municipal Railway has no capital stock and that the excess of its assets over its liabilities represents surplus. In the preparation of the balance sheet this surplus has been divided into two classes—first, that which was created by donations or contributions, and second, that which was accumulated from the earnings resulting from the operation of the road. They are listed as follows:

Contributed surplus		
Premium on funded debt	Cr.	$26,000
Represents premiums realized on sale of bonds.		
Contribution from general taxes	Cr.	$306,552
Represents the following:		
Tax moneys applied to the payment of interest on funded debt		$239,901
Cost of bond elections		29,628
Contributory services of employees		37,022
Total		$306,552
Surplus from income		
Bonds retired through income	Cr.	$1,090,900
Reserve for bond redemptions	Cr.	$99,100

These amounts represent the income, $1,190,000, which has actually been set aside in cash for the redemption of bonds. Of this amount $1,090,900 is covered by bonds redeemed and canceled, and the remainder consists of cash in the hands of the treasurer. The bond redemption program is as follows:

Name of Bond	Annual Redemption	Serial Maturity
Geary Street Railway	$95,000.00	1915–1934
Market Street Railway	6,000.00	1915–1934
Municipal Railway	100,000.00	1918–1952

For the purpose of securing a comparison between the results of the operation of municipally owned utilities and those operated by private capital, the charter of the city and county of San Francisco provides that the operating reports shall include certain comparison charges, consisting of items which constitute part of the actual cost of operating privately owned companies, but which the municipally owned utility is not required to pay. In consonance with the above-mentioned charter provision it is explained that there has been charged to the earnings of the Municipal Railway certain amounts representing insurance and taxes for the period of Dec. 28, 1912, to June 30, 1922.

The Municipal system not having to pay any of these charges, the receipts from operations were deposited in the operating cash fund without any restriction as to how they were to be used. As a matter of fact, however, most of the cash in the operating fund, represented by such comparison charges, was actually expended in new construction and addition and betterment work, so that these reserves, representing obligating charter comparison charges, have in reality been used as reserves for betterments.

For the purpose of making the balance sheet reflect the actual results of operating, the amount expended in addition and betterment work has been reflected in an account entitled "Additions and Betterments From Income," and the charter reserves for insurance and taxes carry a balance equal only to the unused portion of the original reserves.

The account of $1,431,800 for additions and betterments from income represents the value of construction and addition and betterment work performed out of the funds derived from the operations of the road. A small portion of the cash used in this connection came from the depreciation fund, but the larger portion consists of operating fund moneys.

Operating surplus of $211,407 represents the following:

Surplus June 30, 1921, as per last report		Cr.	$26,761
Add: Deduction of compensation insurance reserve corresponding to dividends declared by the state compensation insurance fund adjustment	$96,172		
Less: Transfers previously made by operating fund	90,000		6,172
			$27,934
Deduct:			
Amount transferred from income account	*$190,866*		
Interest on bonds owned credited to income but deposited in the depreciation fund	*48,475*		*239,341*
Balance			*211,407*

The total surplus of $2,905,373 derived from the operation of the road, all of which has been referred to in detail above, is as follows:

Bonds retired through income	$1,090,900
Reserve for bond redemption	99,100
Advanced general fund account Twin Peaks tunnel	82,152
Advanced general fund account Stockton Street tunnel	48,971
Charter reserves	363,856
Additions and betterments from income	1,431,800
Operating surplus	*211,407*
Total	$2,905,373

Italics indicate loss or deficiency.

COMPARATIVE INCOME ACCOUNT OF SAN FRANCISCO MUNICIPAL RAILWAY FOR PERIOD, FROM DEC. 28, 1912, TO JUNE 30, 1922

	Period 12 28 12 to 6 30 21	Period 7 1 20 to 6 30 21	Period 7 1 21 to 6 30 22	Period 12 28 12 to 6 30 22
Passenger revenue	$16,363,363	$2,868,616	$2,884,815	$19,248,178
Miscellaneous revenue	71,331	10,468	11,300	82,632
Total revenue	$16,434,694	$2,879,084	$2,896,116	$19,330,810
Interest on securities owned	166,383	35,128	48,476	214,858
Total income	$16,601,077	$2,914,212	$2,944,591	$19,545,668
Operating Expenses				
Ways and structures	$462,249	$100,228	$112,630	$574,880
Equipment	874,929	201,109	216,317	1,091,244
Power	2,095,983	401,861	383,139	2,479,119
Conducting transportation	6,780,080	1,315,475	1,324,926	8,105,007
Traffic	3,632	994	79	3,714
General and miscellaneous	499,661	89,124	117,475	617,136
Loss on road retired	8,184	8,184	.....	8,184
Total operating expenses	$10,724,718	$2,116,975	$2,154,566	$12,879,284
Excess of income over operating expenses	$5,876,359	$797,237	$790,025	$6,666,384
Less interest on funded debt	1,757,927	224,453	215,089	1,973,016
Excess of income over operating expenses and interest	$4,118,432	$572,784	$574,936	$4,693,368
Less reserve for depreciation and accidents (18% of gross earnings)	2,944,507	516,415	519,267	3,463,774
Excess of income over operating expenses, interest and depreciation and accident reserves	$1,173,925	$56,369	$55,669	$1,229,594
Less charter comparison charges	1,440,167	245,180	246,535	1,686,704
Net income	*$266,245*	*$188,811*	*$190,866*	*$457,110*
Analysis of comparison charges:				
*State franchise tax, 5½% of gross earnings	$861,298	$151,152	$152,038	$1,013,336
Municipal franchise tax, 3% of gross earnings	490,934	86,069	86,545	577,478
Municipal car license	21,318	2,985	2,970	24,288
Federal income tax	13,270	.....	.....	13,272
Salary of clerks	4,872	.....	.....	4,872
Law expense	13,500	.....	.....	13,500
Insurance	34,975	4,974	4,982	39,957
Total	$1,440,167	$245,180	$246,535	$1,686,703

Italics indicate loss or deficiency.
* Franchise tax percentage has varied in different years.

The comparative income statement for the period from Dec. 28, 1912, to June 30, 1922, presents in summary form an analysis of the income and expenses of the road from the date operations commenced, Dec. 28, 1912, to June 30, 1922; also a comparison between the fiscal years ending June 30, 1922, and June 30, 1921, and an analysis of the charter comparison charges. For the purpose of showing clearly just what the property has earned, the direct

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operating expenses have been deducted from gross income, and from the resultant figures there has been deducted in turn interest on funded debt, reserve for depreciation, and charter comparison charges, a new total being shown after each deduction.

MILEAGE—MUNICIPAL RAILWAY SAN FRANCISCO, SINGLE TRACK—JUNE 30, 1922

Operated track:	
Track owned and operated June 30, 1922	57.97
Track owned and operated jointly with the Market Street Railway	5.15
Total operated track	63.12
Non-operated track, sidings, turn-outs, etc.:	
Masonic Avenue spur	.46
Polk and Geary Streets spur	.05
Columbus Avenue, between Washington and Jackson Streets	.08
Geary Street carhouse sidings and turn-outs	2.18
Seventeenth Street carhouse, sidings and turn-outs	1.23
	4.00
Total single track mileage June 30, 1922	67.12
Track changes made during year ended June 30, 1922	None

Financial Readjustment Approved

Readjustment of the financial structure of the Chicago, North Shore & Milwaukee Railroad so as to give greater elasticity to finance and permit capital expenditures such as will enable the company to accept the continuous new business offered it, as recommended recently by the board of directors, was ratified at the annual meeting of participation shareholders held on Feb. 27. The reorganization plan provides for:

1. The creation of an open first and refunding mortgage under which bonds may be issued for retiring first mortgage bonds and other obligations issued for capital expenditures now outstanding and for capital expenditures in the future.

2. The issuance of $10,000,000 prior lien 7 per cent stock to be sold as required for capital expenditures and to retire equipment notes and secured notes in accordance with the sinking fund provisions governing these issues.

3. The issuance of 50,000 shares of 6 per cent non-cumulative preferred stock of $100 per share par value, and 50,000 shares of common stock, $100 par value. This $10,000,000 of preferred and common stock is to be given to the participation shareholders in exchange for their 170,000 no-par participation shares in the ratio of 50 per cent thereof to the holders of the first preferred participation shares, 40 per cent to holders of second preferred participation shares and 10 per cent to holders of common participation shares. Provision for this is made in the participation trust agreement.

It is the intention to give recognition to the dividends in favor of the first and second preferred participation shares. These unpaid dividends, on Dec. 31, 1922, amounted to approximately $2,700,000. In recognizing these dividends it is proposed to give the shareholders the unsecured non-interest bearing notes of the new corporation, payable five years after date, the new corporation at the maturity of the notes to have the option of either giving new notes bearing interest and payable in five years, or of exchanging them for the company's 6 per cent non-cumulative preferred stock at par, or to pay the notes in cash. The shareholders authorized the trustees to proceed with the sale of the property and the issuance of the securities.

Charles C. Shedd was elected a director to succeed E. A. Shedd, deceased. John R. Thompson was re-elected.

$504,979 Net in Louisville

Preferred Dividend Payments Being Arranged—Common Dividend Prospects Very Good

At the annual meeting of the stockholders of the Louisville Railway on Feb. 21, President James P. Barnes announced that arrangements were being made to resume paying dividends on the preferred stock about April 1. The possibility also exists of resumption of dividend payments on common stock by 1925. The voting of dividends on the preferred stock will mark the first dividend paid in a period of five years by this company. This dividend has not been determined as yet and must come out of net earnings since the first of the year, according to Mr. Barnes in a talk after the meeting.

The company has a fund of $504,979 on hand, listed as a balance from 1922, available for dividends on stock, but Mr. Barnes explained that under the terms of the present franchise contract with the city, this money will have to be spent to improve service.

All directors and officials of the company were re-elected.

The comparative income statement of the company for 1922 showed total operating revenues of $4,542,817, an increase of $73,315; operating expenses of $3,190,232, a decrease of $83,490; net revenue from operations, $1,352,585, an increase of $156,805; gross income of $1,128,380, an increase of $198,838. Deductions from the last item are as follows: Interest on bonds and notes $619,589, a decrease of $13,490; amortization of discount on notes $2,220, a decrease of $2,882, and miscellaneous debits of $1,590, an increase of $825, giving total deductions of $623,400, a decrease of $15,547.

COMPARATIVE INCOME STATEMENT OF THE LOUISVILLE RAILWAY

	1922	1921
Revenue from transportation	$4,358,450	$4,275,435
Other operating revenues	184,367	194,067
Total operating revenues	$4,542,817	$4,469,502
Operating expenses	3,190,232	3,273,723
Net revenue from operations	$1,352,585	$1,195,779
Taxes	388,000	363,000
Operating income	$964,585	$832,779
Non-operating income:		
Louisville & Interurban Railroad Co., net income	$145,982	$87,885
Other non-operating income	17,813	8,877
Total non-operating income	$163,795	$96,762
Gross income	$1,128,380	$929,541
Deductions from gross income:		
Interest on bonds and notes	$619,589	$633,079
Amortization of discount on notes	2,220	5,103
Miscellaneous debits	1,591	766
Total deductions	$623,400	$638,948
Balance available for dividends on stock	$504,979	$290,592

The first matter touched upon by Mr. Barnes in his remarks to the stockholders was the fare case. The various moves made in this connection he reviewed very briefly. All of these steps were followed from time to time in the ELECTRIC RAILWAY JOURNAL from the hearing before the Court of Appeals at its March term in 1922 to the passage on Aug. 24 of the new franchise ordinance by the Board of Aldermen. This grant the stockholders of the company approved on Sept. 11 and at 4 a.m. Sept. 17 the ordinance became effective, placing in effect a 7-cent cash fare with tokens at the rate of five for 30 cents.

It was explained by Mr. Barnes that on July 16 one-man safety cars were placed in operation on the Brook Street line. These cars were rebuilt in the company's own shops. The economies resulting from the operation of these cars make it possible to improve the service by running additional cars at closer headway, and their adaptability is recognized in the new fare ordinance, to which reference has just been made, which contains as one of its provisions a paragraph directing the acquisition of 80 additional cars of this type. Fifty-five new safety cars have been ordered from the J. G. Brill Company, some of which are already in operation on the Chestnut Street line, and a sufficient number of old cars have been remodeled in our own shops to complete the number required by ordinance.

When this program is completed the company will have available for operation 101 safety cars. The economies from the use of the new cars, with the saving in platform expense, reduction in power cost, etc., result in an estimated saving of approximately $100,000 a year.

In 1920 seventeen lives were lost in street car accidents in Louisville, in 1921 seven lives and in 1922 three lives. This is regarded as a graphic and very gratifying illustration of the effectiveness of the safety work, in which the officers of the company have been greatly assisted by the Louisville Safety Council.

Mr. Barnes explains that on Dec. 18 the transportation committee of the Welfare Association met the officers of the company and after a general discussion of wage scales in this and other industries a new scale was arranged for platform employees to be effective Jan. 1, 1923. Under the new scale, rates paid to motormen and conductors are as follows:

Period	Rate per Hour
First three months	$0.34
Next nine months	.37
After one year	.40
After two years	.45

One cent an hour additional is paid for interurban service and 3 cents an hour additional for safety car operators.

Purchases Plant.—The Potomac Public Service Company, operating in Maryland, Pennsylvania, Virginia and West Virginia, has purchased the plant of the Fayetteville Electric Light & Power Company and will take possession June 1.

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Valuation of Los Angeles Properties Proposed

In connection with plans announced by the California State Railroad Commission for the proposed unification of the lines of the Los Angeles Railway and the Pacific Electric Railway, the City Council on Feb. 21 adopted the report of the commission, passing the necessary motion in the Council ordering a survey of the two properties in question with a view of their consolidation into a single transportation system.

Engineers of the two railways, working under the supervision of the State Railroad Commission and the Los Angeles City Board of Public Utilities, will make a survey determining the price the Pacific Electric Lines should pay for the Los Angeles Railway system, the price the Los Angeles Railway should pay for portions of the Pacific Electric's local street car system in the city and the amount to be paid by the city of Los Angeles for both city systems should the city elect to take the systems over and operate them. Richard Sachse, formerly chief engineer of the State Railroad Commission, has been engaged to fix the valuation of the properties.

No estimate is given of the time required to complete the survey, but it is thought from three to six months will be necessary in order to compile an exact valuation cost for the Los Angeles Railway properties, as it has been nine years since a proper value was affixed on the property. However, the conditions are somewhat better in connection with the Pacific Electric Railway properties, as that company recently completed a valuation of its properties started during the year 1912 upon order of the State Railroad Commission. These completed valuation data were used extensively during the past two years in rate increase hearings held before the commission.

Bond Issue Approved Conditionally

A bond issue for $500,000 of the Cincinnati Rapid Transit Commission was signed recently by Mayor George P. Carrel on condition that no further contracts would be entered into by the commission until negotiations between the Cincinnati (Ohio) Traction Company and the Cincinnati Street Railway looking to an adjustment of the traction problem in Cincinnati are concluded.

Mayor Carrel refused to sign the bond issue in November, giving as his reason then—immediately after the failure of the extra city tax levy to pass—that no additional financial burdens should be placed on the voters, since they had expressed at the election their desire that the city should function on decreased income.

The proceeds from the sale of the bonds will be employed to pay off existing contractual obligations, to compromise lawsuits and in purchasing property for the completion of the rapid transit system.

The commission informed the Mayor that it needs between $100,000 and $200,000 to compromise claims now in litigation against it by reason of landslides along the subway system.

January Boston Net $96,725

The Boston (Mass.) Elevated Railway still owes $3,462,955 to fourteen cities and towns which advanced money by taxation to pay its deficit from operation during a lean period ending in 1919. The company has accumulated $465,929 toward its second payment on that indebtedness. That payment will be made next July. The company hopes to be able to pay $1,000,000. At the present rate the entire indebtedness should be wiped out in three or four years, after which the company will be in a position to make a downward revision of its fare unit, now 10 cents.

So long as the company continues to make financial gains month by month it probably can reduce fares gradually by the introduction of more 5-cent routes, which are not considered as a part of the straight rate fabric. These 5-cent routes are intended to encourage short-haul riding where they do not encroach upon the 10-cent routes, or eat materially into the receipts from the 10-cent fares, and they bring down the average charge per fare, but the regular 10-cent fare cannot under the present law be reduced until the company has paid its debt to the cities and towns that were assessed in 1919 to pay its deficit from operation.

Even Mayor Curley of Boston has officially announced abandonment of his 5-cent fare campaign, in the face of this law which has been interpreted to him by his own law department, as well as by the State Attorney-General.

In January the Boston Elevated earned $96,725 in excess of the cost of service, while in 1922 the company earned $203,273 in excess of the cost of service. The expenses for January, 1923, however, included $190,807 cost of removal of snow. The condensed statement for January follows:

	1923	1922
Receipts from direct operation	$2,982,532	$2,802,683
Interest on deposits, income from securities, etc.	15,764	34,373
	$2,998,297	$2,837,057
Cost of service	2,901,572	2,633,783
Excess of receipts over cost of service	$96,725	$203,273

The report is interesting in that it shows 25,016,707 10-cent passengers carried in January, 1923, as compared with 24,747,377 in January, 1922, and 8,351,759 5-cent passengers in January, 1923, compared with 5,449,332 5-cent passengers in January, 1922. The receipts per revenue passenger in January, 1923, were 8.985 cents compared with 9.395 cents in January, 1922. The average cost per ton of coal consumed in January, 1923, was $7.68, compared with $6.90 in January, 1922. Coal costs for the two months were: January, 1923, $233,014; January, 1922, $194,388.

Auction Sales in New York.—At the public auction rooms in New York there were no sales of electric railway securities this week.

Will Issue $1,000,000 in Bonds.—The new Lima-Toledo Railroad, which is to take over the property of the old Ohio Electric Railroad, between Toledo and Lima, recently bid in by the bondholders, will issue $1,000,000 in bonds and acquire some new capital by the issuance of $750,000 in preferred stock and $1,000,000 in common stock.

$2,500,000 East Penn Issue.—A new issue of $2,500,000 East Penn Electric Company first mortgage and refunding lien 6 per cent gold bonds, due 1953, is being offered at 97 and interest, to yield over 6.20 per cent. The syndicate offering the bonds consists of J. G. White Company, Spencer Trask & Company, Marshall Field, Globe, Ward & Company. The bankers state that the company supplies most of Schuylkill County, Pa., with electric light, power and railway service.

Mortgage Gold Bonds for Sale.—Arthur Perry & Company and Paine, Webber & Company, New York, are offering $750,000 of the Indiana Service Corporation, Fort Wayne, Ind., first and refunding mortgage 5 per cent gold bonds, series A. The price is 88½ and interest yielding 5¾ per cent. The bonds are dated Jan. 1, 1920, and are due Jan. 1, 1950. Upon completion of the present financing it is estimated that the total funded debt outstanding in the hands of the public exclusive of income bonds will amount to less than 47 per cent of the valuation of the company's property.

Initial Common Dividend by Federal Light & Traction.—At a special meeting of the board of directors of Federal Light & Traction Company, New York, N. Y., held Feb. 21, 1923, an initial quarterly cash dividend, at the rate of 75 cents per share, was declared upon the common stock of the company. An extra dividend of 75 cents per share was also declared upon the common stock of the company payable in 6 per cent cumulative preferred stock of the company. Both dividends are payable on April 2, 1923, to common stockholders of record at the close of business on March 15, 1923.

$10,000,000 Philadelphia Company Issue.—A new issue of $10,000,000 Philadelphia Company fifteen-year 5½ per cent convertible debenture gold bonds, dated March 1, 1923, and due March 1, 1938, is being offered at 92½ and accrued interest to yield over 6¼ per cent. The Philadelphia Company's assets consist of investments in gas and oil properties valued at more than $76,000,000 and investments in electric light and power companies valued at $29,000,000 above existing indebtedness. It also owns securities of the Pittsburgh Railways representing the equity in the electric railway system in Pittsburgh and vicinity. The present issue will be convertible at the holder's option on or after March 1, 1924, par for par, into non-callable 6 per cent cumulative preferred stock.

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Traffic and Transportation

Rhode Island Commission Has Approved Short-Haul Bus Plan

The substitution of motor bus service for local electric railway service along Broadway, placing all electrics on an express line basis, was authorized on Feb. 23 in an order entered by the Public Utilities Commission of Rhode Island granting such a request of the United Electric Railways. As was explained at considerable length in the ELECTRIC RAILWAY JOURNAL for Feb. 17, page 301, a bus line will operate between Exchange Place and Barton Street, and the electric cars operating over Broadway will run express between La Salle Square and Broadway and Valley Street, in both directions. The outbound cars will stop to take on passengers at all of the present stops, and the inbound cars will make the customary stops to discharge passengers. All cars over Broadway, under the new plan, will be operated under the same plan as the Hughesdale and Centredale cars are now running, and the proposed bus line will provide the local service for patrons between Barton Street and La Salle Square.

Charter Permits Bus and Trackless Trolley Operation

The first move by up-state traction companies to start operation of trackless trolleys was made on Feb. 24 by the New York State Railways in the incorporation of the Rochester Railways Co-ordinated Bus Lines, Inc.

The directors of the Rochester corporation are James F. Hamilton, president of the New York State Railways, and W. A. Matson and Daniel M. Beach, Rochester, officials of the New York State Railways.

Under the terms of the charter granted to the new corporation, which is incorporated for $50,000, stage or omnibus routes may be operated. It is probable that the corporation will operate both buses and trackless trolleys. As has been noted previously in the ELECTRIC RAILWAY JOURNAL the new corporation intends to operate connecting cross-town lines between the trolley lines in Rochester.

Cleveland Fare Down to Five Cents

Fares in Cleveland were reduced by the Cleveland (Ohio) Railway to 5 cents cash, eleven tickets for 50 cents and 1 cent for transfer without rebate, on March 1. The fact that a decrease in fare was impending was announced in the ELECTRIC RAILWAY JOURNAL some time ago. Posters announcing the fare reduction were put in all Cleveland cars by the company on Feb. 27, following President John J. Stanley's notification to the City Council on Feb. 26.

The fare reduction comes in accordance with the franchise amendment which provides that when the interest fund, the fare barometer, contains in excess of $700,000, the rate of fare shall be automatically decreased.

Feb. 28 is the end of the company's ordinance year and on that date any surplus in the company's funds, such as the operating or maintenance fund, is placed to the credit of the interest fund. On Feb. 1 there was a surplus in the company's funds of $488,008. On the same day the interest fund contained $474,848. Mr. Stanley, in his letter to the City Council, said that the company's operating allowance for February would be exceeded, but in spite of this draft upon the surplus of the company's funds on Feb. 1 there would still be enough money to throw into the interest fund on Feb. 28 to make the interest fund exceed the $700,000, when the fare reduction takes place.

Council Approves Additional Bus Lines

The City Council at Toledo, Ohio, has finally approved the addition of two auxiliary bus lines for the Community Traction Company and directed that purchases of the buses be made from the moneys in the depreciation fund of the car company as set up by the Milner ordinance. Commissioner Wilfred E. Cann had combated this theory of the payment for the new bus equipment, but he was overruled by the Council.

The new lines will be on Oak Street from Fassett to the end of the street and on South Erie Street, where the present tripper service in effect will be supplanted by one bus.

No date has been set for the starting of the new auxiliary service and company officials have not made any announcement as to the type of bus to be purchased. It was considered at one time that the equipment would probably be the Garford bus, with seating capacity of about twenty-five passengers. Garages and shops will be constructed to take care of the buses.

5-Cent Agitation Continued in Washington

Tennessee Senator Wants Special Committee to Report on Railway Methods—Capital Traction Official Does Not Believe Congress Wants to Throttle His Company Financially

SENATOR McKELLAR of Tennessee, as a continuation of his efforts to secure a return to a 5-cent cash fare on the railways of Washington, introduced a resolution on Feb. 27 calling for the appointment of a special committee of the Senate to investigate the entire question and report at the next session of Congress.

It is understood that the committee to be named under this resolution, if adopted, will be composed of Senator Ball of Delaware, Senator Couzens of Michigan, Senator Keyes of New Hampshire, Senator Simmons of North Carolina and Senator McKellar.

The resolution proposes an inquiry into the franchise grants between the railways and the District of Columbia regarding rates of fare, and especially into the authority of the District of Columbia Public Utilites Commission to order increases of fares. The cash fare in Washington is 8 cents, with six tokens for 40 cents. Senator McKellar has been waging war against railway fares in Washington for several weeks, having spoken on the subject frequently on the floor of the Senate. He has also attacked the members of the District Public Utilities Commission, alleging that they acted without authority in granting increased fares and that such increases violated contracts between the companies and the District. In this connection, it has been pointed out that during the political campaign in Tennessee last fall, when Senator McKellar was re-elected, the successful candidate for Governor on the same ticket, and others, assailed the Tennessee Public Utilities Commission. Also, there is a politico-economic controversy ranging around the railway system in Memphis, the Senator's home city.

The Tennessee Senator offered amendments directing a return to 5-cent fares to three District of Columbia bills in the Senate recently. On the last occasion his amendment was laid on the table by a narrow vote of thirty-seven to thirty-six.

J. H. Hanna, vice-president of the Capital Traction Company, Washington, D. C., on Feb. 20 wrote to Senator McKellar calling his attention to certain statements made by him on Feb. 17 in debate on the 5-cent fare amendment relating to the Capital Traction Company and the effect which the proposed rate of fare would have on it. This letter was sent with a view of giving Senator McKellar accurate information respecting certain matters on which he had been misinformed.

In view of the position of Senator L. Heisler Hall as chairman of the Senate district committee, and knowing Mr. Hall's interest in all affairs concerning the District of Columbia, Mr. Hanna sent him a copy of the letter to Senator McKellar and also gave him certain more detailed information respecting the situation.

The comparison made by Mr. Hanna is shown between the years 1922 and 1912 because in the discussion of the proposed amendment reference was made to conditions existing ten years ago, and also because the year 1912, probably as fairly as any of the pre-war years, reflects conditions existing under the 5-cent fare, with six

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tickets for 25 cents. Data submitted by Mr. Hanna show that:

Total operating revenues in the year 1922 were 120.4 per cent greater than in 1912.

Operating expenses and taxes in 1922 were 193.0 per cent greater than in 1912.

Operating income available for interest, dividends and improvements to property was 34.3 per cent greater in 1922 than in 1912.

Pay passengers increased 34.6 per cent in 1922 over the year 1912.

In 1922 this company earned 8.6 per cent on the fair value of its property as fixed by the Public Utilities Commission, and paid a 7 per cent dividend to its stockholders. During the past ten years it has paid dividends to stockholders ranging from 5 per cent to 7 per cent per annum, the average being 5.975 per cent.

During 1922 operating expenses and taxes per pay passenger was 5.083 cents. Interest and dividends required a further 1.637 cents. At the present rate the average fare per pay passenger is 6.962 cents.

Trainmen's wages constitute a very large item of operating expense. In 1912 the total wages paid the trainmen was $460,070, and in 1922 $1,272,399, an increase of 176.6 per cent. In 1912 the average wage paid trainmen was approximately 23.72 cents an hour and in 1922 55.62 cents. The wages of other employees were increased in about the same ratio during this period, in order to adjust wages to living costs.

Mr. Hanna says that re-establishment of the pre-war fare of 5 cents cash with six tickets for 25 cents would reduce income to a point where the company could not meet operating expenses and taxes, unless the wages paid to employees were materially decreased. Restoration of the old rates would simply make it impossible for the company to meet interest charges or pay any dividend. It is Mr. Hanna's idea that Congress has no desire to place the company in a position where it would be forced to reduce wages, default on interest charges and suspend all dividends, as would be necessary under the restoration of the 5-cent cash fare.

Mr. Hanna calls attention particularly to the fact that any discussion of the capitalization of the company has no bearing on the present fare situation. The values of both railway companies operating in the District have been found by the Public Utilities Commission, and existing rates of fare were fixed by it on the basis of those values. Reports for the year 1922 show that the amount earned under the existing rates of fare on the combined fair value of the two companies as found by the commission was less than 6 per cent, and that the proposed rate of fare would, if made effective, entirely eliminate any question of values or rates thereon, as the income would not be sufficient to meet operating expenses. In conclusion Mr. Hanna said his company was ready at all times to furnish any information that Congress might desire respecting the operations of his company.

Six-Cent Fare Again Extended.—The City Council of Richmond, Va., recently extended the 6-cent fare ordinance under which the Virginia Railway & Power Company is relieved of its obligation under franchise to carry passengers at a fare of 5 cents. The Mayor signed the paper, giving the company permission to charge 6 cents for six months more. The ordinance has been extended regularly every six months for the last two years, awaiting settlement of the new franchise.

Traffic Congestion Worries Newark

Change in Public Opinion Results in a Demand for Removal of Jitneys from Trolley Streets

A short time ago the *Sunday Call*, Newark, N. J., carried under the caption "Newark Needs Your Help" an appeal to its readers to write to the paper telling their views on ways to reduce traffic congestion in the center of the city. By this action the newspaper took the initiative in directing public attention to an important civic problem that has been constantly becoming more complex. Many letters were received in answer to the appeal showing that many people had given serious study to the question, and quite remarkably, had nearly all arrived at the same conclusion, namely, that the jitney buses should not be allowed to operate on the same street with the trolleys.

CONDITIONS BECOMING UNBEARABLE

The original announcement about the matter, which appeared on Feb. 18, 1923, said in part:

Business in the central district of Newark will be seriously threatened, if certain conditions are not corrected soon. Traffic complexities, with attendant discouragement to out-of-town buyers, due to overburdened main thoroughfares and parking difficulties, are much discussed.

Several groups of Newarkers are studying conditions, but they and all others interested in the welfare of the city court advice and criticism. How can these problems be quickly and wisely solved? What do you think is the basic cause?

Let us have your opinion, your analysis of the whole situation, your suggestion for relief.

On Feb. 25 the paper published several pages of letters received in answer to the appeal. Well considered thought characterized almost all of the replies. Only one writer showed that he was unable to distinguish between healthy business activity and hopeless traffic congestion. A few others offered rather far-fetched solutions of the difficulty suggesting overhead bridges for pedestrians, huge underground garages beneath the public parks and so forth.

Subway construction was suggested also as a measure of relief, although none of the proponents of this plan offered any definite ideas to show how it could be arranged. Various other remedies found a little support among the writers of the numerous letters. The New Jersey Industrial Traffic League contributed a novel idea by urging the establishment of a trolley freight service to reduce the amount of heavy trucking in the city streets.

Most of the answers published by the *Call*, however, agreed in putting the blame for the existing traffic congestion on automobile parking and on duplication of transportation facilities on streets where both buses and cars are operated. Inasmuch as no two people thought alike about the proper way to restrict parking, the result was not particularly informative. Opinion was almost unanimous, however, that the first step to relieve traffic congestion in Newark must be to remove jitney bus routes from the important streets on which trolleys operate in the center of the city. This very suggestion had been put forward before from time to time during the past several years by those who had studied the transportation problem but it had always met with a storm of protest from those who wished to have the buses on the principal streets. Storekeepers also had voiced a determined opposition when it was proposed to take the jitneys away from their front doors. It appears now that sentiment is beginning to swing the other way. The practical unanimity of the letter writers in urging this step shows that the public is beginning to realize the disadvantage in having duplicate transportation facilities on the same crowded streets, and the improvement to be effected by removal of bus routes to streets where there are no trolleys.

Average of 4,524 Passes a Week for First Year in Fort Wayne

The first year of the use of the weekly pass system by the Indiana Service Corporation on the Fort Wayne city lines ended Feb. 27. The records of sales show that a total of 235,254 weekly passes were sold during the year, making an average of 4,524 passes a week for the fifty-two weeks.

Starting in with a modest sale of only 2,967 the first week, the sales increased steadily until the peak was reached recently with sales of 7,539 passes. February, with its cold weather and many snows, was an exceptionally good month for pass sales, each week the number sold amounting to more than 7,000. The previous high mark was reached in the week before Christmas when 7,162 were sold.

It is estimated by company officials that the average use of each pass is twenty-five rides. As the pass sells for $1, this means a 4-cent fare for the steady rider.

Five-Cent Fare Bill Killed.—The Massachusetts House of Representatives on Feb. 20 voted to uphold the report of the rules committee in refusing to admit the petition of Mayor James M. Curley of Boston for a 5-cent fare and public operation of the electric railways.

Magnanimous Bus Company.—The Port Jervis (N. Y.) Traction Company in the emergency of snow-clogged tracks has been operating a bus between Sparrowbush and Tri States. The Hudson Transit Company loaned the railway company a bus to help solve the transportation difficulty.

One-Man Cars, Lower Fare, More Service.—One-man operation with the Birney type car was started on Sunday, Feb. 18, on its city line in Milwaukee by the Chicago, North Shore & Milwaukee Railroad. At the same time the company reduced it rate of fare on the line from 6 cents to 5 cents and increased the frequency of service from a headway of ten minutes to a headway of six minutes.

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Personal Items

Mr. Rossman at Mobile

Westinghouse Division Manager Becomes Railway Vice-President and General Manager

Frank F. Rossman has resigned as division manager of the Westinghouse Electric & Manufacturing Company at Kansas City, to become vice-president and general manager of the Mobile Light & Railroad Company, Mobile, Ala., the duties of which office he assumed on March 1. Friends of Mr. Rossman tendered a dinner in his honor at the Hotel Baltimore, Kansas City, on Feb. 22. Brief talks were made by

F. F. Rossman

W. M. Hand, district manager of the General Electric Company; C. E. Allen, southwestern district manager of the Westinghouse Electric & Manufacturing Company; Col. K. D. Klemm, president of the Kansas City, Kaw Valley & Western Railway; Col. P. J. Kealy, former president of the Kansas City Railways; B. C. Adams, vice-president and general manager of the St. Joseph Railway, Light, Heat & Power Company; Mayor H. B. Burton of Kansas City, Kan.; L. H. Chapman commissioner of water and light, Kansas City, Kan.; D. O. Vaughn, vice-president of the Albert Emanuel Company. F. G. Buffe, general manager for the receivers of the Kansas City Railways, presided as toastmaster.

Mr. Rossman has represented his company in the Kansas City territory for the last eight years, and in that time has endeared himself to all those in the industry with whom he has come in contact. Mr. Rossman has completed his twenty-third year of service with the Westinghouse Electric & Manufacturing Company and in that time has become thoroughly acquainted with railway matters, especially those pertaining to the mechanical and operating departments, so his entry into the operating end of the industry as an official of an electric railway is not an experiment.

Mr. Rossman was born in Bay City, Mich., on Sept. 17, 1882. He was educated in the public schools there and was graduated from the Bay City High School in 1900. He started work with the Westinghouse Electric & Manufacturing Company as helper in the construction department in Philadelphia on July 1, 1900. After about two years there he was sent to East Pittsburgh, where he served two years as an engineering apprentice. In 1904 he was placed in the construction department and followed that class of work for four years. He was then appointed district engineer of the Cleveland office of the company. In 1909 Mr. Rossman entered the sales department and has followed railway work closely since that time. Since 1916 he has been manager of the Kansas City office of the Westinghouse Company. While he was located in Cleveland Mr. Rossman had charge of the construction of the Youngstown & Ohio River Railroad, the Cleveland, Ashland & Mansfield Railroad and the extensions to the Lake Shore Electric Railway.

Railway Men, Manufacturers and Others Attend

Among those present at the dinner to Mr. Rossman were:

C. E. Allen, N. B. Johnson, B. W. Stemmerich, J. S. Warren, Graeme Ross, R. C. Redhead, G. S. Gillespie, F. S. Detweiler, of the Westinghouse Electric & Manufacturing Company; W. M. Hand and F. R. Johnson of the General Electric Company; F. G. Buffe, J. A. Harder, D. E. Druen, I. R. Carson, C. A. Kincade, R. S. Neal, H. M. Smith, J. J. Fitzmorris, C. L. Carr, A. E. Harvey, E. E. Stigall, D. L. Fennell and R. W. Bailey of the Kansas City Railways; B. C. Adams, H. C. Porter, Frank Harrington and F. E. Henderson of the St. Joseph Railway, Light, Heat & Power Company; H. B. Burton, Mayor, Kansas City, Kan.; L. H. Chapman, commissioner Water & Light, Kansas City, Kan.; J. D. Donovan, chief engineer, Kansas City, Kan.; A. E. Baum and J. M. Dapron of the Westinghouse Traction Brake Company; J. A. Weimer and C. W. Way of the Kansas City, Clay County & St. Joseph Railway; K. D. Klemm and O. S. Lamb of the Kansas City, Kaw Valley & Western Railway, and P. J. Kealy, F. S. Dewey, F. L. Markham, F. V. Cook, Nic Le Grand, L. E. Gould, E. T. Bronenkamp, D. O. Vaughn and H. S. Day.

Arrangements for the dinner were handled by a committee consisting of E. E. Stigall, purchasing agent of the Kansas City Railways; B. C. Adams; D. L. Fennell, superintendent of transportation of the Kansas City Railways; F. V. Cook of the Ohio Brass Company; and W. M. Hand.

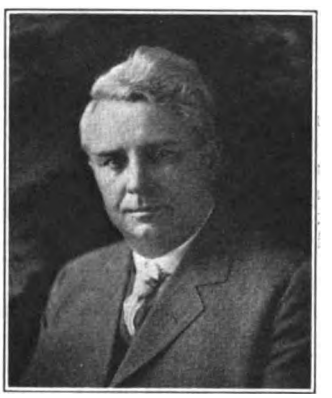
A. F. Kertsing has resigned as manager of the Citizens Gas Company in Jackson, Tenn., to accept a post with the Carolina Light & Power Company.

Mr. Shartel Made President

Former Vice-President and General Manager of Oklahoma Road Succeeds Late Mr. Classen

John W. Shartel, vice-president and general manager of the Oklahoma Railway, Oklahoma Cty, Okla., and long an associate of the late Anton H. Classen, president of the company, has been elected president of the company to succeed Mr. Classen. Mr. Shartel and Mr. Classen share almost equally between them the honor for the excellent system of transportation which the residents of Oklahoma City now enjoy. Each of these men in his respective field made the success of the enterprise possible.

In the brief period of twenty years the city grew from a town of 15,000 to a city of 100,000 population. The



J. W. Shartel

local company was liberal, almost to the extent of being radical, in building new lines through unsettled territory. Much private right-of-way was secured and land obtained for terminals with the result that the railway system in Oklahoma is one of the best laid out, if not quite the best, to be found anywhere in a city of similar size in the civilized world.

That sounds like an all-embracing statement, but it needs no other qualifications than those previously mentioned. Moreover, the company has been uniformly successful, a statement that is also mighty significant considering the adverse conditions affecting electric railways everywhere during the war-time period.

John W. Shartel, the new president of the company, was born in Harmonsburg, Pa., on May 1, 1862. Soon thereafter his parents moved to Missouri, where Mr. Shartel received his early education in the county schools. He was graduated from Kansas Agricultural College, Manhattan, Kan., in 1884. After leaving college Mr. Shartel went to Topeka, Kan., and studied law. He was admitted to the bar in 1885 and practiced law in Topeka for a year. He then went to Sedan, Kan. After serving three years there as county attorney he formed a partnership in 1890 with W. C. Hackney, and prac-

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ticed at Winfield, Kan., until Jan. 1, 1893, when he moved to Guthrie, Okla., where the firm of Asp, Shartel & Cottingham was formed.

In 1898 Mr. Shartel went to Oklahoma City and became general attorney for the Choctaw, Oklahoma & Gulf Railroad, which position he held until 1901. Several years later he formed a law partnership with J. R. Keaton and Frank Wells. This connection continued until 1912, when he retired in order to devote his time to the Oklahoma Railway, which he had helped to organize in 1902 and which had grown meanwhile to such proportions that the conduct of the company's affairs required the greater part of his time.

In 1920 he was elected president of the Oklahoma Utilities Association and the following year was reelected to that office, the precedent of a single term for that office having been abandoned. Mr. Shartel is also a director of the Chamber of Commerce of the United States, representing the fifth district. He was elected to this office at the last annual meeting of the chamber, held in Washington in May, 1922.

Engineer Resigns

Richard Sachse Will Work Up Plans for Unifying Railway Lines in Los Angeles

Richard Sachse, chief engineer of the California Railroad Commission, resigned Feb. 21 to engage in the work of fixing the valuation of the properties of the Los Angeles Railway and the Pacific Electric Railway in the proposed unification plan. Mr. Sachse's work will be to determine the costs of the properties so as to ascertain the sum to be paid for the properties taken over, depending on which plan is the one to be finally accepted.

Since the railway lines involved will assume the expense of the proposed surveys, Mr. Sachse will be engaged by them in handling the surveys. He will also represent the Railroad Commission. Likewise, he will serve the city of Los Angeles in a supervisory capacity, if the city decides that his services are needed in this respect. It is understood that Mr. Sachse resigned his post with the Railroad Commission primarily to take up private engineering practice in Los Angeles. Mr. Sachse announced more than a year ago his plans for leaving the commission.

Mr. Sachse entered the service of the California State Railroad Commission in 1912 and was appointed chief engineer of the commission in 1916. He was recently appointed chairman of the engineering advisory commission on valuation of all railroad and public utility properties in the United States. He was also chairman of the inductive interference commission which investigated all power, railroad and telephone lines in California. As chief engineer of the State Railroad Commission he has had engineering supervision over public utility properties valued at $700,000,000.

During Mr. Sachse's service on the Railroad Commission he has been actively engaged in handling the Los Angeles Plaza Terminal project, which the Railroad Commission ordered be carried out by all the steam road and electric interurban lines entering Los Angeles. The railroads carried the matter to the State Supreme Court on the score that the Railroad Commission lacked jurisdiction and from that body the case went to the Interstate Commerce Commission.

J. W. Nicholson Secretary at Cincinnati

Joseph W. Nicholson, for many years assistant to W. Kesley Schoepf, president of the Cincinnati (Ohio) Traction Company, has been elected secretary of that corporation by the directors. The promotion comes to Mr. Nicholson, one

J. W. Nicholson

of the youngest executives in the electric transportation field, after years of faithful and efficient service. He entered the employ of the company eleven years ago as a stenographer. Mr. Nicholson also has been elected secretary of the Cincinnati Car Company. In 1920 he was elected secretary of the Ohio Traction Company, the parent organization of the Cincinnati Traction Company, which office he still occupies.

William T. Crawford has replaced George A. Peirce as secretary of the Columbia (Ga.) Electric & Power Company.

H. B. Weatherwax, vice-president of the United Traction Company, Albany, N. Y., was recently elected a director of the Champlain Transportation Company.

Senator John H. Trumbull, Plainville, Conn., a director of the Bristol & Plainville Tramway, has been appointed president, pro tem., of the Connecticut State Senate at Hartford.

David L. Starr, attorney and public utility expert, has been elected representative of the Pennsylvania League of Boroughs and Townships on the four-man traction conference board to be created in the proposed reorganization of the Pittsburgh (Pa.) Railways.

Chief Engineer of Los Angeles Board Resigns

H. Z. Osborne, Jr., has resigned as chief engineer of the Los Angeles Board of Public Utilities in order to run for Congress as successor to his father, Congressman H. Z. Osborne, who died recently. Mr. Osborne had been employed by the Los Angeles municipal government for twenty-seven years. He entered the Los Angeles city engineering department after graduating from Leland Stanford University. After serving in various positions in the engineering department for twenty-four years he was appointed to the position of chief engineer of the Board of Public Utilities three years ago.

Mr. Osborne will retain his connection with the semi-official Los Angeles Traffic Commission as chairman of the executive committee. This is an unsalaried position. The commission is organized to make recommendations toward the improvement of relief of traffic conditions. Resolutions were passed by the members of the board expressing regret at Mr. Osborne's resignation and extending appreciation of the service rendered by him.

Mr. Gaboury in New Field

Arthur Gaboury, formerly superintendent of the Montreal (Que.) Tramways, has been elected vice-president and managing director of the American Druggists Syndicate, Ltd., of Canada.

Mr. Gaboury, a well-known figure in the railway field, first became identified with the Montreal Street Railway in 1894 as conductor after he had completed his college course at St. Laurent. It was in the role of conductor and later as a motorman that he learned the practical end of the transportation business. In 1901 he was appointed assistant inspector and from that time on we find him taking on new and bigger responsibilities until in 1906 he was made assistant superintendent. Only one year did he remain assistant superintendent, being appointed superintendent in 1907. This position he held until last fall, when he was allowed a long leave of absence to regain his failing health.

Mr. Gaboury was actively connected with the Canadian Electric Railway Association, at different times being president and treasurer. In the American Electric Railway Association he was also a prominent figure, having been made second vice-president of the Transportation & Traffic Association at the meeting in Chicago last fall. Besides his professional interests Mr. Gaboury gave his services for the advancement of French activities, which in 1918 received public recognition from the French government in the form of a title of Officer of the Academy.

The American Druggists Syndicate, with which Mr. Gaboury's company is affiliated, is a $10,000,000 corporation, with branches throughout the United States and with offices in New York, Chicago and San Francisco. The Canadian branch, which is essentially a Canadian industry in pharmaceutical

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products, has its main office in Montreal with branches in Toronto, Winnipeg and Vancouver.

C. H. Goddard, president of the American Syndicate, is also president of the Canadian branch. W. B. Woodland, B. Sc. and Phar. C., was elected treasurer and production manager at the same meeting at which Mr. Gaboury was made an officer of the company.

A. G. Nelson has replaced W. W. Crawford as secretary and treasurer of the Chicago & Interurban Traction Company, Chicago, Ill.

F. G. Hart has replaced C. B. Hamilton as acting superintendent of transporation of the Bloomington & Normal Railway & Light Company, Bloomington, Ill.

Norman W. Mumford has been elected vice-president of the Savannah (Ga.) Electric & Power Company to serve with Harry H. Hunt and Charles F. W. Wetterer.

Victor D. Vickery has been elected vice-president of the Jacksonville (Fla.) Traction Company. Other officials acting in this capacity are Harry H. Hunt and Charles F. W. Wetterer.

Walter S. Lee is now auditor of the Chattahoochee Valley Railway, West Point, Ga., and J. L. Pepper is claim agent. Both positions were formerly combined and were held by Hubert Cumbee.

I. P. Macnab, superintendent of tramways of the Novia Scotia Tramways & Power Company, Halifax, N. S., has resigned. He will accept the position of manager of the Riverside Iron Works, Calgamy, Alta.

C. A. Harvey, associated with the North American Railway Construction Company for fifteen years, has been appointed roadmaster of the Chicago & West Towns Railway, Oak Park, Ill. The appointment became effective on Feb. 11.

Walter M. Bird, formerly general superintendent of the railway department of the Savannah (Ga.) Electric & Power Company, has been appointed manager of the Fort Madison (Iowa) Electric Company. Both properties are under the management of Stone & Webster, Inc., of Boston.

Judge Warren W. Foster has been elected chairman of the executive committee of American Light & Traction Company, New York, N. Y., succeeding the late Emerson McMillin. M. S. Paine, vice-president of the Bowery Bank, New York, has been made a member of the executive committee.

Oscar Johannesen, for several years connected with the Brunswick & Interurban Railway, Brunswick, Ga., in the capacity of superintendent, has resigned from the company to accept an appointment by the Brunswick Board of Trade and the Young Men's Club as port statistician for the port of Brunswick. During his long years of service with the local railway lines Mr. Johannesen made an enviable record for faithful service and efficiency and received many expressions of best wishes from his immediate associates and others for success in his new work.

R. F. Tyson, who has been assistant to the vice-president of the Philadelphia Rapid Transit Company, has been made operating manager of subway-elevated lines of the company, succeeding G. B. Taylor, who resumes his former place as engineer of way. This change in personnel of the company is in addition to the ones noted in the ELECTRIC RAILWAY JOURNAL for Feb. 24, page 353.

N. M. Aycock, formerly superintendent of car maintenance of the Philadelphia (Pa.) Rapid Transit Company, has joined the electric street railways department of the Texas Company, producers of Texaco petroleum products. Mr. Aycock will act in an engineering capacity with the Texas Company. His headquarters will be in New York City.

Matt L. Cobb, has been employed by the Dallas Railway in the claim department. Mr. Cobb is experienced in this work, having served the company in a similar capacity from 1911 to 1914. Mr. Cobb served the people of Dallas County as District Clerk for three successive terms, a period of six years. The last two years of his public service was as deputy tax assessor under W. E. Horton. Mr. Cobb re-enters the employment of the Dallas Railway as assistant claim agent under G. P. Reddick.

James Mangan has been appointed superintendent of the railway department of the Rutland (Vt.) Light & Power Company, W. R. Farr superintendent of the gas department and W. O. Minard superintendent of the electric department. J. M. Eveleth, W. H. Lawson and E. D. Sibley were the former superintendents of these departments. W. H. Lawson was advanced from his position at the head of the gas department to that of assistant manager. W. E. Kampf is operating engineer in the place of C. D. Spencer.

Obituary

Anton H. Classen

Anton H. Classen, president of the Oklahoma Railway, whose death was noted briefly in the ELECTRIC RAILWAY JOURNAL for Feb. 17, was one of the pioneers of Oklahoma and in more than one sense the father of Oklahoma City. He was one of the first men to see the future possibilities of the city and the very first to set systematically about the task of planning for the city's future growth. In the pioneer days there he made an intimate study of cities elsewhere with a population of 100,000 and then set about shaping the development of Oklahoma City to its future requirements as he discerned them.

Mr. Classen was born in 1862. He was graduated from the law school of the University of Michigan and went to Oklahoma from Illinois in 1889 at the opening of the new State. He spent one year in Guthrie and then moved to Edmond. There he became editor of the Edmond *Sun*. In 1895 he was appointed receiver of the land office at Oklahoma City. In 1897 he entered the real estate field in Oklahoma City, in which line he continued active until the time of his death. In 1902 he organized the Classen Company to take over his real estate holdings. It was in this same year that a company was organized to build an electric railway in Oklahoma City. Mr. Classen at once became one of the principal backers of the company. He was connected with the company officially from that time on and in 1903 was made president of the company.

Writing in the issue of *Oklahoma* for Jan. 18, Ed. Overholser, president and manager of the Oklahoma Chamber of Commerce, concluded an appreciation of Mr. Classen with this statement:

> As I sat in the Methodist church the day Mr. Classen was buried and watched Oklahoma City filed by his casket, it occurred to me that a man who could so live that he would receive such homage in his last hour, would leave as a heritage to his family, city, state and nation something of greater value than any hero of wars, holder of office, prince or potentate, and surely such a man will hear the final message: "Well done, thou good and faithful servant . . . enter thou into the joy of the Lord."

Martin Francis Hanley died at Ottawa, Ill., on Feb. 13. He had been in poor health for more than a year, but it was not until quite recently that his condition became critical. Mr. Hanley was claim agent for the Chicago, Ottawa & Peoria Railway and a special investigator for the law firm of Duncan & O'Conor. He had held these positions for the past fifteen years. Mr. Hanley had a very large circle of friends in Ottawa, and was well known in every city in which the Chicago, Ottawa & Peoria Railway operates. He was born in La Salle June 29, 1884, a son of the late Judge and Mrs. Patrick Hanley of La Salle. He is survived by a wife and four children.

William E. Kuhlman, a brother of the late Gustave Kuhlman, founder of the G. C. Kuhlman Car Company, Cleveland, Ohio, is dead. With the passing of William E. Kuhlman one brother is left of the four who, with their father, Fred Kuhlman, Sr., won a niche in the city's cabinet making industry. The oldest was Charles. Next came in order Gustave, William and Fred, who, with two sisters and the widow, Mrs. Anna Kuhlman, survives. Born in Cleveland, William entered his father's cabinet making shop as a boy. Some time later, horse-drawn street cars came into use and the father and the three eldest sons were commissioned to build the first half dozen. With the organization of the G. C. Kuhlman Car Company, William was associated with his brother. A number of years before he opened a wood working shop at E. Fifty-seventh Street, north of Euclid Avenue. This he later sold, but some months before his death he opened another shop. Mr. Kuhlman was sixty years old.

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Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Car Building Active

Orders for Rolling Stock So Far Placed This Year Running Ahead of 1922

Confirmation was hardly needed of the predictions made previously in the ELECTRIC RAILWAY JOURNAL regarding the outlook in the market for electric railway cars for the year 1923, but it is at hand in the figures of the car building companies with respect to the amount of work on hand as expressed in dollars of business booked. Thus on Feb. 1 the J. G. Brill Company had orders booked for $11,000,000 of work, while the St. Louis Car Company has more than $2,000,000 of work on its books and the Cincinnati Car Company has $5,000,000 of new car construction under way. Here is a total of more than $17,000,000 of work in hand by the three largest manufacturers, to say nothing about orders placed with other builders.

That the electric railways were coming back into the market for equipment was indicated early in 1922 by the record of orders listed from week to week in the ELECTRIC RAILWAY JOURNAL. So pronounced did the tendency become early in 1922 to order new equipment that a survey was made in the issue of this paper for July 1, 1922, which reduced the matter to definite figures. The tendency to buy manifested itself slowly at first, as many buying movements do, but as the year rolled on the orders continued to increase in number and size with the result that the year 1922 closed with nearly 200 per cent increase in rolling stock orders placed, as noted in the ELECTRIC RAILWAY JOURNAL for Jan. 6, 1923.

It might properly be expected that a buying movement which so quickly accelerated its pace and to such proportions would shortly spend its momentum, but such has not been the case judging from the orders so far placed this year of which there is a record and of the inquiries that are out for bids on additional rolling stock.

No doubt much of the buying being done is on account of deferred purchases in the past, but that does not alter or detract from the facts with respect to the indicated total of business now on hand among the car builders. If there is to be any slackening in the market for cars in the near future there has certainly been no indication of any such trend so far this year. Not all the orders so far placed or those likely to be placed in the near future have been recorded in this paper, but enough of them have to show the trend.

As typical of some of the orders placed recently there is one from the Key Route for fifty-five cars, one from the Louisville Railway for fifteen cars, one from the Interstate Public Service Corporation for forty-four cars, one from the Philadelphia Rapid Transit Company for 576 cars, one from the Washington Railway & Electric Company for ten cars, to say nothing of the smaller orders. This is a total of considerably more than 700 cars reported as ordered since the first of the year and places the industry, even allowing for the unusual Philadelphia order, back on the pre-war basis when orders for cars ran from 4,000 to 6,000 a year. So far the new year is running ahead of 1922 with its record of 3,538 cars.

As regards contemplated purchases there is the desire of the city of Seattle to provide the Municipal Railway with from 100 to 200 new cars, the plan of the Los Angeles Railway to build eighty-two cars in its own shops, the contemplated purchase of fifty cars for the Cleveland Railway, the inquiry of the Brooklyn City Railroad for 500 new double-truck cars and the contemplated purchase noted in this week's issue by the Kentucky Traction & Terminal Company of twenty-seven new city cars, a few extra one-man interurban cars and some one-man express cars.

These are merely the outstanding inquiries from the railways among the plans so far made public. Doubtless these represent most of the large additions to rolling stock equipment so far decided of which news has become public, but the list is not meant to be inclusive and probably is far from being so. As a criterion for judging the future, however, the facts set down show, as indicated previously, that the cars so far ordered this year are proportionally in excess of the total of cars ordered for 1922, while purchases contemplated in the future indicate the demand for cars continues unabated.

Large Order for Automatic Substations

The order for automatic substation equipment placed on Feb. 17 by the United Railways & Electric Company of Baltimore is said to be the largest single order ever placed by a city railway company for automatic substation apparatus. There will be four new substations, each containing two 1,500-kw. rotary converters with necessary transformers and control equipment.

The installation will be unique in other respects than size. The new substations are designed to supply power to the central portion of the railway system where the heaviest loads occur, and the four new substations will all be within a mile of each other. This installation will not involve the discontinuance of any of the existing substations. They will be continued in service with manual operation as at present. The company purchases its power at 25 cycles.

The order for substation equipment was placed with the Westinghouse Electric & Manufacturing Company, and it is expected that one or two of these substations will be in service by Dec. 1 and all of them within slightly more than a year. The cost of installation is said to be more than $500,000.

ELECTRIC RAILWAY MATERIAL PRICES—FEB. 27, 1923

Metals—New York

Copper, electrolytic, cents per lb.	16.687
Lead, cents per lb.	8.15
Nickel, cents per lb.	27.50
Zinc, cents per lb.	7.95
Tin, Straits, cents per lb.	44.875
Aluminum, 98 to 99 per cent, cents per lb.	24.00
Babbitt metal, warehouse, cents per lb.:	
Fair grade	42.00
Commercial	25.00

Bituminous Coal

Smokeless mine run, f.o.b. vessel, Hampton Roads	$6.275
Somerset mine run, Boston	4.00
Pittsburgh mine run, Pittsburgh	2.75
Franklin, Ill., screenings, Chicago	2.375
Central, Ill., screenings, Chicago	1.625
Kansas Screenings, Kansas City	2.50

Track Materials—Pittsburgh

Standard Bessemer steel rails, gross ton	$43.00
Standard open hearth rails, gross ton	43.00
Railroad spikes, drive, Pittsburgh base, cents per lb.	2.90
Tie plates (flat type), cents per lb.	2.525
Angle bars, cents per lb.	2.75
Rail bolts and nuts, Pittsburgh base, cents, lb.	4.175
Steel bars, cents per lb.	2.25
Ties, white oak, Chicago, 6i n. x 8 in. x 8½ ft.	1.50

Hardware—Pittsburgh

Wire nails, base per keg	2.80
Sheet iron, (28 gage), cents per lb.	3.50
Sheet iron, galvanized, (28 gage), cents per lb	4.60
Galvanized barbed wire, cents per lb.	3.45
Galvanized wire, ordinary, cents per lb.	2.65

Waste—New York

Waste, wool, cents per lb.	13.50
Waste, cotton, (100 lb. bale), cents per lb.:	
White	12.25
Colored	10.00

Paints, Putty and Glass—New York

Linseed oil, (5 bbl. lots), cents per gal.	99.00
White lead, (100 lb. keg), cents per lb.	13.125
Turpentine, (bbl. lots), per gal.	$1.55
Car window glass, (single strength), first three brackets, A quality, discount*	84.0%
Car window glass, (single strength), first three brackets, B quality, discount*	86.0%
Car window glass, (double strength, all sizes, A quality), discount*	85.0%
Putty, 100 lb. tins, cents per lb.	5.50

*These prices are f.o.b. works, boxing charges extra.

Wire—New York

Copper wire base, cents per lb.	18.75
Rubber-covered wire, No. 14, per 1,000 ft.	7.30
Weatherproof wire base, cents per lb.	17.50

Paving Materials

Paving stone, granite, 4 x 8 x 4, f.o.b. Chicago, dressed, per sq.yd.	$3.60
Common, per sq.yd.	3.15
Wood block paving 3½, 16 treatment, N. Y., per sq.yd.	3.04
Paving brick, 3½ x 8½ x 4, N. Y. per 1,000 in carload lots	50.00
Crushed stone, ¾-in., carload lots, N. Y., per cu.yd.	1.75
Cement, Chicago consumers net prices, without bags	2.20
Gravel, ¾-in., cu.yd., N. Y.	2.00
Sand, cu.yd., N. Y.	1.00

Old Metals—New York

Heavy copper, cents per lb.	13.25
Light copper, cents per lb.	11.75
Heavy brass, cents per lb.	8.00
Zinc, old scrap, cents per lb.	4.75
Yellow brass, cents per lb (heavy)	8.00
Lead, heavy, cents per lb.	6.75
Steel car axles, Chicago, net ton	24.25
Old car wheels, Chicago, gross ton	27.75
Rails (short), Chicago, gross ton	25.25
Rails (relaying), Chicago, gross ton	33.50
Machine turnings, Chicago, net ton	14.25

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Rolling Stock

Community Traction Company, Toledo, Ohio, will purchase buses in accordance with a recent ruling of the City Council.

Virginia Railway & Power Company, Richmond, Va., received five new one-man type cars recently from the Brill Company. The cars are for use on the Richmond division and are of the type in use throughout the system.

American Electric Power Company, Philadelphia, Pa., successor to American Railways Company, is considering the purchase of thirty cars within the next six weeks. These cars will be purchased on the car trust plan and will be assigned among the different properties owned by it.

Kentucky Traction & Terminal Company, Lexington, Ky., contemplates the purchase of twenty-seven new city cars, a few additional one-man interurban cars and some one-man express cars. This company was one of the first to use the one-man light-weight car in interurban service, so that the order now contemplated is a repeat one.

Louisville (Ky.) Railway, through Frank Miller superintendent of maintenance and vice-president, reported on Feb. 23 that so far it has taken no action in regard to replacing the fifty-four cars lost to the company in the last six weeks. Thirty-five of these were lost in one fire and seventeen in another, while two were demolished in grade crossing accidents. Mr. Miller stated that he had been busy with plans for rebuilding the two burned carhouses and was not in a position as yet to say much about the rebuilding program for the carhouses or replacement of cars lost by fire and wreck. Some new cars will probably be purchased, although in actual number of cars the company is protected by the new ones which are arriving.

Track and Roadway

Cape Fear Railways, Fayetteville, N. C., will extend its line to Hope Mills and to Manchester.

Louisville (Ky.) Railway will likely extend its Second Street car line to the new park which is being erected by the Louisville Baseball Club. The company has also been requested to arrange new trackage to carry part of the service on the Fourth Street line to the new ball yard during the season.

Houston-Beaumont, Tex. — Ed Kennedy, Houston, Tex., is now at work on a project to build and operate a line from Houston to Beaumont, via Goose Creek, with connection from Beaumont to Port Arthur. Mr. Kennedy has launched several interurban projects which have been carried out and the lines put in operation.

El Paso (Tex.) Electric Railway announces a program of improvements and extensions for 1923 calling for the expenditure of $450,000. A tentative budget prepared by Alba Warren, vice-president and general manager, will be submitted to the directors and, if ratified, work will begin at once on the improvements. These will include several extensions, addition to power plant and replacement of some old cars now in service.

Trade Notes

A. E. Ensell, formerly with the Equipment Corporation of America, is now engaged in the purchase, sale or rental of contractors' railroad, mine, mill and quarry equipment, new, used or rebuilt. He will deal in inspection, appraisals, and retail estimates. He is located at 1628 Market Street, Philadelphia.

Ohio Brass Company, Mansfield, Ohio, has built a new plant at Niagara Falls, Ont., and organized a company to be known as the Dominion Insulator & Manufacturing Company, Ltd., which will manufacture high-tension insulators and such other O. B. products as are sold to any particular extent in the Canadian market.

Portland Cement Association, Chicago, Ill., announces the opening of a new district office in the Hibernia Bank Building, New Orleans. Association Work in Louisiana and Mississippi will be directed from this office. The district engineer in charge of the New Orleans office is John E. Tate, formerly associated with the Atlanta office as field engineer in North Carolina.

The Uehling Instrument Company, Paterson, N. J., has just appointed two new agents, namely, John E. Arnold, 15½ South Fourth Street, Tulsa, whose territory is the State of Oklahoma, and H. R. N. Johnson, 917-A Marquette Avenue, Minneapolis, whose territory is Minnesota, North Dakota and South Dakota. These agents are well acquainted in the power plant field and are thoroughly conversant with the problems necessitating the use of Uehling CO_2 recorders and other Uehling gages.

Mitsui & Company have been appointed exclusive representatives in Japan and China for Uehling CO_2 recording equipment and other Uehling power plant instruments and gages. The head office of Mitsui & Company is located in Tokio and the New York branch office is at 65 Broadway. Many Uehling installations have been made in Japan and China without the aid of local representatives, but it is believed that with the co-operation of the very able engineering department of Mitsui & Company the Japanese and Chinese Uehling customers will be served to the very best advantage.

Combustion Engineering Corporation, New York, N. Y., announces that T. J. Cleary, who has recently opened an office in Atlanta, Ga., for the sale of power plant equipment, has been appointed the company's Southern agent. Mr. Cleary has been a sales engineer in the South for many years and has a thorough knowledge of Southern business methods and power plant problems. By this arrangement the company is enabled to extend to Southern power plants a complete service covering all phases of combustion engineering and to supply equipment of its own manufacture to meet any fuel-burning problem.

Railway Bearing Company, Syracuse, N. Y., capital $200,000, has been formed to manufacture bearings for railway cars. Incorporation papers give Alexander T. Brown, Willard C. Lipe, J. H. T. Bell, Herman Cassler and Harry D. Weed as incorporators. Most of these men have been prominent in the gear industry in Syracuse. Of the capital stock of $200,000, a total of $50,000 is to be preferred to pay 8 per cent, and the balance $150,000 in common stock. The new company is the successor to the Railway Roller Bearing Company and the change in name is to provide for extension of operations.

Globe Ticket Company, Philadelphia, Pa., recently opened a branch factory in Los Angeles, Calif. The new plant is located in the Westinghouse Building, 420 South San Pedro Street. During the last year or two the business of this company has increased to such an extent that it seemed advisable to establish a factory on the west coast. This factory is a complete unit, prepared to turn out all classes of tickets on short notice. C. M. MacAllister, who was in the Philadelphia office for several years, has charge of the Los Angeles factory. The same brand of service that has been the standard of the Globe Ticket Company in Philadelphia for over forty years will be the aim of Mr. MacAllister in operating the Los Angeles plant.

New Advertising Literature

Combustion Engineering Corporation, New York, N. Y., has just published an eleven-page pamphlet describing with illustrations its Combusco water seal ash conveyor.

Nic Le Grand, Inc., Rock Island, Ill., has issued a folder describing some of the railway equipment parts handled. These include safety hand and footholds for cars, improved scrapers, life guards and ball and roller bearings for center plates and side bearings.

Philip Casey Company, Cincinnati, Ohio, has issued a thirty-two page booklet entitled "Insured Results with Concrete Paving." In the introduction it is said that the booklet exhibits what Elastite, "the Sandwich Joint," has accomplished when afforded the opportunity.

The Conveyors Corporation of America, Chicago, Ill., has issued a new folder describing the American airtight door. This door is largely used in ashpits and boiler settings and is made in five sizes 15 x 16, 18 x 18, 22 x 26, 24 x 24 and 24 x 36. The door is of unique design, strong and substantially built of cast iron. When closed and locked it is airtight.

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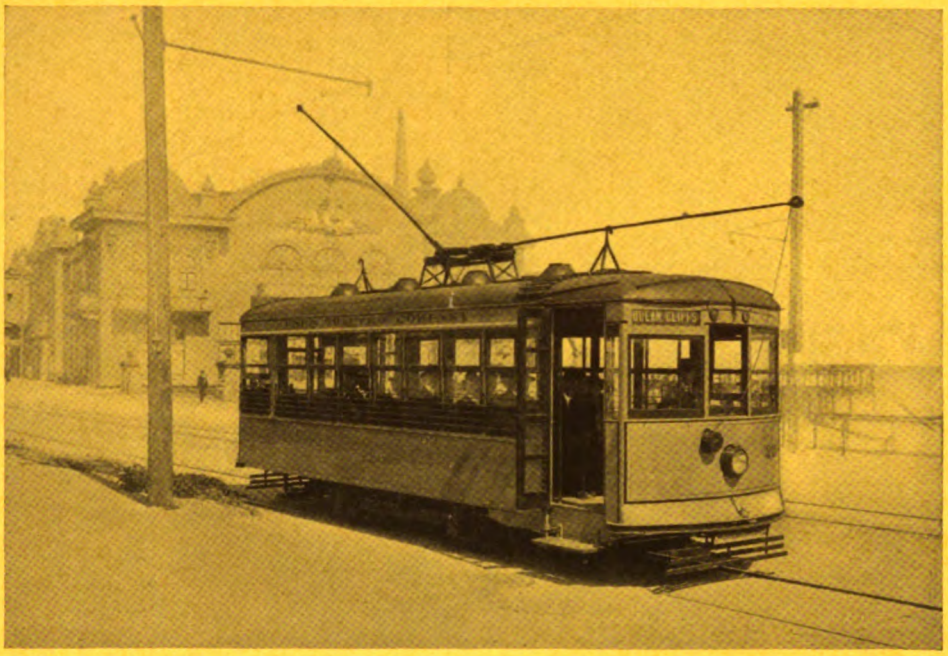

Birney Safety Car at Santa Cruz, Cal. Built by the American Car Co.

Maximum Economy

The large number of Birney Safety Cars in service today is evidence of their success. Over 3,600 cars have been built by us for service on over 200 railways. Their introduction at a time when economical operation and increased receipts were necessary proved to be the solution of many difficult financial problems.

Today the Birney Safety Car is just as capable in providing the most service at the lowest cost as it was when the industry's financial pulse was at its lowest ebb.

Figured on the basis of its seated passenger load the Birney Safety Car is the lightest car yet developed, and consequently the maximum saving in power and maintenance is worth taking advantage of.

THE J. G. BRILL COMPANY
PHILADELPHIA, PA.

AMERICAN CAR CO. ST. LOUIS MO. — G. C. KUHLMAN CAR CO. CLEVELAND, OHIO. — WASON MANF'G CO. SPRINGFIELD, MASS.

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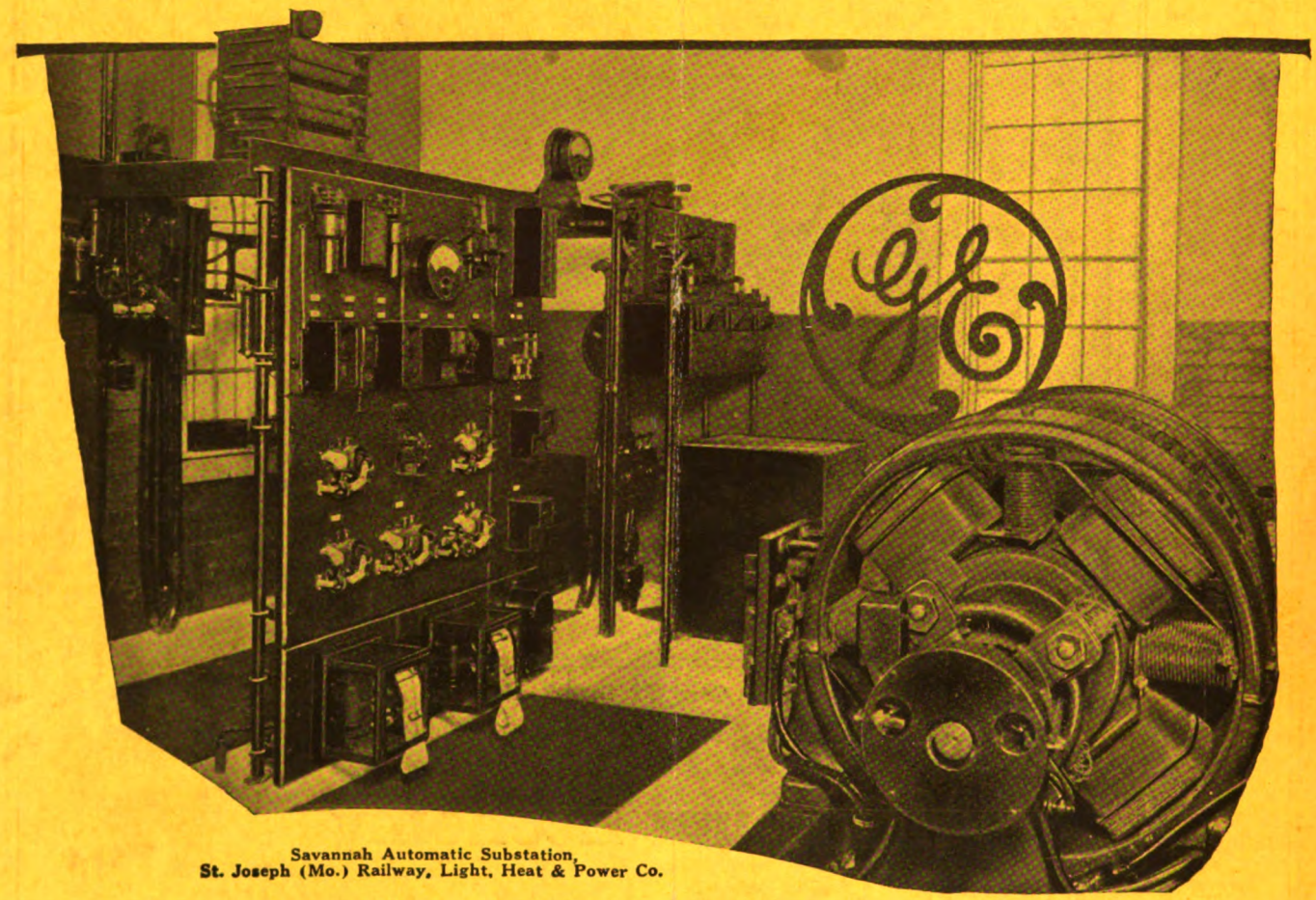
Automatic substations effect greater economies



Savannah Automatic Substation,
St. Joseph (Mo.) Railway, Light, Heat & Power Co.

No hands, yet they serve

Significantly indicating the trend of the times is the increasing application of automatic control to electric railway distribution systems.

Automatic railway substations have proved themselves in service. They are being preferred by many properties in the interest of greater economy and better schedules. Automatic apparatus—responding to power demands—insures a power supply which is adequate to meet traffic requirements.

There are now 165 G-E automatic control equipments for railway substations in operation or on order. This makes a total of nearly 130,000 kw. capacity, established since 1914 when the first automatic equipment was furnished.

General Electric Company

General Office
Schenectady, N.Y.

Sales Offices in
all large cities

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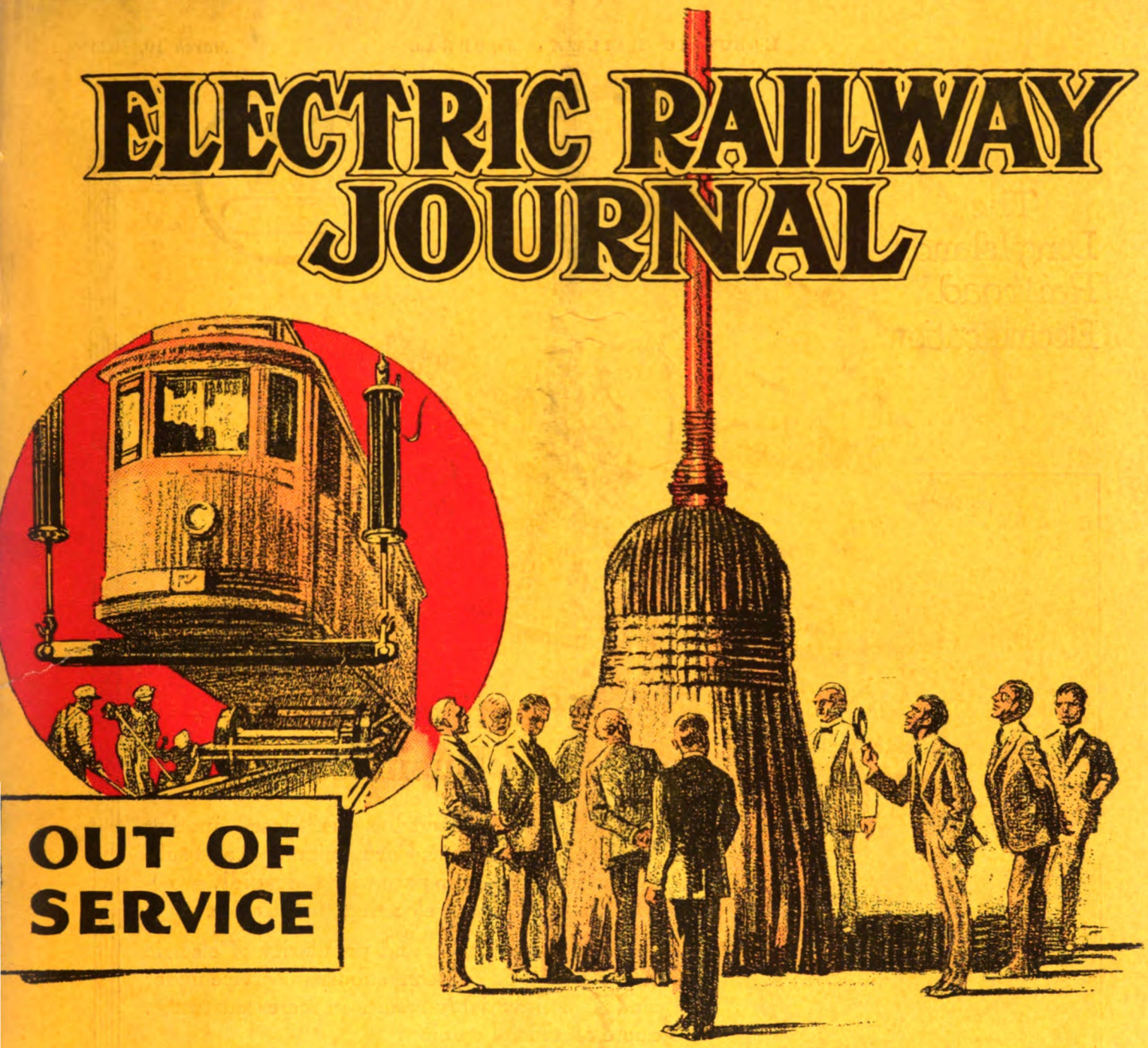
ELECTRIC RAILWAY JOURNAL



Do Brooms ring up Fares?

Some electric railway companies attach more importance to the selection of brooms than they do to the selection of lubricating oils.

Brooms have good uses of their own, but scientifically correct lubrication keeps cars running and fares ringing.

The Vacuum Oil Company will gladly cooperate in making an analysis of your car failures and will make lubrication recommendations based on its 57 years' experience in reducing operating costs throughout the world.

GARGOYLE

Lubricating Oils

A grade for each type of service

Domestic Branches:

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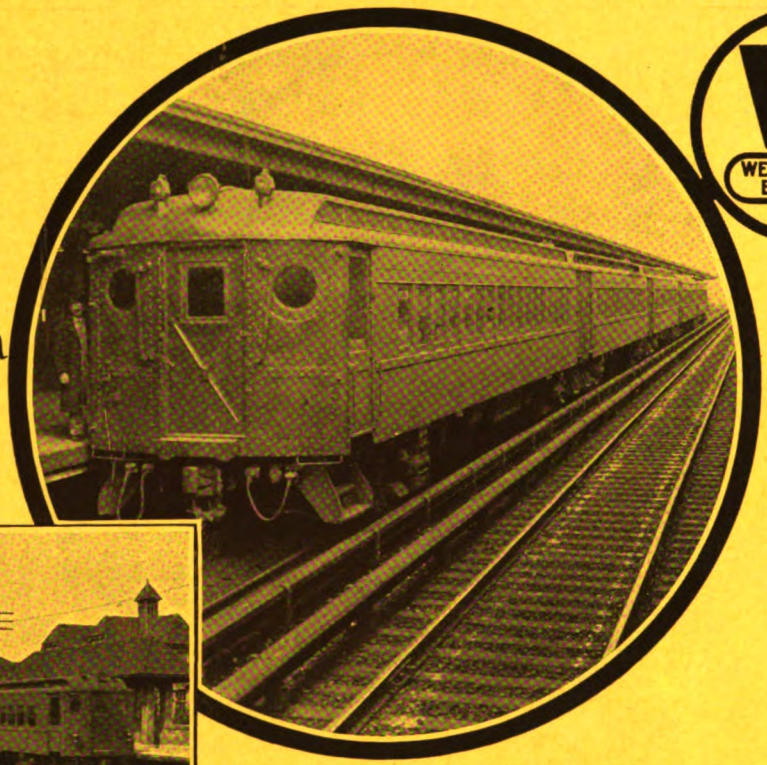
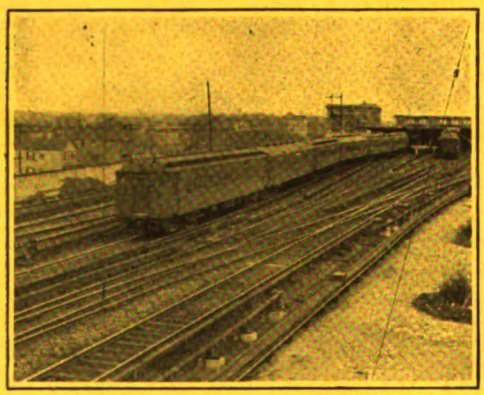
The Long Island Railroad Electrification





Electrification Means Increased Business

The Long Island Railroad has just closed another order for 44 Multiple-Unit Car Equipments and substation apparatus to keep pace with the rapidly growing requirements of this electrification service.

The reliability, regularity and popularity of electric service as compared to steam suburban service under all conditions, invariably results in increased traffic. To quote an official opinion:

"Were we today forced to abandon electricity as a motive power, it would mean a complete revolution in our train service and either the enlargemen of our Flatbush, Brooklyn, station to two or three times its present size, at an almost prohibitive expense or, what is more probable, it would be necessary to abandon much of the service not possible under the restrictions of steam operation."

Westinghouse Electric & Manufacturing Company
East Pittsburgh, Pa.

Westinghouse

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ELECTRIC RAILWAY JOURNAL

Consolidation of Street Railway Journal and Electric Railway Review

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The Personal Touch Is Necessary in Maintaining Friendly Public Relations

THE present interest in fostering good relations between the public utility and its public is excellent. Wherever such relations can be fostered on a sound basis, no effort to develop them is wasted. But to be successful the effort must be based upon a few fundamental facts. Otherwise the relations will fall like the house built upon the sand when the storm comes. The manager ambitious to keep his property right with its patrons must have high ideals of the mission of the property to the community, must understand the individual and social characteristics of his patrons and must know how to convince his community that he and the utility which he administers are there to serve it first and make a profit second. In no other ways can he keep from getting in wrong, and once in he will find it hard to get out. A tough proposition? Yes, it takes a real man to solve it. But it can be solved.

The public which supplies the patronage for an electric railway is something individually personal, not a mass of humanity. These individuals, therefore, must be reached as such. They do, of course, think in groups and even then many think very little, but unless they are visualized as separate entities, "public relations" will not get very far.

The manager must, therefore, be a "mixer," using that overworked word in its best sense of a friendly man. The public relations matter must begin at the head, it is something that cannot be delegated. The manager personifies the railway to the patrons. They must like and respect him or he cannot properly serve them. Good public relations cannot be made by machinery, no matter how ingeniously devised, for machinery has no heart.

Service Must Come Ahead of Profits in Promoting Good Public Relations

OBVIOUSLY, then, good public relations are friendly relations, but they must be based on what really interests the people—good service. No amount of handshaking and captivating talk will take the place of it. Better keep mum and in the background until the service is as good as it can be made. When good service is being supplied it is worth talking about. In doing this some simple rules can be followed, although, people being as they are, no complete technique of good public relations will ever be developed. The following appear to be sound:

Let the manager put service ahead of profits in his mind as well as in his words. Profit will follow.

Let the manager and his entire staff be as integral a part of the community socially as their service is an intimate part of its life.

Let the manager mellow his intelligence in putting a message across with sympathy for the public point of view, without necessarily saying or feeling that the public is always right.

Let the aim be to reach the public as individuals, man to man, utilizing so far as possible the natural channels of leadership through which the general run of people are accustomed to receiving their impressions.

Many companies have men who are vested with the particular task of promoting good public relations. Where do they come in if this is a kind of work which cannot be delegated by the management? When a company can afford a specialist along these lines, well and good. But he must do his work as an auxiliary and not as the principal representative of the company before the public. Otherwise he would put the management in the shade as far as the public is concerned, and render it in effect and to this extent supernumerary. There is plenty of study and planning for a specialist where the manager has the right idea on this subject.

A Place for College Men in the Transportation Department

THERE is no great difficulty to interest young engineers coming out of college in a job in the power house of an electric railway. The power house seems to appeal to the training these men have had in a way that no other place in the organization does. Some can be interested in jobs in the mechanical and way and structures departments. But practically none seem to visualize any opportunity in the transportation department. They are willing and happy to don overalls and get into the grease of the power plant, but seem unwilling to start with a clerical job at a division headquarters and learn that phase of the business.

The opportunity here is something that colleges can well bring to the attention of student engineers. The transportation department of the electric railway offers real opportunity for a man to grow for several reasons. In the first place, there is probably greater room for improvement of the calibre of men now in the transportation positions than is true of any other department. Generally speaking, the men holding the positions of division superintendents and their assistants are men who have come up from the ranks and who have learned to handle men. But they are often hard taskmasters and have little vision beyond the existing methods and routine. A young engineer with energy and initiative, and trained to think and analyze, would thus step into an almost virgin field in many companies upon taking a place in the transportation department. Of course, he must expect to start at the bottom and spend perhaps two or three years in hard subordinate positions while gaining a thorough grounding.

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That there is need for something more than a boss of men hardly needs argument. The transportation department employee who develops the genius to fit schedules to traffic, so that there shall be the minimum of unprofitable mileage, but the maximum profitable use of equipment, and then, as a boss, can turn his trainmen and inspectors into a truly merchandising organization, can name his own salary.

The transportation department spends some 60 per cent of the total operating expenditures and yet it is probably the poorest manned of all departments. It is also the poorest paid of all departments, referring to the salaried positions. But this is an outgrowth of the fact that these men are from the ranks and they have not required as much money, though this is wrong. Had the salaries paid in this department been adequate to attract and hold better men, the transportation department would probably be a better functioning machine than it is today, generally speaking. At any rate, there is great opportunity for improvement and managements would do well to endeavor to bring some new blood into this department and give it a chance to grow. For the young college men, this department would be no bed of roses, but the chance for real accomplishment there is so great that it may be quite sound to say that the young engineer will find his ability rewarded more quickly here than in strictly engineering pursuits, where the need for improvement is much less apparent.

Is a Merit and Demerit System for Utility Service Possible?

CAN utilities be graded as to their service performance to determine which are living up to their capabilities. The public service commissions of at least two states think that they can. As yet, there is no report that a service standard has been drafted for electric railway companies, but if the grading system can be applied to gas, electric light and telephone companies, it may be possible later to include the railways. The system as used in Wisconsin was described at a meeting of the commission engineers in Washington last week, and it is reported that the Illinois commission also has a somewhat similar schedule.

Mr. Hayden of the Wisconsin commission was very careful to explain that the system as applied to the utility companies was not drafted with the thought that they should be graded like schoolboys, with some receiving honor marks and others being conditioned and perhaps failing finally to graduate. Nevertheless, it is obvious that such a merit and demerit system has many possibilities for good, if justly administered.

Of course, allowances would have to be made for the conditions under which the service had to be given. One should not expect metropolitan service in a small community. Nevertheless, one of the handicaps of many railways has been that there has been no real standard against which their service can be judged. When a chronic grumbler or a demagogue for political effect says that the service is poor compared with what it ought to be, no reply is possible. But it would be different if the company could declare that its service has been classified on a recognized definite standard in comparison with other like properties and had been found to be "Grade A." It may be also that such a system of grading, as has been pointed out by Mr. Nash of Stone & Webster, will provide a basis for that financial "incentive" which many think necessary in service-at-cost franchises.

Holding Company Investors Carry Reorganization Load

FAST on the heels of the announcement of the completion of the plans for the readjustment of the financial affairs of the Interborough Rapid Transit Company, New York, has come the publication of the terms of the proposed reorganization of the Brooklyn Rapid Transit Company under foreclosure. As has been detailed before, the underlying bonds of the companies making up the Brooklyn Rapid Transit system will remain undisturbed. The principal obligation to be adjusted is the company's own $57,243,700 of three-year 7 per cent notes due in 1921 on which $20,035,295 in interest will have accumulated by July 1 next. In the place of this $77,278,995 of principal and interest there will be issued $62,968,070 of new 6 per cent bonds and $10,303,866 of 6 per cent preferred stock with $4,007,059 to be paid to the holders in cash. As for the tort creditors, about whom such a fuss was made in the newspapers following the terrible Malbone Street accident, they are to be paid in full. These claims for personal injuries are estimated at $2,200,000. Holders of general contract claims aggregating $1,500,000 with $400,000 of unpaid interest to July 1, 1923, will receive $1,150,000 in the new preferred stock and $750,000 in cash according to the plan proposed. As for the stockholders, they must pay an assessment of $35 a share.

The net result of the reorganization will increase the funded debt to $139,210,135, or more than $10,000,000, with an estimated annual interest charge of $6,679,528. This, it is said, is slightly less than the amount paid on this account before the receivership, but a fair comparison is not possible because the reorganization plan is subject to some revision and because the last report made by the company previous to the receivership did not differentiate between taxes and fixed charges. Offhand, it would seem that the charge of $1,500,000 per annum on the issue of $25,000,000 of new 6 per cent preferred stock accumulative after three years must necessarily work to the material detriment of the holder of the common issue. As a matter of fact the holders of the common stock will, under the reorganization, be assured of a small immediate income, for they will receive for the assessment 62½ per cent in new sinking fund 6 per cent bonds, while for the balance of the assessment they will receive preferred stock. Moreover, the chance is good for immediate appreciation in the value of the common share holdings, which will be exchanged share for share. On the basis of the earnings of the company for the year ended June 30, 1922, it has been estimated that the dividend on the preferred stock is being earned 2.84 times, with 3.5 per cent left for the common.

As Judge Mayer explained, it was a very difficult job to reconcile the representatives of the various security holders to a workable plan not too onerous in its terms to any of the holders. All that remains to be done now is to work out the details inherent in every important plan of reorganization and then to present the plan to the Transit Commission. It is interesting to note that whereas in the Interborough Rapid Transit readjustment that company divested itself of the surface lines in New York and Queens to devote itself to the intensive development of the rapid transit lines, the Brooklyn reorganization contemplates the possible future reacquisition of the Brooklyn City Railroad, now restored to a good degree of prosperity and a dividend-paying basis.

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Rerouting Would Save Money in Richmond

By Rerouting and Other Service Changes Requiring a Very Slight Capital Expenditure for Special Trackwork Only, a Saving of More than $250,000 Annually Is Possible—Principles of Rerouting Are Laid Down—Other Economies Are Suggested

THE report on the Richmond railway property for the City Council of Richmond, Va., being made by John A. Beeler of New York, concludes with a suggested rerouting plan. Briefly, it declares that without the addition of any new equipment or the building of any new lines or tracks except a few minor connections more than $250,000 can be saved annually by the plan proposed.

Previous abstracts of sections of this report have been published as they have been made public by the Council and have appeared in the issues of this paper for Dec. 9, 1922; Jan. 27 and Feb. 10, 1923. Briefly their contents may be summarized as follows:

First, the cost to reproduce the property as it exists today and the company's actual cumulated investment from the date of its organization to the present time are given.

The status of the securities issued is then treated in detail, with their proper allocation to the Richmond railway division.

Then the report describes the financial methods and practices of the railway from its organization to the present, with a statement of the service rendered, the expenses and taxes in detail by years from 1911 to date. The income and outgo are analyzed, and the rate of return ascertained for each year.

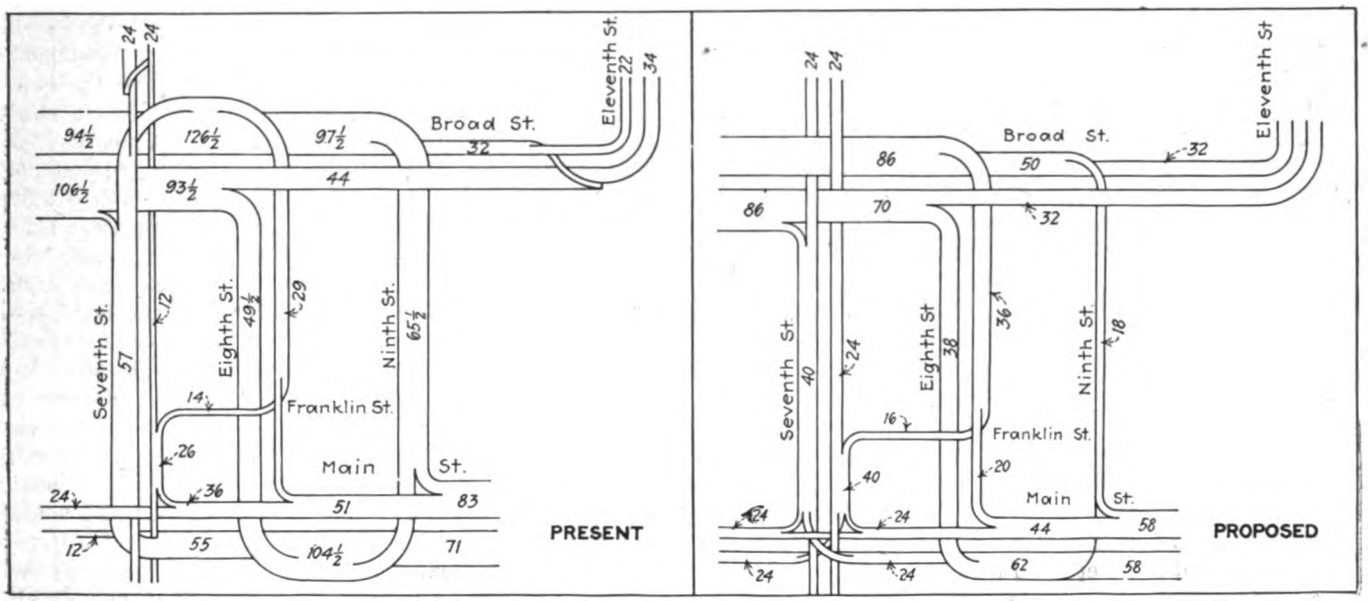
Next a survey of the passenger and traffic movement is presented, showing that the present movement has long been obsolete. A new routing plan is proposed, which will lessen congestion in the downtown section and provide quicker, more direct and better service. By this, with the improved operating method suggested, the saving already mentioned may be expected.

It is believed that with these changes a fair return on a fair valuation will be immediately available.

Routing and Service

In this final section of his report Mr. Beeler not only outlines a system of rerouting for the Richmond lines but lays down a set of principles of routing and service. Routing, he says, is a vital factor in the successful operation of a street railway property. It should be watched continually. A routing correct today may not be suitable a year hence. Cars should be so routed as to serve best the riding public by carrying them where they want to go directly, quickly and economically. To transport passengers economically, the car service must be adjusted to the traffic demands, and to carry them quickly the routing must be such as to avoid traffic congestion.

Usually the demand confronting a street railway is for transportation between the manufacturing or business sections of a city and the residence districts. Two methods have been developed, namely, loop routing, where the cars loop in the business section and return, and through routing, where cars operate from one side of the city through the downtown section to another district. Some cities adopt one plan and some the other. In Richmond, a combination of the two is found. The best solution depends on the riding characteristics. If the demands for service in two different districts are about the same, through routing is the better, as it



Downtown Car Flow Charts Under Present and Proposed Routing. The Figures Indicate Cars Scheduled in Maximum Hour, 5 to 6 P.M.

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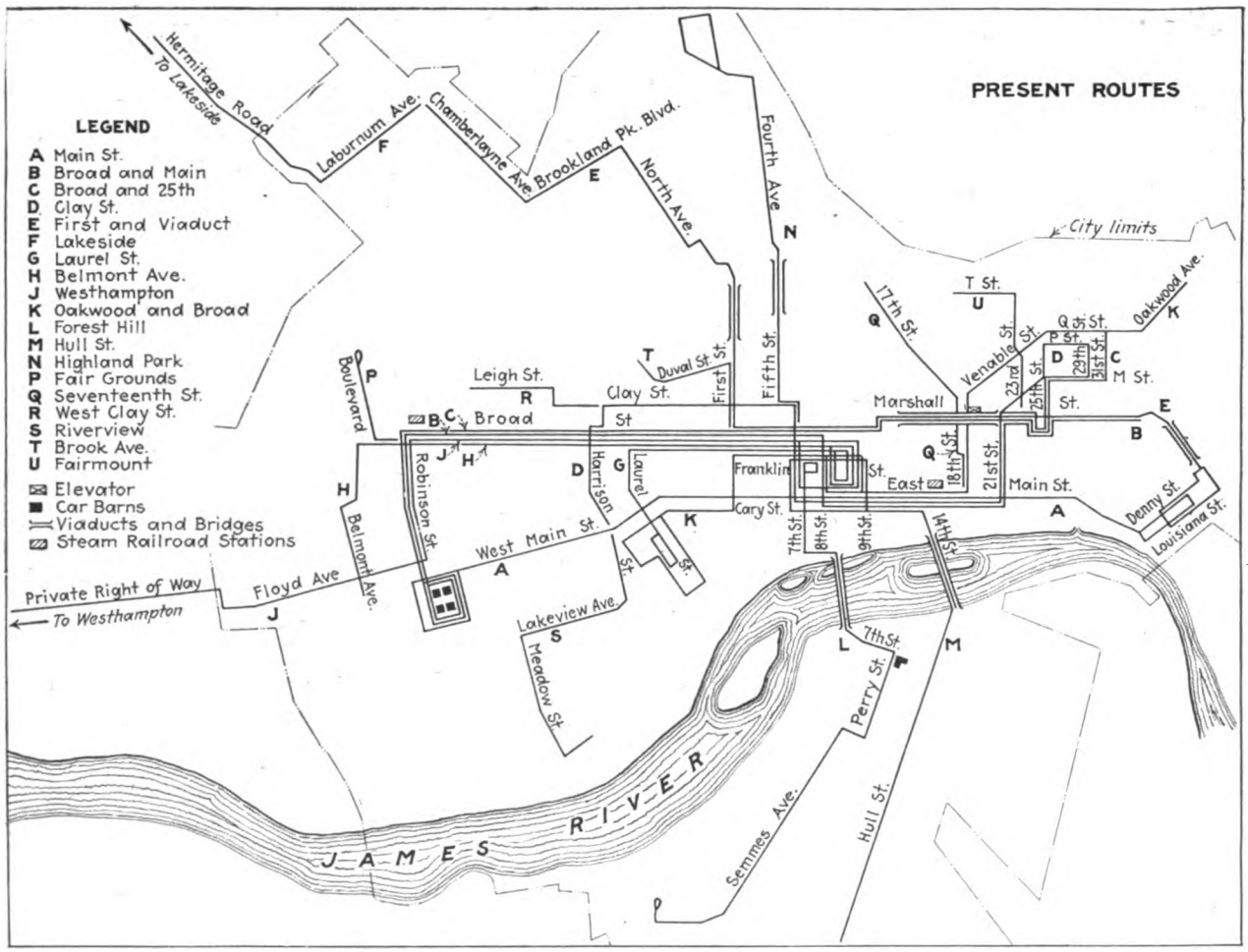

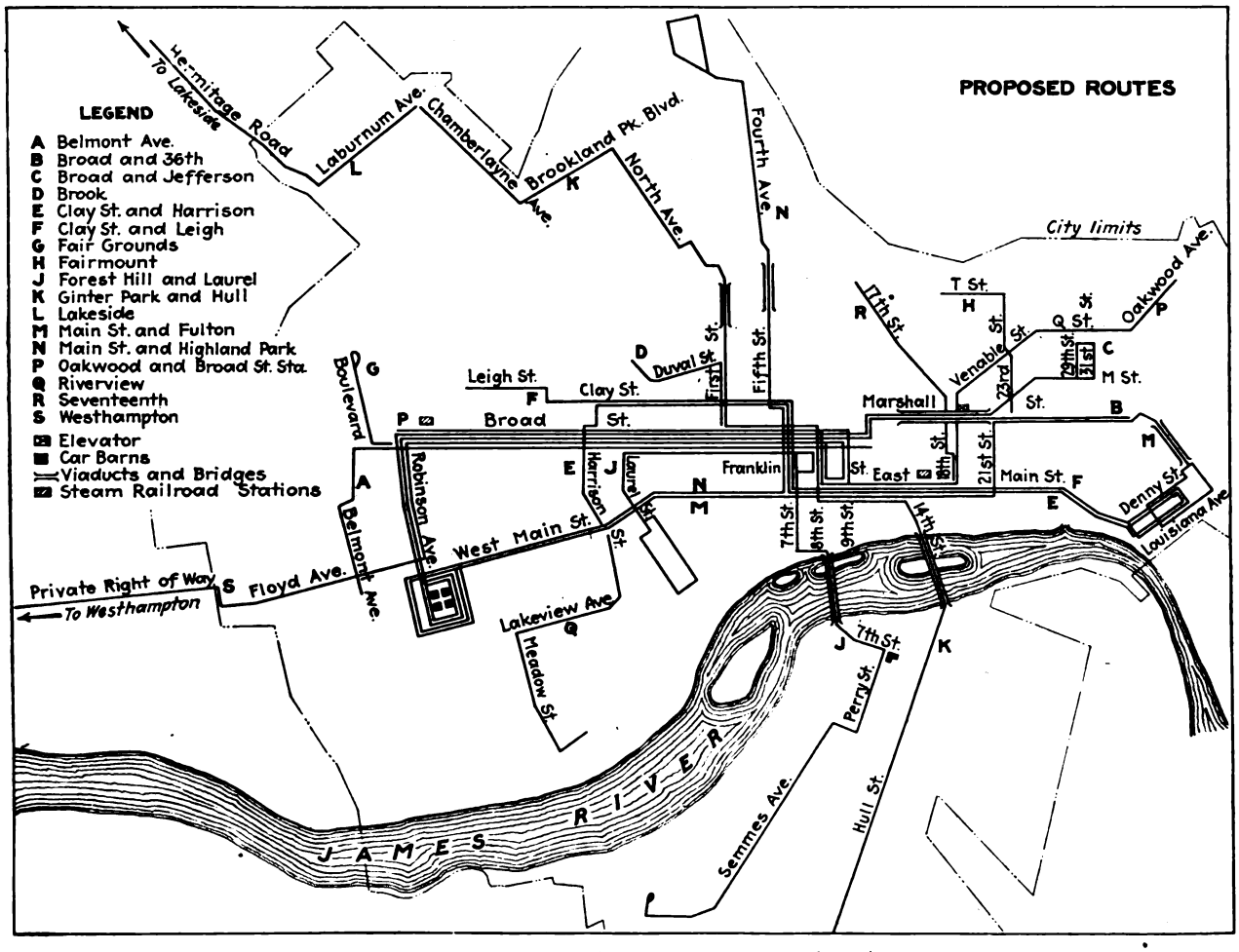

Present and Proposed Routes, Richmond Rerouting Plan

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eliminates loop mileage, usually unproductive, and reduces turning movements in the business section, where congestion is most acute. On the other hand, if the demands are not approximately the same, loop routing may be preferable, because if through routing were used either one section would be under-serviced at the expense of the other or more cars would be run lightly loaded in the first.

Short-lining, or turning back a part of the service at some intermediate point instead of running it all to the end of the line, should always be considered in any routing plan. This not only promotes more efficient operation but it distributes the service more justly.

Before recommendations for improving transportation in the city of Richmond were formulated it was necessary to obtain and digest a large amount of material with regard to the operation of the cars at all times of day, as well as movements of people and vehicles, and traffic conditions generally throughout the city. The company co-operated by furnishing schedules of all lines, route maps and much other valuable information.

To study car loading and operating conditions of individual lines, more than 100 trips covering all routes were made by trained observers and carefully analyzed. The records of these trips show the actual observed running time of the car over the various sections of the route, the locations where stops were made, the passenger interchange at each, and the delays and their causes. These rides were made at all periods of the day, special attention being given to obtain average rush-hour and non-rush conditions. Charts were made to show graphically the information obtained, so as to have them available for study of the individual conditions of each route. A typical one is reproduced.

A series of traffic counts was made to show the total demands for service at the principal controlling points in the city. The counts show the total number of riders passing these points for all periods of the day from 6 a.m. until midnight. The passenger loads were tabulated by fifteen-minute periods in the rush hours, and by thirty-minute periods in the non-rush. Charts similar to that reproduced were then prepared to show similar information in graphical form. Special observations were taken of traffic at congested points in the business district and during the rush hours at selected locations where conditions were bad.

LAYOUT OF THE CITY

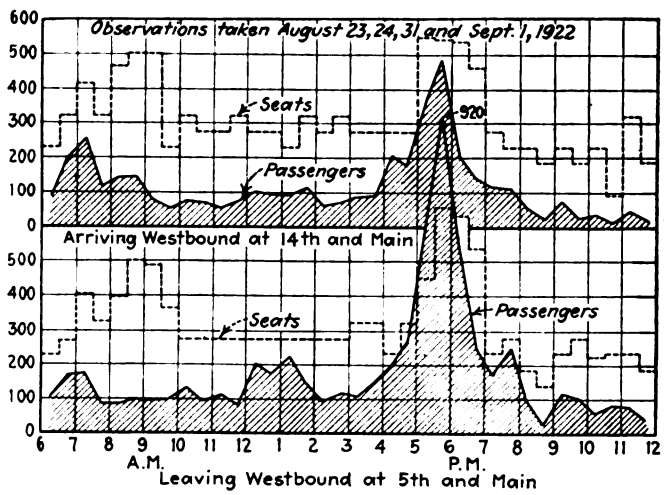
The city of Richmond has a rather rugged topography. It is divided into two main portions by the James River, which runs near the center of the city. The northern section is divided further by Shockoe Creek, which runs in a deep valley between the hill on which the business district is built and the residential sections to the north and east. Several industries requiring transportation facilities are located in this valley. The separation of the city into districts by this topography has necessitated the construction of several bridges and viaducts. Naturally the distances to be covered are fairly great, causing a decided increase in demands on the transportation system.

Service is now given by eighteen routes regularly operated in the base hours, supplemented by various "tripper" cars for the rush. On the average weekday some 134 cars are in operation in the base. During the rush periods this service is built up to 182 cars in the morning and 195 in the evening. The passenger averages show that there are more than enough seats furnished everywhere in the city at all periods of the day. Even in the rush periods from 6 to 9 a.m. and 4 to 7 p.m. there is no place where the total passengers exceed the total seating capacity. Nevertheless, if the cars do not come at the right time, there may be more than enough seats furnished in any given period and yet passengers may be obliged to stand. Irregular loading and spacing are characteristic of the Richmond service.

PRESENT AND PROPOSED ROUTING

The eighteen routes forming the major service in Richmond were laid out more as a result of competition than with regard to the present needs of the residents they serve. There is much duplication, and many lines are indirect and inefficient. The present and proposed routes are shown on the accompanying maps, which are not drawn to scale.

In the new routing much of the duplication mentioned is eliminated, and the routes are more direct. It will be easier to build up the rush-hour service. Congestion in the business district will be reduced, especially in the peak hours, so that all car, vehicle and pedestrian move-



Traffic Count of Cars on Main Street Line, Taken by Fixed Observer

This is a through east and west line, and westbound cars are charted in both of these cases.

ments will be speeded up. The time required for a patron to reach his destination should be reduced, and in many instances the headways will be improved materially.

A comparison of these routes shows that those proposed are more direct than at present. The arrangement is such as to accommodate the riding public as well as may be with the limitations of track and topography. More through routes are provided, thus increasing the delivery area for such lines and decreasing the amount of transferring. Of the transfers that may be necessary under the new routing, more are made outside the downtown district, so that this source of congestion will be lessened. Fewer cars also are turned back in the heart of the city. This will reduce the congestion. It also will better serve the stores in this district and beyond, since more of the patrons will be able to take their cars without a walk to some point removed a considerable distance.

The plan will commend itself in the rush hours especially. The traffic graphs reproduced show the present and proposed number of cars scheduled in the maximum evening hour, between 5 and 6 o'clock. At present the worst points on the system are on Broad between

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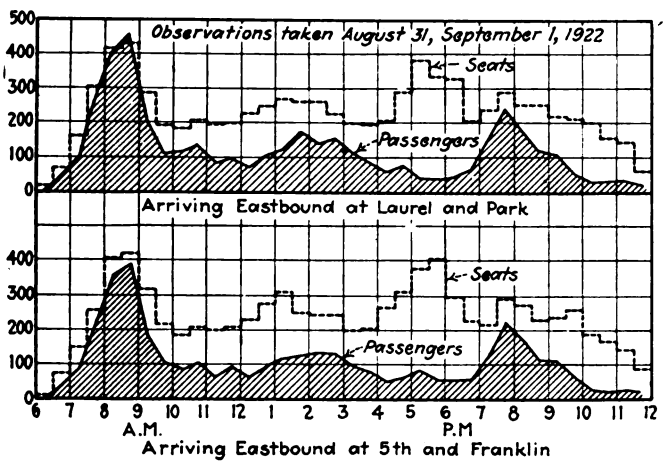
Seventh and Eighth, and on Main between Eighth and Ninth. The trouble is due to the large number of cars looping in these squares. With the rerouting this source of congestion will be reduced materially. The present operation is further complicated by the cross-over movements at Seventh and Broad and Eleventh and Broad. With the new routing these movements will not be made in the rush hours, the cars going straight through. All left-hand turns at Seventh and Broad will be eliminated, while similar turns at Ninth and Broad will be reduced to less than a third the number now made.

On Main Street conditions will be improved about equally. All the left-hand turns at Ninth and Main,



Traffic Count of Jitneys on Jitney Route No. 1

This route serves the "fan-shaped" residential district in the western part of the city, 3,000 ft. wide at its widest part, now without direct car lines going downtown. Both charts show inbound traffic. The point of observation in the upper chart is part way "downtown." The observations in the lower chart are in the business district. The charts show much unused jitney service.

except those made by the Westhampton cars, will be eliminated. At Seventh and Main the left-hand turns will be reduced from forty-three to twenty-four.

The total turning movements scheduled at present are 402. With the proposed routing they will be reduced to 264. The gain is largely in the reduction of left-hand turns, as will be seen from the detailed figures. A comparison of totals follows:

	Car Movements		Reduction	
	Present	Proposed	Number	Per Cent
Number of left-hand turns	266½	136	130½	49.0
Number of right-hand turns....	135½	128	7½	5.5
Total turning movements	402	264	138	34.4

It is generally conceded that the left-hand turn is much more difficult and conducive to congestion than the right-hand turn. In this case, while the total turns proposed are one-third less than at present, the number of left-hand turns proposed has been reduced nearly 50 per cent. Another improvement is that the number of cars scheduled in opposing directions on a street is more nearly equal. This is desirable as two streams of cars can be moved through an intersection almost as quickly as one. With the rerouting in effect the total congestion from car movements in the downtown section will be reduced more than a third. All movements, both car and vehicular, will be accelerated. The other recommendations for the relief of traffic congestion should assist still further.

Due to the economies recommended it is possible to handle the business with somewhat fewer cars than now in use. Each car will make more mileage and provide more service than with the existing methods. The safety cars will be used to best advantage, thus improving the service for a larger share of the public.

Extensions

Due to conditions of unbridled competition existing when the present street car lines were begun too much track was constructed for the best interests of the public. Since that time the city has grown very greatly. The development, to a great extent, has been along the street car lines, but even so there are certain lines which have not earned as yet, nor are likely to earn in the near future, enough to justify their existence apart from the general good to the city.

In planning new lines it is desirable to consider all the factors likely to influence city growth, so that the mistakes of the past may not be repeated in the light of more experience.

The Jitney Situation

As in many other cities, competition to the street cars sprang up a few years ago in the form of "jitneys," principally Ford touring cars, carrying passengers for a 5-cent fare directly along the street railway routes. The operation of these jitneys was conducted in an irresponsible manner, and traffic congestion increased to the point where all vehicle movements were affected adversely. The situation finally became so serious that the city was forced to adopt regulatory measures. During the past summer an ordinance was adopted, among other things licensing the drivers, fixing the fare at 8 cents, and providing for indemnity insurance. Operation was restricted to five regular routes, covering a large portion of the city. This ordinance has clarified the situation and has brought the operation of jitneys within the supervision of the city authorities. Up to the present time but one of the routes has been operated regularly. This is known officially as "Route No. 1," and runs through the "fan-shaped district" in the West End section of the city.

A special investigation of the jitney traffic was made in accordance with the request of the Council committee. The data are charted in an accompanying diagram. In the eighteen hours covered by the check the jitneys on this one route carried 4,017 passengers westbound and 4,309 eastbound, as determined at the maximum point, Laurel Street. This compares with 12,454 carried westward and 13,131 carried eastward on the Broad Street cars, and 6,419 westbound and 6,152 eastbound passengers on the Main Street cars.

The maximum number of jitneys observed was fifty-six in one fifteen-minute period. This is at the rate of nearly four per minute, and represents almost the limit from the standpoint of congestion. While the headways were very close, the advantage to the individual was not equally great, as the usual allowance per jitney is four passengers, and frequently prospective passengers have to wait considerable periods before they can obtain transportation by this method.

To carry this business ninety-nine machines actually were in operation at some time during the day of the counts. Presumably at the very least ninety-nine men were engaged in the business of operating these cars.

Equal or better service could have been offered by the street railway with some twelve safety cars, with not more than twenty-four men as operators for the entire eighteen hours. This would furnish the same

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number of seats throughout the day as the jitneys had during the rush hours, or nearly twice as many as were running in the non-rush hours.

Jitney service costs considerably more to operate than equivalent street car service. This has been proved many times and under widely varying conditions. The reason the business survives is because any individual may engage in it and be satisfied with day wages. In fact, some persons will run their machines a few hours each day in addition to some other line of work. The jitneys as at present operated, even with the excellent provisions of the ordinance now in force, do not have anything like the safeguards required of a responsible corporation, either with respect to service or damages. There is no way of collecting damages beyond the amount of the insurance, though several people may be involved in an accident. Neither is the public assured of adequate service, as there is no method by which the jitney operator may be forced to run his machine, or by which individuals may be obliged to engage in the jitney business.

Up to date the jitneys have not been taxed nearly as heavily as the corporations, nor have they been obliged to assist in paying for paving and its maintenance. The street railway pays taxes equivalent to nearly 10 per cent of the gross receipts and, in addition, installs and maintains a considerable portion of the paving on streets where it operates.

Estimated Savings of Proposed Car Service

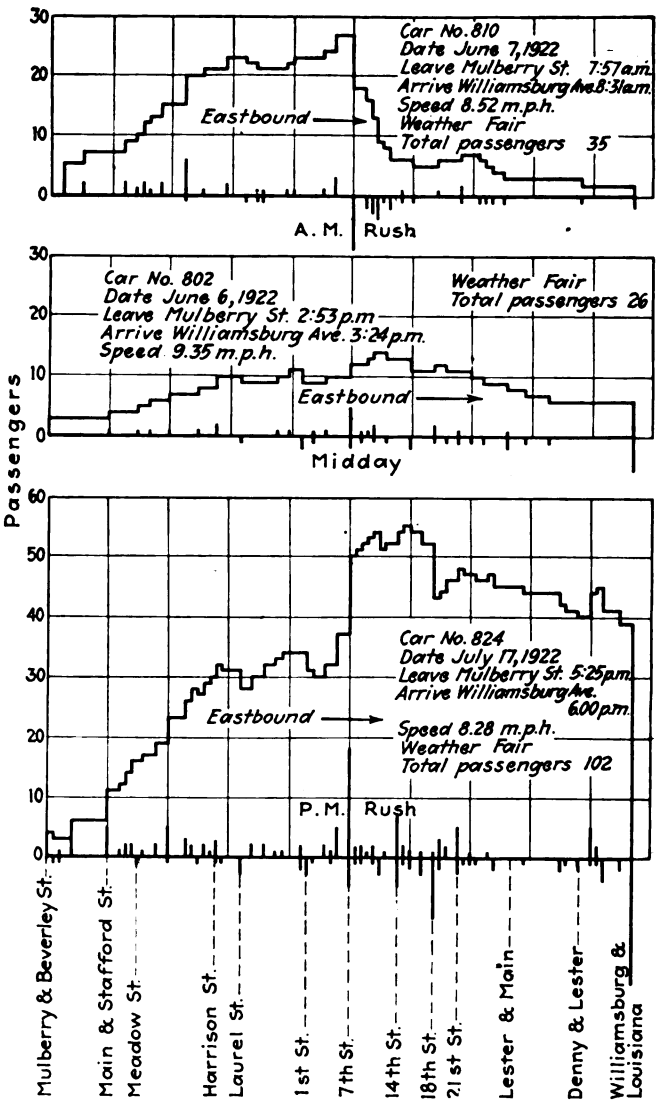
The plan outlined in the preceding discussion has been laid out with a view to giving the best service for the entire city of Richmond. The operation will also be conducted with regard to economy and efficiency. Schedules based on this plan show savings in every department, due to a reduction in car-miles or car-hours operated. Those calculated have been the savings in maintenance, power, and trainmen's wages. Savings in other accounts, such as supervision of transportation, accidents, damages, and general miscellaneous expenses, have not been estimated, though there will be some reduction in these items. On the above basis, the total saving from routing and service changes will amount to $251,790 annually. The only capital expenditures required are for a revision in the special work at four points. To offset these, there is a certain amount of track to be retired, so that the capital account should not be increased, and there should be no addition to the fixed charges. As new cars are not needed to put the entire program in effect, there should be no delay in proceeding with it.

Effect of Savings on Finances of Company

Based on the latest information available, the revenues and expenses of the Richmond railway division, operating on a 6-cent fare, are approximately as follows:

Gross earnings		$2,621,000
Operating expenses	$1,739,900	
Replacements and renewals	187,500	
Taxes	251,600	2,179,000
		$ 442,000
Other income less deductions		49,400
Net income		
Sinking fund charges		51,200
Amount available for interest, etc.		

The above amount is almost exactly 6 per cent on the reproduction cost of the property new, less depreciation,



Typical Car Loading Curves, Taken by Observer on Car
The verticals above and below the zero line show the number of passengers boarding and leaving the car at each stop.

of $7,355,000 as determined by the Beeler organization. A 7 per cent return on the valuation would call for $515,000 in round figures.

With the successful inauguration of the more efficient routing and scheduling just proposed, there will be an increase in the net income of some $252,000 annually, bringing the total net up to $692,000 annually. After deducting from this the $515,000 required to pay 7 per cent on the investment, $177,000 will remain, which may be applied for lowering the fare or for other purposes. A return to the flat fare of 5 cents at the present time would, undoubtedly, reduce the gross revenues practically one-sixth or about $437,000. To make this possible and at the same time permit a 7 per cent return would require some $260,000 additional savings. This rate of return is used for purposes of illustration only.

Further Economies Possible

The economies already recommended may be obtained with a few minor changes in track. With the co-operation of the authorities and the public, other improvements can be made with further economies. There is no reason why practically all the service in Richmond cannot be given with one-man cars, if the

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methods already recommended for traffic control and rush-hour loading are employed. This would require the purchase of additional equipment if the safety type of car is used. For certain purposes the best of the two-man cars may be remodeled to give fair service with one man, although of course they will be inferior to cars designed for the purpose. By a careful readjustment of the stopping places throughout the city to conform to the standard of eight per mile as nearly as practicable, patrons would be afforded faster and better service, and at the same time further operating savings would result.

The re-establishment of an effective power-saving device, followed up energetically by the management and co-operated in by the men should save a considerable amount of the power now used. Other companies have been able to reduce their power bills 10 per cent or more in this way, and Richmond should do as well. Were the jitneys eliminated the company undoubtedly would be able to get a large share of their patronage and should add some $125,000 to the net earnings. None of these economies should interfere with the requirements of good service, but on the contrary, if properly carried out, they should improve the performance of the cars and give better results for the public.

The trend in traction settlements for some years past has been strongly toward the service-at-cost plan. The one serious defect in this method, however, is that with valuation fixed and rate of return determined, managements naturally are content to proceed along lines of least resistance. Indeed, under such conditions, it is most unusual that one will make strenuous efforts to reduce the rate of fare. To stimulate a management to strive for the highest attainments there must be an incentive.

A plan can be provided whereby the benefits resulting from efficient management may be shared by the public and the owners of the property. For illustration, suppose the company be allowed to earn 7 per cent on its valuation with the present rate of fare. The adoption of the improved routing, together with the application of economies set forth herein, should prove more than sufficient for this. The savings may be used to reduce the fare. As the fare is reduced, allow the company to earn an increased rate of return if it can do so by operating more efficiently. For instance, if the fare can be reduced to 5½ cents (or nine tickets for 50 cents), the return may be increased to 7½ per cent; should the fare be reduced to 5 cents the return may be 8 per cent, and so on. With such an incentive the company should exert all its energies toward giving the best possible service at the lowest possible fare.

New Cars Embody Unusual Features

Kansas City Railways' Multiple-Unit Cars Are Used in Trains in Rush Hours, with Three Men for Two Cars, and as Single Units in Non-Rush Periods—Facilitate Handling of Peak Load, with Operating and Investment Costs Minimized

By E. B. Sanders
Publicity Manager Kansas City (Mo.) Railways

IN ORDER to provide equipment which can be operated most economically and efficiently, the Kansas City Railways has recently placed in operation twenty new multiple-unit cars built by the G. C. Kuhlman Car Company of Cleveland, Ohio. The control equipment of these new "1400" type cars, as they are known, is so designed that they can be operated not only in two-car trains with three men, but also as single units with either one or two men. The many steep grades and short curves in Kansas City have made the use of large trailers impracticable. Accordingly, the new trains consist of two motor cars rather than one motor car and a trailer.

These new cars were built from the specifications of the "1100" and "1200" type cars which have been so successfully used since 1915. A few minor changes were introduced in the new cars, and are also being built into the "1100" and "1200" type cars in the Kansas City Railways shops. The new cars are equipped with Westinghouse standard HL control, four General Electric 247 motors, the Safety Car Devices Company air brakes, and the St. Louis Pneumatic Devices Company rear-end door control.

An unusual feature of this equipment is that the HL control has been combined with the Safety Car Devices Company equipment on double-truck cars embodying the one-man operating features. All safety features embodied on the one-man type of car have been applied to this new equipment, and in addition to this a new type of rear-end control has been worked out. The rear doors on these cars can be controlled by conductor's valve, or by a street collector's valve on the outside of the car near the rear doors. All apparatus used to make connections for two-car train operation is a permanent part of the car equipment, so there is no delay in coupling up single units for train operation.

A matter of special interest was the working out of satisfactory coupling connections. For many reasons it was desired to operate the trains with only one trolley, which necessitated the carrying of a bus line, in addition to the control wires, through the coupler. The Tomlinson automatic coupler was adapted with minor changes in anchorage. Installed on one side of the coupler head is the bus line circuit, and on the opposite side the necessary HL control wires, compressor synchronizing wire, door signal wire and conductor's signal; all this is in addition, of course, to the air connections. Just back of the coupler is installed a group of disconnecting switches which couple simultaneously with the air connections of the coupler, so that with one operation the air cocks are closed off and the electric disconnections made. In this way whenever the cars are operated as single units the coupler is dead.

All doors on the cars are interlocked with the brakes, and it is impossible to start a car or train with any of the doors open. The motorman also has signal lights

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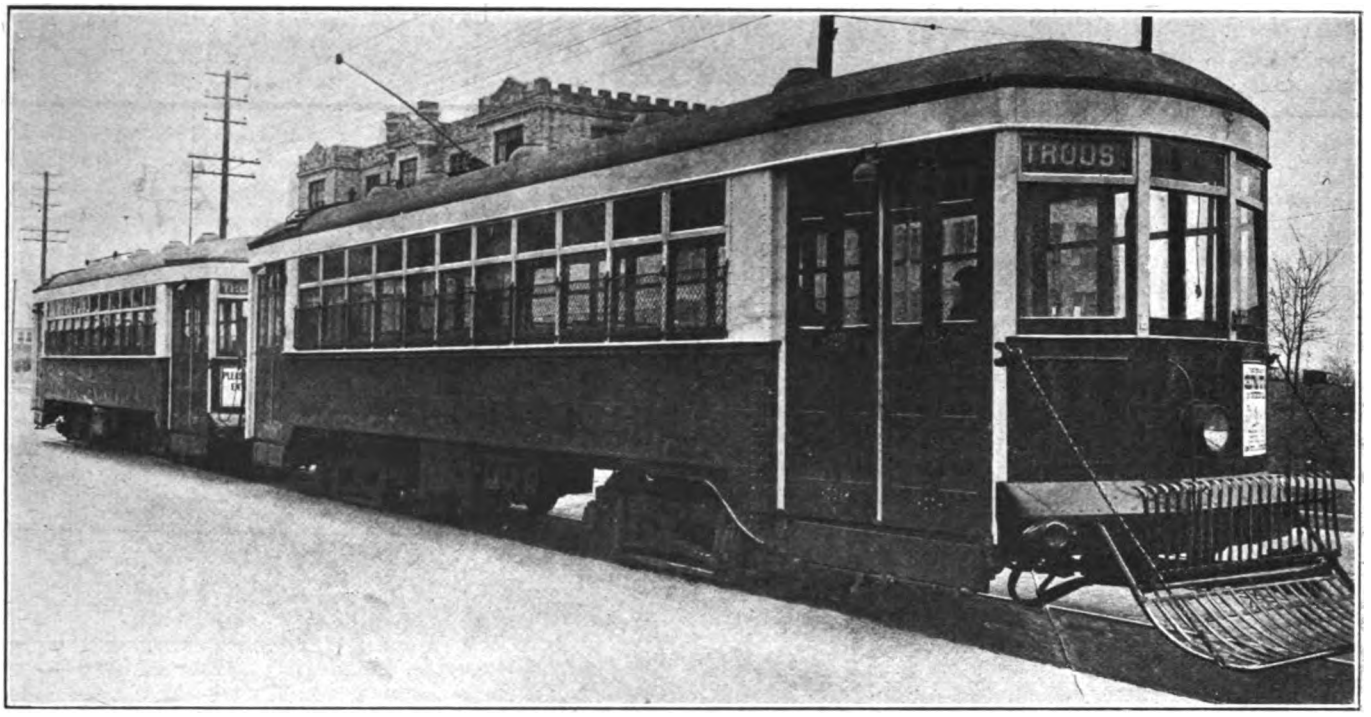
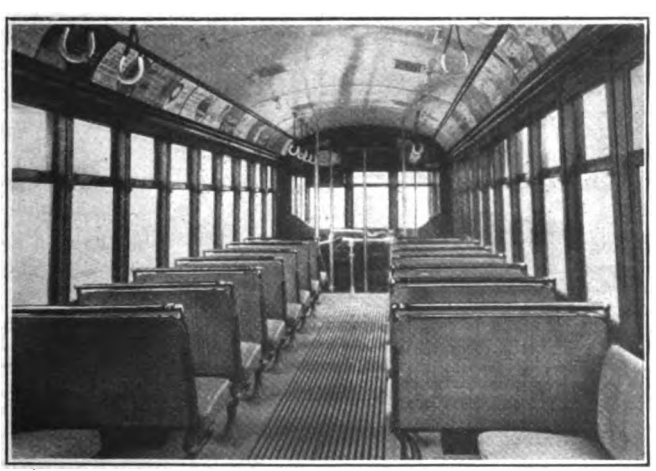


Two-Car Train in Service, Trolley Used on Head Car Only

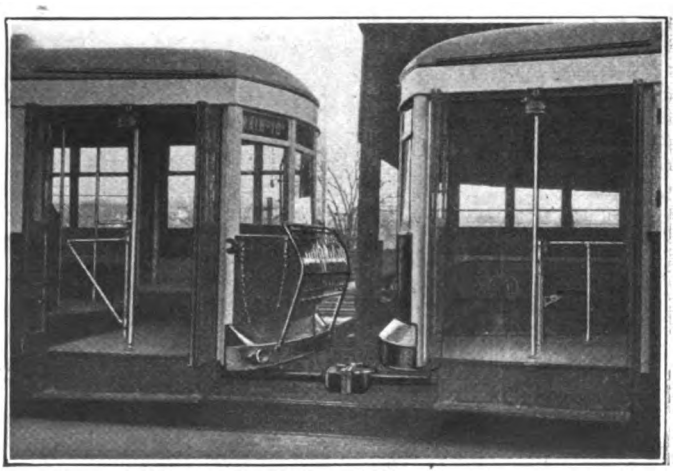
which show when the doors are closed, and he is governed by these lights, not starting until the lights show that the doors are all closed.

All cars are equipped with the standard M-28 type of brake valve which controls the front door operation. The rear doors are controlled by the conductor's valve or street collector's valve. It is impossible to open or close these rear doors from one valve, without the other valve being in "door closed" position, as they are connected in series and operate separately by means of a double check valve and relay valve which also interlocks the door with the brake system. If the doors are opened while the car or train is moving, brake application is immediately made. The equipment on all cars is identical and it is possible to make connection through the Tomlinson automatic coupler with the cars in any position. With the coupler disconnecting switches closed, that is, when current is on the second car through the bus line, the cut-out cock is open, permitting the passage of air into the brake system on the second car. If for any reason the coupler connection is broken or cars are separated without first closing the disconnecting switches and cut-out cock, the emergency air line in the braking system opens to atmosphere through the coupler head, setting the brakes on both cars in emergency. If by mistake the operator neglects to open the disconnecting switches and simply pulls the coupler open to disconnect the train, thus leaving the points alive on the coupler, the cars as separate units cannot be moved until the disconnecting switches are closed. This interlocking feature is accomplished by having the cut-out cock, which is placed in the air line to the coupler, operated by the same mechanism that operates the disconnecting switches. This combined operation is performed by the manipulation of a small handle mounted under the bumper iron on each car.

In respect to doors and steps, both front and rear platforms are the same. The doors are handled with the air valve, opening to the full width of the platform. The rear platform is equipped with a conductor's rail, and folding seats for passengers. The front platform is the same as any other standard platform on this class of equipment, with the exception of a motorman's railing and a swinging gate which when closed permits



Wide Aisles and Comfortable Seats Outstanding Features



Coupling Arrangement for Two-Car Operations

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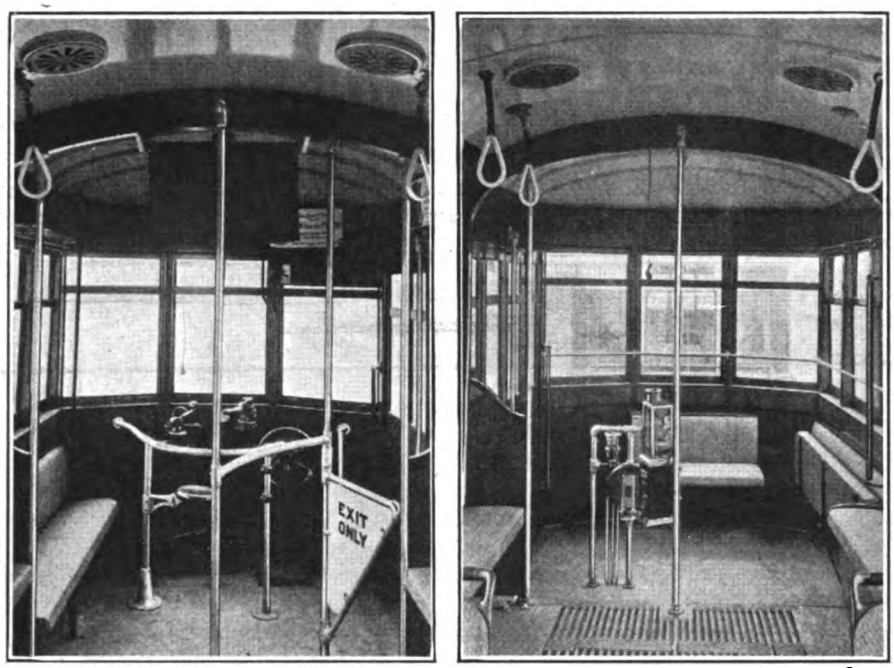
loading only through the front half of the door. If desired for two-man operation, however, this gate may be locked open.

Both the passenger and conductor's signal systems are a little different from those usually used for train operation. The passenger signal reaches only the conductor, who in turn relays it to the motorman. The passenger push buttons are the Faraday high-tension buzzer buttons connected to Faraday buzzers. The Faraday single-stroke bell is used by the conductor.

A city ordinance requiring that a light be kept burning at night on the rear end of each car while on the streets necessitated the installation of a battery system. A double-acting relay, designed and built in the Kansas City Railways shops, was installed. This operates a small tail lamp which burns only when the power is removed from the car. A two-way switch is used to connect the charging system and the passenger buzzers, making it impossible to work the buzzer system until the switch is thrown on. Connecting these two in this manner permits a trickle charge of 0.1 amp. to flow into the battery at all times that the cars are in use. If this switch is on and the power off of the car, as in a storage yard, the tail light on the car continues to burn, indicating to the crew or the watchman that the switch has not been thrown to the off position. The fenders were designed by the Eclipse Railway & Supply Company of Cleveland, Ohio, and allow the coupling of the cars without being removed.

These cars have now been in operation for a period of more than three months and have measured up to expectations in every way. No changes have been made as to the original layout, and none are contemplated.

The accompanying tables give a fair sample of the air control tests made on one and two car trains. A study of this table is very interesting and the indications are that the same efficiency will be obtained on this style of equipment that has been adopted as standard on one-man single-truck cars.



Front and Rear Platforms, Showing Folding Seats and Exit Features

The following results indicate the compressor operation on cars 1105 and 1116 operating as multiple unit. These results do not represent normal car operation, because a number of emergency applications were made. Emergency application and door operation receive air from reservoirs on both cars, but for straight air application air is furnished by the reservoir on first car only.

OPERATION TESTS—AIR EQUIPMENT

CAR NO. 1105.

(ALL TESTS MADE BETWEEN 50 AND 65 LB. OF AIR)

Piston travel—4 in. Governor cut-out at 65 lb.—Cut-in at 55 lb.	Time of Operation
Brake cylinder application, 0 to 50 lb.	2 seconds
Brake cylinder release, 65 lb. to 0	1½ seconds
Secure controller handle emergency in	1½ seconds
Release after control handle engaged	8 seconds
Secure brake-valve emergency	½ second
Release after brake-valve emergency	8 seconds
Application of brakes to 50 lb. by rear door opening	1½ seconds
Release by closing rear door	3½ seconds

TWO-CAR TRAIN, CAR NOS. 1105 AND 1116

Brake cylinder 10 in. x 12 in.—4 in. piston travel	
Brake cylinder application, 0 to 50 lb.	2½ seconds
Brake cylinder release, 65 lb. to 0	3 seconds
Controller handle emergency	2½ seconds
Controller handle release	11 seconds
Brake-valve emergency	1 second
Brake-valve release	12 seconds

Car weight, 38,000 lb.
111 per cent braking ratio with 50 lb. cylinder pressure.

TWO-CAR TRAIN STOPS SERVICE APPLICATION

Miles per Hour	Time	Test	B. C.
25	8 seconds	130 lb.	50 lb.
30 down grade	9 seconds	200 lb.	50 lb.

CONTROL HANDLE EMERGENCY STOP

Miles per Hour	Time	Test	B. C.
30	7½ seconds	125 lb.	50 lb.

BRAKE VALVE EMERGENCY STOP DOWN GRADE

Miles per Hour	Time	Test	B. C.
30	11 seconds	210 lb.	50 lb.

GOVERNOR OPERATION

FIRST CAR—NO. 1105

Duration of test	1 hour, 20 minutes, 40 seconds
Compressor "on"	22 minutes, 17 seconds, or 27 per cent of time
Compressor "off"	58 minutes, 23 seconds, or 73 per cent of time
Number of governor operations	17
Average time "on"	1 minute, 29 seconds
Average time "off"	3 minutes, 27 seconds
Pressure increased from 55 lb. to 65 lb. in average time of 1 minute, 29 seconds, or at the rate of 6.66 lb. per minute.	
Type of compressor Car No. 1105	CP-27
Type of governor	S-6-A
Size of reservoir	16 in. x 42 in.

SECOND CAR—NO. 1116

Duration of test	1 hour, 20 minutes, 40 seconds
Compressor "on"	19 minutes, 32 seconds, or 24 per cent of time
Compressor "off"	61 minutes, 8 seconds, or 76 per cent of time
Number of governor operations	18
Average time "on"	1 minute, 7 seconds
Average time "off"	3 minutes, 24 seconds
Pressure increased from 55 lb. to 65 lb. in average time of 1 minute, 7 seconds, or at the rate of 8.95 lb. per minute.	
Type of compressor on Car No. 1116	CP-27
Type of governor	S-6-A
Size of reservoir	16 in. x 42 in.

Big British Electrification Impending

THE *Electric Railway & Tramway Journal* states that specifications for the work involved in electrifying the South Eastern & Chatham Railway for a radius of 15 miles from London are to be issued at once and the work will be inaugurated almost immediately. It is expected to take two years to complete, and for that period between 16,000 and 17,000 men will be engaged, either on the electrification of the line or in making the equipment for it. The main stations which the electrification will reach are Dartford, Orpington, Addiscombe Road (Croydon) and Hayes. Between these points and London the intention is to operate more frequent and more rapid services, with a considerable addition to seating capacity during rush hours.

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Automatic Substation Experience in Cleveland—II*

The Author Traces in Detail the Sequence in Operations of the Present Substations of the Cleveland Railway, Which Are Designed Particularly to Give Reliability of Power Supply

By L. D. Bale
Superintendent of Substations the Cleveland Railway

TO THOSE who have not had the opportunity of becoming intimately familiar with the scheme of operation of an automatic installation, the sequence chart of the Cleveland installations, shown in Fig. 7, may seem unduly complicated, so much so, possibly, that dependability in continuous operation might be questioned. The contrary is, however, the case. Experience with these installations, together with reports from other properties utilizing automatic control, indicates that, when the equipment is properly installed and receives adequate inspection and maintenance, the utmost confidence may be placed in its operation.

The operation of the individual converters in the Cleveland installations does not vary greatly from that of the general scheme of automatic operation with the exception that a greater number of service protective features than usual have been installed. The occurrence of higher current values than have been encountered in previous automatic railway converter substation work adds some complications, as does also the necessity for protecting the air-blast transformers against air failure. The presence of the second converter in these stations, likewise, creates an interesting item of control.

First Converter Connected to Load

The initial start is accomplished through the operation of voltage relay No. 1, which closes its contact when a predetermined low value of trolley voltage occurs. This action causes the master relay No. 3 to close, and starts operation of the delay motor-drive relay No. 27. This is followed by the closing of the oil switch which energizes the power transformers. As the auxiliary 410-volt a.c. bus is energized from the secondaries of the power transformers, the starting contactor No. 6 is closed, connecting the converter to the one-half voltage tap of the transformer secondaries. There is a pause in the operation at this point sufficient to allow the converter to pull into step. In the event that the converter potential builds up in the wrong direction it is, of course, necessary to reverse the field to cause the converter to slip a pole. This is accomplished through the action of polarized motor-drive relay No. 7.

This relay, having a permanent field, has the armature connected directly across the armature of the converter. If the converter potential builds up reversed, the armature of No. 7 relay will revolve in a counter-clockwise direction. If, on the other hand, the potential builds up in the correct direction, the armature will revolve in a clockwise direction. The armature, in revolving, drives a set of contacts which perform certain operations, depending upon the direction of rotation. In the event of incorrect potential, connection is made through No. 7 relay contacts for reversing the shunt field of the converter through the operation of field contactor relay No. 9 and field contactor No. 10.

As the voltage of the converter falls to zero under reverse field connections, No. 10 contactor again operates and reconnects the field in the normal operating position. The converter thus is given an opportunity to build up in the correct direction. With correct d.c. potential, No. 7 relay, in rotating in the clockwise direction, causes the transfer to be made from the one-half a.c. voltage starting taps to the full a.c. voltage running taps by opening No. 6 contactor and closing the three No. 11 contactors. Interlock connections are then made, energizing the brush-operating device, No. 31, which lowers the brushes on the d.c. commutator. As this device completes its operation, a contact is made, closing the equalizer contactor No. 39.

The operation of No. 39 contactor completes an interlock circuit closing No. 12, the first of the d.c. contactors which connect the converter through the current-limiting resistance to the load. The resistance shunting contactors, Nos. 14, 15 and 16a and b, are closed in turn, provided the load is not in excess of the calibration of the various controlling relays. As No. 16 contactor closes, the circuit for No. 27 time-limit relay is opened. The function of this will be explained later.

Under normal conditions, as the load upon the first converter increases to the point where it is desired to have the second machine in parallel, the operation of No. 34 thermal relay (after an interval of approximately fifteen minutes) sets up a circuit, causing the second machine to be started, similar to the circuit derived through the under-voltage relay No. 1 in the case of starting the first machine. The action of No. 34 relay is dependent upon a condition simulating, as nearly as possible, the mean square heating effect of the current in the armature conductors of the converter. In this manner full advantage is taken of the overload capacity of the converter, with the result that a higher operating efficiency is maintained.

When the load has decreased to a point where it is desired to discontinue the operation of the second converter, underload relay No. 13, whose contacts close at a predetermined minimum d.c. load, again energizes No. 27 delay relay. After operation has continued for a definite time (fifteen minutes) the closing of No. 27t contacts will cause the control circuits to be de-energized, and allow the second machine to be disconnected. The first converter is also shut down in the same manner, when the load upon that machine has decreased to a predetermined low point for a definite time.

*For the first article in this series see issue of this paper for March 3, page 359.

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In the event that only one machine is in operation, and an overload is encountered that is of sufficient volume to cause the insertion of current-limiting resistance in the converter circuit, the second machine is put into operation in one and one-half minutes, through the action of No. 27 relay (No. 27s contacts) of the overloaded machine, thus securing the service of additional equipment without having to wait for the operation of the thermal starting relay No. 34.

Protective Features Which Are Included

Failure of Converter to Start.—In the event that the converter armature does not revolve upon the application of starting current, relay No. 53, energized from a current transformer in one of the starting leads, opens the control circuit and cuts off the energy supply before damage to the armature conductors can be done.

Failure of Converter to Complete Cycle of Operation on Starting.—If for some reason the converter does not complete its cycle of operation, No. 27 delay relay, which is started simultaneously with the starting of the converter, will cause its No. 27s contacts to be closed in one and one-half minutes, shunting out the relays of the converter that has failed and placing the second machine in operation instead. As the demand upon the second machine reaches a point where additional equipment is desired, the control is so arranged that an attempt will be made in this case again to start the machine that has failed. If the converter fails a second time its control circuits will again be de-energized, and, upon a third attempt to operate, it will be locked out through the operation of No. 30 relay, which will be discussed later.

A.C. Overloads—For overloads of abnormal value, such as short circuits within the station itself, a.c. overload relays are provided.

D.C. Overloads.—Overloads on the d.c. side are limited by inserting current limiting resistance in the converter circuit in three sections, by causing one or more of the resistance shunting contactors (Nos. 16a and b, 15 and 14) to open, depending upon the severity of the overload. These contactors on the two converters are controlled through relays in such a manner as to synchronize the action of the contactors and, in this way, prevent pumping.

Bearing Protection.—Should the converter bearings reach a dangerous temperature the thermal relays No. 25 will function, shutting down and locking out the converter.

Balance Phase Protection.—To prevent the possibility of the converter running single phase (due, for example, to the failure of a contactor to close), relay No. 45 is connected across three current transformers in the low voltage side of the converter, so arranged that, in the event of the unbalancing of the transformer circuits, the relay will operate and disconnect the converter.

Low A.C. Voltage or Its Entire Failure.—If the voltage is too low for proper operation at the time of starting, No. 2 low-voltage relay will not make contact. If the voltage drops during starting or after the start has been made, No. 18 relay will close its contacts, causing the starting contactor to open. In the event of low voltage during operation, No. 49 relay, whose contacts are set to close at a voltage corresponding to the minimum at which the converters will operate satisfactorily, will complete a circuit shunting out No. 50 relay, which in turn, opens the circuit of No. 3 master relay, thus causing the converter to be disconnected from the line. No. 50 relay also prevents the converters from being locked out by the action of No. 27 relay (No. 27s contacts) in the event of failure of a.c. power lasting more than one and one-half minutes.

D.C. Reverse Current.—Reverse current relay No. 32 will remove the converter from the bus in the event of reverse direction of flow of current.

Overspeed.—The customary overspeed device has been supplied on the converter shaft, which works in con-

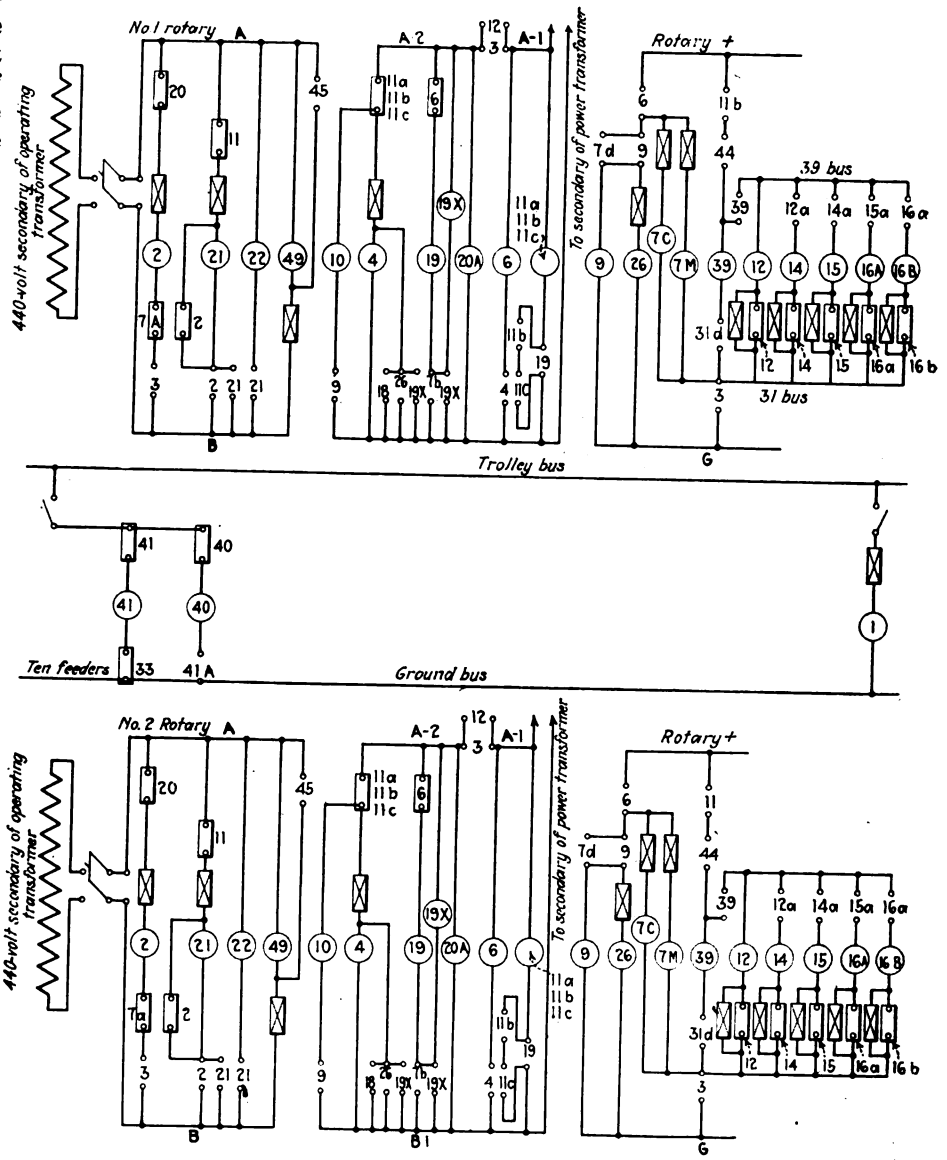

Fig. 7—Diagram Showing Sequence of Operations in

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nection with the manually operated circuit breaker in the converter positive between the bus and the various positive contactors and resistances. This circuit breaker, in opening, disconnects the converter from the d.c. bus and completes an interlock circuit, shutting down the converter.

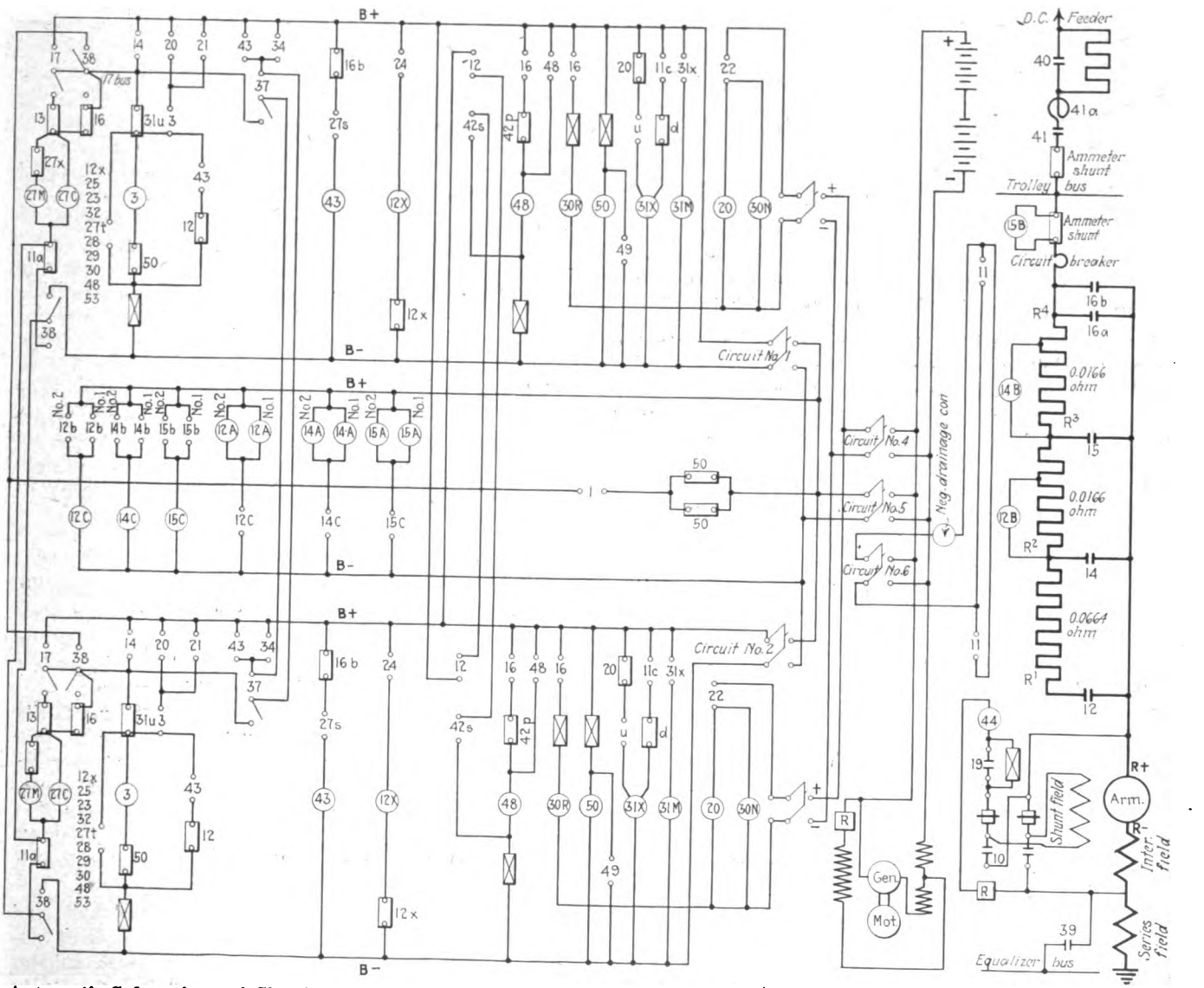
Field Reversal Limiting Relay.—Occasionally a converter is found that will persist in building up its potential in the reverse direction. In automatic operation, if some special preventive measures were not taken, it would be possible under abnormal conditions to have a converter continually reversing its field, thus consuming the one and one-half minutes allowed for its complete cycle of operation, and, as a result, shutting down through the operation of No. 27 relay. To help rectify this condition a notching-up relay, No. 26, has been provided, which will allow the field to reverse three times in succession and then cause the starting contactor to open for a few seconds. After the time allowance in connection with No. 26 relay has elapsed, the starting contactor is again free to close, and three more attempts, if necessary, are made to reverse the field.

Failure of Field Circuit.—Relay No. 44, whose coil is in series with the shunt field circuit, will prevent the converter from being connected to the load in the event of open or no field, or will shut down the converter in case it is already in operation.

Continuous or Sustained Overloads.—To protect the converter against sustained or repeated overloads, brought about by some abnormal condition of loading or, possibly, failure of control, thermal relay No. 29 is provided. This relay operates on the same principle as No. 34 relay, being calibrated, however, for a longer time interval. In the event of operation the converter is removed from service.

Protection of Transformers Against Air Failure.—This phase of the control presented some difficult angles. It was realized that it would be a simple matter to protect each individual transformer bank against air failure by shutting down the converter connected to that bank. But, the adoption of such a scheme would mean that 50 per cent of the equipment (of a two-unit station) would be thrown out of service by reason of the failure of a blower. The possibility of such an occurrence, particularly during peak-load periods, necessitated the finding of some other solution to this problem.

The scheme of protection finally adopted resolved itself into the utilization of air pressure relays (No. 42) on each transformer, which, in the event of air failure



Automatic Substations of Cleveland Railway

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with but one converter in operation, will cause that unit to be discontinued from service through the action of No. 48 relay. The resulting demand for equipment (caused by the immediate lowering of the d.c. bus voltage), will subsequently close No. 1 relay in the attempt to place this converter again in operation. This being impossible (because the converter is locked out by No. 48 relay), No. 27 relay will operate and through No. 27s contacts cause the second unit to be started. Both blowers discharge into a common air chamber under all transformers, hence, when the second unit goes into operation with its blower, air is supplied again to all of the transformers, and, as a result, the No. 42 relays on the transformers originally discontinued from service will reset, relieving the locked out circuit on the first converter through the operation of No. 48 relay. By this scheme of control it will be noted that the first converter is again applicable for service upon demand, and will be placed in operation through the normal functioning of No. 34 relay of the machine in service, or through No. 27 relay in the event of overloads.

Lockout Features.—Several of the protective devices, during the course of their operation, form but a momentary circuit, shunting out the master relay No. 3 and causing the converter to be shut down. It is, therefore, necessary to have some provision at hand to prevent the continual starting and stopping in the event of operation of protective devices which have no lockout features in themselves. Relay No. 30, known as lockout relay, is provided for this purpose and is so arranged that each closing of the a.c. oil switch causes a coil of the relay to raise a specially constructed mechanism one notch. If the converter completes its cycle of operation, a second coil of the relay (No. 30r) is energized, returning the mechanism to the original position. On the other hand, if the converter attempts to start twice, that is, if the oil switch is closed twice, without the converter being connected to the load, then upon the third closing, the converter will be definitely locked out.

D.C. Feeder Control.—The proper method of outgoing d.c. feeder control has been one of the most troublesome problems of the whole automatic development. There was installed (and, in fact, still exists in the Cleveland plants) the only type of automatic feeder control available at the time these stations were built. In this scheme, current limiting resistance is introduced into the feeder circuit by the opening of the resistance shunting contactor in the event of overload or grounds. If the overload persists, the feeder is finally disconnected from the station bus entirely. This scheme of feeder control has proved very successful when applied to interurban and suburban work, but for urban systems the scheme has certain limitations which make it undesirable for this type of service.

For example, a feeder in urban work may be quite often subjected to legitimate overloads from extraordinary car movements, traffic delays or, possibly, power trouble on the system elsewhere. Under these conditions, it certainly is not desirable either to lower the potential on the feeder by cutting in resistance, or to allow the feeder to be disconnected from the source of power, which in all probability is capable of handling the overload. Such a procedure would tend to make operating conditions still worse. On this property, where a premium is placed upon continuity of power supply, the policy is adopted of "burning off" all grounds possible. This phase of operation cannot be obtained with the resistance type of feeder control unless the ground is light and the current necessary to clear the ground is within the capacity of the current-limiting resistance, or nearly so.

The Short-Circuit Detector Prevents Unnecessary Interruptions of Power Supply

Within the past year there has been made available a new system of automatic feeder control, known as the short-circuit detector, or differentiating method, that is, a system differentiating between legitimate overloads and grounds. This scheme utilizes a current transformer whose primary is formed by the d.c. feeder cable. The secondary is connected with control relays, which, in turn, cause the feeder contactor to be opened only when sufficient current is induced in the secondary by the flow of short-circuit current in the feeder cable. By this method, the feeder is disconnected from the source of supply only in the event of a ground, service again being restored when the ground is cleared. By utilizing this scheme the feeder is not subject to the disadvantage of a reduction in potential in the event of legitimate overload. The scheme as it stands does not, however, adapt itself to the process of "burning off" grounds.

A feeder control system is at present being installed in the Cleveland automatic substations utilizing the most important features of the detector, or differentiating, system of feeder control, together with an auxiliary feeder bus frequently used in manual plants, and, in addition, remote supervisory control that, when installed, will afford complete control of the direct-current feeders.

With this system in operation all feeders will, as at present, be connected to the main converter bus. In the event of a ground the feeder will automatically be disconnected from the main bus and transferred or connected to the auxiliary bus. The auxiliary bus and the faulty feeder may then be energized by causing one or more tie feeders, fed from other sources, to be transferred to the auxiliary bus by remote control. In utilizing the potential drop of these feeders, energy may be supplied to the faulty feeder, clearing it of ground and at the same time distributing to two or more plants the possible total overload resulting over the feeder system. When the feeder has been cleared of ground it will automatically be retransferred to the main bus again.

A Device for Handling Faulty Feeders

There is also available a heavy-duty current-limiting resistance which may be connected by remote control between the main and auxiliary buses for handling faulty feeders. Both the resistance and the tie feeders may be utilized simultaneously for this purpose.

Which of the methods will be used in clearing a faulty section will be dictated by conditions existing at that particular time, regarding condition of the plant from which the faulty feeder originates, station load, equipment reserve or availability, etc. It will be noted that with the exception of the one heavy duty d.c. bus tie resistance, all individual feeder current limiting resistances are eliminated.

Details of the remote supervisory control and load indication, operating experience with the present automatic substations and proposals for future substations, will be covered in the third and last article in this series.

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4,000-Volt D.C. Italian Electrification Successful

Picturesque Route from Turin Northwestward Was Electrified in 1920—High Voltage Was Selected to Minimize Number of Substations and Insure Good Transmission Efficiency

IN ANOTHER part of this issue is a letter from the Tecnomasio Italiano Brown Boveri, referring to the electrified railway operating between Turin and Cérès, Italy. This is a distance, measured along the railway route, of 26.6 miles. The railway was built from Turin northwest to Lanzo in 1876, and was extended to Cérès between 1913 and 1916. From Turin the railway climbs progressively, with one short stretch excepted, until Cérès is reached. The grade increases from 0.83 per cent to 3.5 per cent, the last for a distance of less than 2 miles between Pessinetto and Cérès. Between Turin and Borgaro, and Ciriè and Cérès the track is single; being double between Borgaro and Ciriè. The route is a picturesque one, the western end being of a mountainous character. The construction of the line is in harmony with the beauty of its surroundings.

It was expected that the line would be electrified when the western section was built, but the war interfered. However, in 1918 money was raised for the electrification and operation was inaugurated in September, 1920. The voltage of 4,000 was selected so that only one substation would be required and to give good transmission efficiency. This substation, located at Ciriè, receives three-phase, 22,000-volt, 50-cycle power from the Société Anonyme d'Electricité Alta Italia. Provision is made for taking power either from the plant at Funghera or from a steam station in Turin.

In the substation each converter group consists of five machines mounted as a unit: a three-phase synchronous motor, two 2,000-volt generators connected in series, and two exciters, one for the motor and one for the two generators. The motor exciter has an auxiliary winding in series with the generators so as to improve the power factor of the load. At present two converting sets are installed and there is provision for a third. Each motor is rated at 716 kw.

The contact line has a simple catenary suspension, the area of the contact wire being 120,000 circ.mil (between 0 and 00 A.W.G). A feeder of the same size is used in the Ciriè-Cérès section.

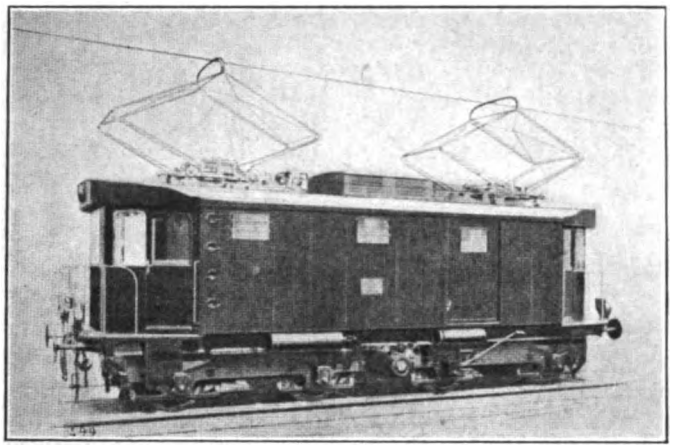
There are five locomotives with these characteristics:

Length over bumpers	42 ft.
Distance between truck centers	16 ft. 5 in.
Rigid wheelbase of trucks	7 ft. 10½ in.
Diameter of driving wheel	38½ in.
Total weight	46 tons
Motors, four in number	140 hp. each at 20 m.p.h.
Voltage at brushes	1,800
Gear ratio	1:3.95
Maximum speed of locomotive	40 m.p.h.
Tractive effort at 20 m.p.h.	10,025 lb.
Maximum braking effort	20,500 lb.

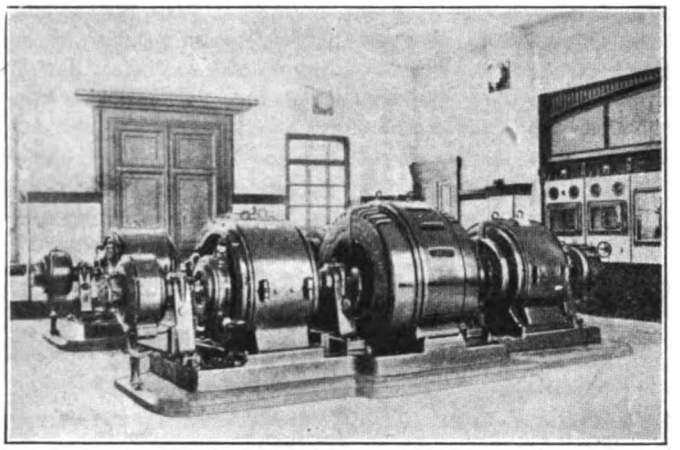
The locomotives have two pantographs each, with greased aluminum shoes.

The coaches used by this road are of two types: first and third class, seating seventy-two persons, and third class, seating eighty persons. Both are double-truck, 61 ft. 8 in. long over bumpers and of 32 tons weight. They are divided into four compartments and three platforms, one in the middle.

The cost of this installation was 5,699,340 lires, or about $1,100,000 at par exchange. Of this the substation cost $312,000 ($83,700 for the building, the remainder for the equipment); the aerial line and track bonding cost $400,000; the locomotives cost $360,000, and the remainder was for miscellaneous expense. With about 40 miles of aerial line, of which 7½ miles is in the stations, the cost per mile of line is less than $10,000, even with copper at 87 cents per pound. The substation cost $7,750 per mile of single track, and $212 per kilowatt installed. Each mile of electrified track cost a total of $27,300.



4,000-Volt Locomotive Used on Turin-Lanzo-Cérès Railway



Interior of Substation at Ciriè

The Hope of Reward

Mr. Nash Argues for a Monetary Incentive for Efficient Public Utility Operation

IN A three-page article in the *Electrical World* for March 10 L. R. Nash of Stone & Webster urges the adoption by commissions of some rating or merit system for efficient service by public utility companies. The article is entitled "The Hope of Reward." He declares that the tendencies of the day toward standardization and co-ordinated effort are destructive of the highest moral standards and efficiency and of that individual incentive which is necessary for both.

The public service field, he says, because of its comparative youth, pioneer spirit and enthusiasm for progress, has not yet yielded to the conventionalizing influences as much as some others, but if they continue, the yielding is inevitable. A system of regulation which reduces rates when a gain in economy has been secured by the business skill of the management acts to dis-

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courage further improvement. In that case, he thinks, 18 holes of golf on pleasant afternoons will prove much more interesting to executives than saving a tenth of a pound of coal per kilowatt-hour for the benefit of their patrons.

As an illustration he suggests a railway company which, by putting on one-man cars or car energy-measuring devices could effect important economies, but if all the savings are to go to the patrons, why bother? He also cites, as a case from actual experience, a company which spent considerable money in planning out a welfare system for its men, in the hope of securing greater efficiency and improved morale from them, but a commission, in a rate investigation, excluded these expenses from the cost of service on the ground that the company should not be reimbursed for them unless or until the program had been put into effect and had proved profitable.

In conclusion Mr. Nash says that one of the state commissions had recently developed an interesting system of grading public utilities, but the purposes of the grading have not been disclosed. If there is a slight difference, say 10 per cent, he thinks, in the valuation or rate of return, based on some merit system, it would have a negligible effect upon the amount paid in rates by the bulk of a utility's patrons, but to the utility it would have a great incentive to improvement and progress.

French Progressing with Electrification Projects

Comments on the Tremendous Developments Already Under Way on Three Great Transportation Systems —Review of Considerations Which Render This a Logical Program

BY J. C. THIRLWALL
Railway Engineering Department, General Electric Company, Schenectady, N. Y.

FOR the time being the center of greatest activity in steam railroad electrification is France, where a program involving approximately 5,000 route-miles, mostly double track, has been adopted. The Paris-Orleans, the Paris-Lyons-Mediterranean and the Midi systems are involved and the work is to be carried out within the next twenty years. The direct incentive for this move was the desire to conserve fuel and to utilize water powers to the greatest possible extent, but the need for increasing track capacity also influenced the decision.

Many railroad men in this country picture European traffic as much lighter than our own, based on the well-known fact that locomotives and cars, both passenger and freight, are smaller and lighter than we are accustomed to on our main systems. It may be illuminating, therefore, to outline the basic traffic on the Paris-Vierzon division of the Paris-Orleans Railway, for which electric equipment has been ordered and which will shortly be electrically operated. This division includes 25 miles of four-track and 118 miles of double-track road. One complete steam engine division for through trains and one suburban division will be involved in the change-over. The traffic over this route, at the outbreak of the war, was crowding the track capacity. While it slumped immediately after the war, it is again expanding and the basic schedules for which equipment contracts have been placed call for the following train movements out of Paris daily: 44 freight trains and 106 passenger trains, about half of which are suburban trains consisting of motor cars and trailers. The freight trains average about 1,100 to 1,200 tons of trailing load, the through passenger trains from 400 to 700 tons of trailing load, and the motor-car trains 325 to 490 tons total, depending on whether the trains are six-car or nine-car make-up.

Altogether the daily traffic over the 78 miles between Paris and Orleans, about one-third of which is four track, is about 11,000,000 ton-miles. Of this about 5,000,000 ton-miles is freight, with approximately the same amount of locomotive passenger train ton-miles, and about 880,000 ton-miles in motor-car train movements.

Equipment already ordered by the Paris-Orleans includes 200 locomotives and eighty motor cars. The high-speed passenger locomotives weigh 123 tons and are capable of pulling a 580-ton train at a speed of 75 to 80 m.p.h., the schedule speeds on the fastest runs being as high as, and in some instances higher than, anything in this country. For the freight service, switching and local passenger runs, 71-ton locomotives will be used, two being coupled together as a 142-ton unit for the heavier freight movements, the double unit, however, requiring but a single engine crew. The first electrified division, as stated above, will cover 143 route-miles and extensions will be made at frequent intervals, the first to Limoges, an additional engine division about 175 miles beyond Vierzon, and next some east and west routes where gradients are severe.

On the Midi, the first electric operation will be over the mountain division in the Pyrenees, some of which are already electrified, and the present contracts cover about 155 route-miles. The company has selected for use in freight, local-passenger and express-passenger service over heavy grades an 80-ton eight-wheel locomotive, all the weight being carried on the drivers. The motors are capable of delivering 1,000 hp. continuously, and 1,400 hp. for one hour. The passenger locomotives are geared for a maximum speed of 60 m.p.h. All locomotives are arranged for multiple-unit operation, so that two or more can be coupled together and operated by a single crew, for use on the heaviest trains.

The program which is now under way in France is, of course, the outcome of the comprehensive study made some years ago by a large commission. Now that the work is actually being carried out it may be interesting to review the important considerations which render the present program a logical one.

In the first place, the rails and bridges in France are so much lighter than are usual in this country that the American practice of purchasing heavier and more powerful locomotives to handle increased traffic would have entailed complete rebuilding of road and structure. Not only would there be additional weight per axle, but the longer wheelbases would have required the straightening out of curves. This would have entailed prohibitive expense, and the same objection applies to the building of additional trackage, water stations, shops, roundhouses, turntables, etc., to accommodate an increased number of trains hauled by steam locomotives of the existing weight. Experience had proved conclusively that electric locomotives can provide the tractive effort for much greater trailing loads without increase of axle weight or of wheelbase, and can handle longer trains at higher speeds than the steam locomotive. This permits a material increase in the capacity

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of the existing track, with substantially lower operating costs.

Weight on drivers is the measure of the effective working capacity of any locomotive. In the steam engine, this weight is not over 60 per cent of the total, including tender; in the electric freight engine, the entire weight is available for traction. The electric locomotive costs to build nearly twice as much per pound of effective weight, but a smaller number of units are required to handle a given freight tonnage, partly because of the higher and more uniform speed, and partly because the electrics need to be less in the shops or roundhouses. On the Chicago, Milwaukee & St. Paul Railroad, for instance, forty-two electric locomotives displaced 112 steam engines, and in many instances, the ratio would be considerably bettered. The comparative weight on drivers would not, however, be in the same ratio, but would probably average at least twice as great for a division with steam haulage as for electric. The first costs of the two types of locomotive, therefore, are not far apart, and that for the electric may actually be less.

The cost of the electric distribution system, including overhead and substations, is largely offset by savings in shops, turntables, roundhouses, water stations, and coal and ash facilities, which add, on an average, 50 per cent to the cost of the steam engines required. Excess investment in the electric structures is more than counterbalanced where the need of building additional trackage can be postponed for years by a reduction in the number of train movements.

Fuel Savings Through Electrification

As to economies in operation, records from this country and Europe show savings of 60 per cent to 70 per cent in the consumption of fuel for electric operation, and of 50 per cent to 75 per cent in locomotive repairs and engine-house expense, in addition to material reductions in crew wages. In most places in this country the fixed charges on the investment in power houses, substations and overhead lines nearly balance the reduction in fuel costs, but where the price of coal has run unusually high as in many sections here and abroad, or the cost of electric power unusually low as it is on the Milwaukee system, the total charges for power may be very materially lower. Moreover, in a country that must import nearly all of its fuel, conservation is of vital importance. In France, with water power available in the Alps, the Pyrenees and in the central plateau district, the possible savings in fuel and in power costs are tremendous. The engineers estimate that within twenty years the annual power consumption of the three roads mentioned, with electrification complete on 5,000 route-miles, will be about 2,260,000,000 kw.-hr., which will all be obtained from water-power development. The same power output from steam locomotives would require the burning of at least 6,000,000 tons of coal. With coal prices materially higher than they are in the United States, the direct money saving is an important item and the release of this fuel for industries in northern France of tremendous economic value. On the basis of the present traffic, the coal saving would be somewhat more than half of this total, and since the first divisions to be changed over will be those involving the greatest power consumption, on account of mountain grades, or because they have the heaviest traffic, the initial savings will probably be proportionately as great as the eventual.

The Readers' Forum

High-Voltage Locomotives in Europe

TECNOMASIO ITALIANO BROWN BOVERI

MILAN, ITALY, Jan. 30, 1923.

To the Editors:

Our attention has been drawn to the article on page 19 of your issue for Jan. 6, entitled "1922 Was a Good Year in the Field of Heavy Traction." In this it is stated that six 3,000-volt d.c. locomotives, nearly completed, will be the first machines of such high voltage in Europe.

We would call your attention to the fact that the Turin-Lanzo-Cérès Railway in Italy, constructed by our firm, has been operating for two years at 4,000 volts direct current. We shall, therefore, be obliged if you will correct the above statement in an early issue and publish some details of the Turin-Lanzo-Cérès Railway.

TECNOMASIO ITALIANO BROWN BOVERI.

[EDITOR'S NOTE:—The statement made in the article referred to by the Brown Boveri Company of Italy was not that the six locomotives mentioned were designed for the highest direct-current voltage used in Europe, but that "they will be the first 3,000-volt machines in Europe." This fact was considered of special interest in view of the use of that particular voltage in the United States and elsewhere. There was no intention in the review to compare voltages of different high-voltage electrifications. We feel, therefore, that our correspondent misinterpreted the statement made in the review.

We are pleased, however, to accept the suggestion made in the above letter and give some details of this interesting and important 4,000-volt d.c. electrification. This is done in an article elsewhere in this issue.]

Pioneers in the Development of the Engineering Association

BROOKLYN RAPID TRANSIT SYSTEM

BROOKLYN, N. Y., March 5, 1923.

To the Editors:

Anent your editorial on the history of the American Electric Railway Engineering Association, appearing in the March 3 issue, it is suggested that some steps be taken to compile a complete roster of those present at the meeting held in the power station in Detroit in 1902, when the association had its real beginning. As additions to the list it should be noted that G. W. Palmer, former vice-president, stated at the recent Chicago convention that he was present and the writer also subscribes his name as being among those who were on hand.

It may not be out of place to add that for several years the association comprised only mechanical and electrical men, track men not being eligible to membership. About 1906, as I recall it, Past-President Fred G. Simmons started to organize a way engineers' association, and the writer had some correspondence with him about it. Ultimately the way men were permitted to join the mechanical-electrical group and the idea of forming a second, separate engineering society was abandoned.

R. C. CRAM.

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New 180-Ton Passenger Locomotives for the New Haven

One of These Locomotives Will Be Capable of Hauling a 900-Ton Trailing Load, or Twelve Pullman Cars, Between Grand Central Terminal and New Haven in Ninety-nine Minutes at a Schedule Speed of 44 M.p.h.

BY W. J. CLARDY
General Engineering Department
Westinghouse Electric & Manufacturing Company

THE New York, New Haven & Hartford Railroad has in service almost 600 miles of electrified track, including some of the busiest main-line and yard trackage in the world. Yards at Oakpoint and Westchester are served entirely by electric switcher locomotives.

The present electric motive power consists of 106 Baldwin-Westinghouse locomotives, fifty-two for passenger, thirty-eight for freight and sixteen for switcher service. There are also thirty-five multiple-unit motor cars. The first forty-one passenger locomotives, placed in service in 1906 and 1908, are of the 2-6-2 type and weigh 102 tons complete; the last five were built in 1919 and are of the 2-6-2 + 2-6-2 type, weighing 180 tons complete. Recently twelve more of this type were ordered.

Sixteen 80-ton, 0-8-0 type switcher locomotives were placed in service in 1912, and thirty-six 110-ton, 2-8-2 type road freight engines in 1912 and 1913. The first of the thirty-five multiple-unit motor cars were operated in 1909 and the last eight cars went into service in 1922. These cars range in weight from 84 to 91 tons complete with all equipment (no load) and are really locomotives, as each motor car is capable of hauling two trail cars.

The twelve passenger locomotives now under construction will be identical with the five placed in service in 1919, except for some refinements in minor details. They will be equipped with six twin motors and will operate from an 11,000-volt, single-phase trolley or a 650-volt, direct-current third rail. The gear ratio will be 25 to 89, and the drivers will be 63 in. in diameter. Each engine will have two pantographs and four third-rail shoes for current collection. Of the total weight 122 tons will be on drivers.

The new locomotives will rate 2,016 hp. They will develop 23,200 lb. tractive effort at 32.6 m.p.h., the continuous rating being 15,800 lb. at 39.4 m.p.h. The high-speed rating will be 2,424 hp. at 45.5 m.p.h. and 19,900 lb. tractive effort. A maximum momentary tractive effort of 52,500 lb. will be available and the normal accelerating tractive effort will be 36,200 lb. A maximum speed of 66 m.p.h. may be attained with safety.

The mechanical parts of the engine involve an interesting feature in that the frame is a one-piece steel casting for each half of the running gear. That is, there are but two frame castings per locomotive and these are the largest integral castings ever made for a locomotive, each weighing 18,000 lb.

The quill drive and details are the same as on the present locomotives and this type of flexible drive has proved very successful.

The 409 C-2 twin motor, which will be used on the new locomotives, rates 336 hp. at 275 volts for one hour and 276 hp. continuous at the same voltage. It is of the series commutator type with a resistance lead winding in the armature, and compensating windings on the field. A twin motor weighs approximately 13,000 lb., including bases, axle caps, axle bearings, dust guards, commutator lids and gear cases.

The a.c.-d.c. control equipment will be of the Westinghouse unit-switch, pneumatically-operated type, the entire control of an engine being handled by twenty-eight switches. This is accomplished by connecting the motors in four permanent groups of three armatures in series. The switches are arranged in three groups: motor switches, transformer switches, and resistance switches. There will be three starting and nine running notches obtained by means of voltage taps on the transformer.

Series-parallel control is not provided for direct-current operation as sufficient speed can be obtained when three motors are connected in series. A field shunt, which is effective on the last controller notch, will give the speed that is necessary in the d.c. zone.

The airblast transformer will weigh 15,300 lb. and rate 2,100 kva. Storage batteries (used on alternate days) will provide energy for operating the control switches and a motor-generator set will charge the batteries. Each locomotive will be equipped with an oil-fired flash boiler and the necessary oil and water tanks. The boiler will have sufficient capacity to heat a twelve-car train.

The 180-ton locomotive permits the handling of all the heavy passenger trains with a single engine. The heaviest of the express trains consist of twelve Pullman cars of 75 tons weight each, or a trailing load of 900 tons. This locomotive can haul these trains between Grand Central Terminal and New Haven in 99 minutes on a non-stop run, a schedule speed of more than 44 m.p.h.

The five 180-ton passenger locomotives that have been in service the past four years frequently make over 500 miles per day, the longest single trip being 72 miles. A number of the forty-one original passenger locomotives of the 2-8-2 gearless type (0-1 to 0-41) have now made over 1,000,000 locomotive-miles and the others are very close to this figure. This is the result of sixteen years of successful oeration.

In concluding the writer would call attention to the fact that in the design of passenger locomotives for the New Haven, the weight is limited to 181 tons complete with all details including sand, water, oil and crew. This restriction is imposed on account of the Park Avenue Viaduct in New York over which passenger trains run when entering the Grand Central Station. Further, the locomotives must be designed for direct-current operation from a 650-volt third rail to permit running on the tracks of the New York Central. This, of course, complicates the control apparatus.

Atlanta Window Poster

BETTER TRAFFIC LAWS
would bring better street car
service to the
250,000 who depend
upon the street cars daily

The Georgia Electric Railway is carrying this poster to help the campaign for better traffic laws in Atlanta.

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Association News & Discussions

General Accounting with Bookkeeping Machines*

Machines Are Used to a Great Extent in the Accounting Work of This Property—An Analysis of the Operations and Advantages Over Hand Bookkeeping Are Given

By R. R. Peery

Chief Clerk Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind.

THE use of mechanical appliances in the office is becoming more general. The typewriter and ordinary adding machine are now considered a necessary part of the equipment for practically every office, and the bookkeeping machine is rapidly making a place for itself. Our equipment consists of two 11-in. bed, Elliott-Fisher bookkeeping machines equipped with crossfooter and four seven-digit registers on each machine.

Forms Used and How Machines Are Used with Each

Invoices—Vouchers and Accounts Payable Ledger. Approved invoices, after they have been audited by comptometers and a predetermined total taken by listing on the adding machine, are posted to the distribution ledger. Proof sheets are made of such postings for checking purposes and are retained until the end of the month, after which they are destroyed. At the close of the month these invoices are accumulated by firms, and a total is made. The distribution by control accounts is filled in on the lower portion of the voucher in ink, and the voucher is numbered, with month and year given, and is passed to the operator for completion.

The operator then proceeds to write the check, remittance statement and voucher and post the accounts-payable ledger in one operation. The voucher number is written in the last column for reference in the accounts-payable ledger. One add register is used to prove that the items listed are correct, and the total is written in the second column from the right, which is a subtract register and clears the crossfooter. Checks for payment of loss and damage claims are made on a special form and are posted to the accounts-payable ledger by the same operation. Proof sheets are made of these checks and are attached to the voucher at the end of the month, covering all payments of this nature made during the month.

The accounts in the ledger are arranged alphabetically by name of creditor. As payments are made, the bookkeeper enters the amount of such payments on the cash book and the operator from time to time posts all the payments to the accounts-payable ledger immediately below the amount of voucher, giving the check number. A proof sheet of these postings is made, showing each entry, and the total is accumulated, which agrees with the total cash disbursed.

Distribution Ledger. The distribution ledgers are kept in a vertical tub file or desk, and are divided into control groups, numerically under each group. There are from twenty to 200 accounts in each division. In other words, the accounts in the first control are numbered consecutively, 1 to 28, "Way and Structures," those in the second, 29 to 44, "Equipment," etc. Payroll, store requisitions and invoices (vouchers) are posted at separate runs.

Store Requisitions. Material issued at the storeroom is entered on requisition forms which are assorted daily by operating account numbers and entered by the storekeeper to a disbursement sheet and forwarded to the auditor's office periodically according to the size of the storeroom—weekly, semi-monthly or monthly as the case may be. These sheets are audited by comptometers for errors in extensions and additions and are then arranged according to the account number and passed to the operator. The operator first posts to "Way and Structures," then to "Equipment" and so on. When she has posted all the stores on "Way and Structures" or the first control, she transfers the total to the next column which subtracts from the crossfooter and leaves the machine clear. This transfer shows on the proof sheet only. The totals in this register are accumulated until the entire run is completed and verification made against an adding machine total.

By handling the work in this manner we get a total separately and collectively. At the end of the month these proof sheets are recapped by storerooms and used as a journal entry.

Payroll Distribution. The distribution of the payroll is made by the head of each department, and the accounts are arranged on the sheet in numerical order. After being verified against the total of each payroll they are passed to the operator for posting. The postings are made as with the stores' requisitions. A proof sheet is made of this work by payrolls, and from the summarized totals, the journal entry is made at the end of the month.

Invoices (Vouchers). When vouchers are posted, no division is made by controls, but as the postings are made the amount for each account, as shown by the crossfooter, is thrown out into the last column on the right, and is allowed to accumulate in the register so as to give the total for the run. This grand total must agree with the predetermined total, proving the correctness of the postings. As all the work is handled by separate runs, only one adding register is necessary for the payroll, store and voucher columns.

Balancing. At the end of the month the various columns on the distribution ledger are added and proved against the total amount of the requisitions and payroll. The total of the vouchers is proved against the voucher register control, which is kept by the bookkeeper.

Payrolls. Department time sheets are made up twice each month, are assembled in approximately the same order as each payroll period, and the rates checked against the previous payroll (except for trainmen whose rates are checked against the trainmen's roster). Deductions are shown, such as time orders or advances against salaries, and other miscellaneous items, as well as the number of the check in the first column on the payroll sheet. The sheets are then passed to comptometers for adding total time, verification of extensions, and addition to arrive at the total payroll. The time sheets are now ready for the operator.

Pay checks for about 1,800 employees are written from these time sheets (the checks being dated and numbered previously by a combination numbering and dating machine), showing the amount earned, time orders, other deductions, check number and amount to pay. A proof sheet in duplicate is written at the same time. One copy accompanies the checks to the department head and the other is kept as a permanent payroll record. The machine automatically takes care of deductions, "time orders" and other items and the amount to pay is computed by the crossfooter, which latter amount when written on the check clears the crossfooter and a star is shown proving the operation to be correct. As the amounts are written in different columns on the check, four registers are used, and the totals are subtracted from the registers as each payroll is completed. This form of check is not

*Abstract of paper presented at the annual meeting of the Central Electric Railway Accountants' Association, Lima, Ohio, Feb. 23-24.

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universally used but the banks do not object to it. An actual test showed the operator was able to write 1,793 pay checks, which constitutes an entire payroll, in eleven hours.

Earnings Reports. Eleven copies of a daily earnings report are made and proved to be correct. The machine figures the increases and decreases as the amounts are written in the first two columns, namely, "this year" and "last year." It also furnishes the column totals at the same time.

Conductors' Overs and Shorts. A daily record of conductors is kept, giving the total charges, amount remitted and net amount over or short, as the case may be. Three registers are used for these postings. The first register accumulates the total debits, the second the total remittances and the third the net amount over or short. This work is proved against the total of recapitulation of conductors which gives the total for each division.

Accounts Receivable. Various departments advise this office of material sold and labor performed for individuals and companies, as well as charges against the United States government for transportation furnished, and a bill is promptly made in duplicate. These bills are then posted to the proper firm and an entry is made on the statement at the same time. The statement is the original and the ledger sheet the carbon copy. Four registers are used for this work, one for each column on the sheet. At all times we know the exact amount due, and this plan enables us to mail statements promptly at the end of each month. A proof sheet is made of all postings, both debits and credits. The debit postings less credit memoranda issued are proved against the total of the invoice register and cash credits are proved against the cash book.

In conclusion I might say that with the use of bookkeeping machines we have eliminated a lot of possibilities for errors such as illegible figures, incorrect postings that can be found only by checking back the work for the entire month, etc. We have found that they are more economical than the hand method of bookkeeping.

Commission Engineers Hold Conference

Decide in Washington on Annual Meeting, Also Discuss Grading of Utilities for Efficiency

PLANS for an annual conference of engineers attached to the state utilities commissions, to be conducted under the auspices of the Bureau of Standards, were laid at a meeting at the Department of Commerce March 2 and 3. It was the consensus of opinion of the engineers of more than one-third of the state commissions that there should be an annual conference at which the technical and enginering questions involved in utility operation could be discussed in the interest of the common good.

This conference was called by Dr. F. C. Brown, the acting director of the Bureau of Standards. The conferences are to be along the lines of those which have been in progress many years in which the specialists of the bureau meet with the weights and measures officials of the various states with the idea of exchanging views and experiences. In addition to the benefits which will come from the exchanges of views among the utilities engineers, it will give them an opportunity to secure first-hand knowledge of the experiments and research which the bureau is conducting on the public utility problems.

An executive committee was selected to work out plans for future conferences. C. B. Hayden of the Wisconsin commission was chosen as the chairman of the executive committee and E. C. Crittenden, chief of the Electrical Division of the Bureau of Standards, its secretary. Other members selected are: William M. Black of the Maine commission, C. R. Vanneman of the New York commission and A. I. Thompson of the Oklahoma commission.

Secretary Hoover, in opening the conference, pointed out how necessary it is to promote uniformity and to prevent duplication of effort. Such gatherings of engineers, he declared, give an opportunity for each one attending to benefit by the accomplishments of others.

Commission engineers who attended the conference were: Alabama, I. F. McDonnell; Georgia, J. Houstoun Johnston; Illinois, J. Howard Mathews; Indiana, Earl L. Carter; Iowa, A. B. Campbell; Maine, William M. Black; Maryland, H. C. Wolf, W. F. Strouse, S. A. Covell, Mr. Cullen, L. Ellis, R. Y. Gildea and J. L. Wicks; Michigan, Manfred K. Toeppen; New Hampshire, D. Waldo White; New Jersey, Col. P. Betts; New York, C. R. Vanneman and R. H. Nexsen; Ohio, L. G. White and Ward Snook; Oklahoma, A. I. Thompson; Tennessee, F. G. Proutt; Virginia, J. W. West, Jr.; West Virginia, James Imboden and W. B. Hall; Wisconsin, C. B. Hayden; District of Columbia, E. G. Runyan, and Connecticut, A. E. Knowlton.

STANDARDS FOR GRADING GAS AND ELECTRIC SERVICE

Subject	Credit — Gas, per Cent	Rank	Electric, per Cent	Rank
Creeping meters	..	..	4	6
Accuracy of meters	7	4	7	3
Installation tests	..	..	5	5
Periodic tests	14	3	14	2
Meter testing records	5	6	5	5
Meter testing equipment	5	6	5	5
Request tests	4	7	4	6
Referee tests	..	..	..	..
Meter readings on bills	4	7	4	6
Heating value	21	1	..	..
Calorimeter equipment	7	4	..	..
Interruptions	..	..	18	1
Station records	..	..	6	4
Pressure and voltage variation	18	2	18	1
Pressure and voltage surveys	6	5	6	4
Purity	4	7	..	..
Complaint records	5	6	..	..
Information	..	..	4	6
	100		100	

Grading Public Utilities

At the meeting C. B. Hayden, assistant engineer Wisconsin Railroad Commision, read a paper entitled "Grading Utilities in Conformity to Service Rules." While the paper indicated that no criteria had been established yet for railways and the study had been confined to gas, electric and telephone utilities, the address is of much interest to railway men.

The speaker said that the first order issued by the Railroad Commission of Wisconsin prescribing certain requirements for gas and electric service was made effective in 1908 and the second order, which is now in effect, was issued in 1913. Very soon after the last order came out the service department began grading the gas and electric utilities, and about a year later, in 1915 or 1916, the telephone utilities were given standings. It was not the thought when this system of grading was started of applying it in the way used in schools, where it is necessary to keep the pupils placed according to the achievements which each makes, nor was it expected that each utility would pass or secure honor marks through the various years of the course, with a possibility of failure up to the final graduation. It was done because it afforded a means of keeping track of the utilities according to the service standards which had been established, and if possible to determine whether there was any increase or decrease in the degree of compliance, from year to year, of the utilities throughout the state or of any one in particular.

After use in this way for some time, it was determined to try out the scheme on the unsuspecting utilities, and it was found that the results were decidedly good. The utilities which received high rank were very much pleased, and in most every case put forth effort to improve their position or maintain it in any event. To be sure, some jealousy developed, but for the most part the best of feeling existed and a friendly rivalry developed for the high rank position.

The weighting of the various standards for gas and electric service was decided after a number of conferences of all the inspectors, and it is believed that the result is reasonably proper. For gas service, the heating value of the gas is given first place in importance, pressure variation second, periodic meter tests third, accuracy of meters and calorimeter equipment fourth, and the balance of the standards of about equal value. For electric service, interruption and voltage variation hold first place, periodic tests second, accuracy of meters third, and the balance of the standards of about equal value. The accompanying table gives an idea of the plan.

The speaker then gave the wording

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and an explanation of the rules or standards of each of the subjects in the table.

A somewhat similar set of standards was prepared for the telephone companies. In conclusion, the speaker said, in part:

"For the last few years the service requirements imposed by the Wisconsin Railroad Commission have been tempered materially because of the difficulties which have been the lot of all public utilities, and doubtless this condition has been prevalent throughout the country. Special cases, which have arisen because of the conditions resulting from the war, have engaged largely the time of our engineers, so that the personnel of the staff was not sufficient to handle the service matters thoroughly and do the extra special work. For these reasons the work of grading the utilities has not been complete, i.e., while grades have been given with their reports on all inspections, it has not been possible to make the inspections of all the localities, and therefore comparative summaries have not been made for two or three years. We are getting caught up again, though, and will have our summary of the gas companies again, for this year, for inspection by the utility representatives at the gas and electric association convention this month.

"It is our opinion that the practice of gradings has been of great value and aid to the department and has been generally looked upon favorably by the utilities."

Talks on Management and Operation

Railway Club Members Hear an Explanation of the Electric Railway Situation in and Around San Francisco as Presented by Three Executives of Important Local Properties

AT THE Feb. 8 meeting of the Pacific Railway Club in San Francisco three talks were made dealing in a general way with the problems that, in one form or another, continually confront electric railway executives. The speakers of the evening were: Fred Boeken, superintendent Municipal Railways of San Francisco; M. McCants, assistant general manager Market Street Railway, and J. P. Potter, superintendent of transportation San Francisco-Oakland Terminal Railways. Abstracts of the three talks are given in the following:

Mr. Boeken's Address

On the subject of developing traffic, Mr. Boeken pointed out that one of the peculiarities of San Francisco's problem is that its location on the tip of a peninsula limits its future growth to one direction, i.e., down the peninsula. In commenting on some of the schemes for increasing revenue he said:

"The European zone system of fare collection, which has been introduced in a few places in the United States, might properly be termed a traffic-developing measure. While no doubt the main object of the zone system of fare collection is more nearly to equalize the distance traveled for the amount paid, whether it develops any more car riders or not, if properly worked out it should at least produce more revenue."

He referred to an innovation now being tried out in southern California by a merchants' association whose members sell street car tokens with free coupons to their customers, the tokens being accepted by the street car company at the regular rate of fare and the coupon being accepted by the merchant on goods purchased. These tokens are accepted only in the off-rush period. On store purchases amounting to $1 the saving by the use of the coupons is 8 cents, or a little over half the round-trip fare.

Another somewhat similar method, known as the Prole system of coupon transfer, he said, provides for a discount of 5 cents on a dollar's purchase. Both these schemes seemed to Mr. Boeken to involve danger of incurring the ill will of small storekeepers in the outlying districts.

Depreciation as affecting changes from one type of equipment to another is a subject that requires careful attention. Changes were rapid up to the electric stage of operation, the larger cities are being forced to elevated or subway construction, the radical change from one-man horse-drawn cars to expensive two-man electric cars has been succeeded by a trend toward a lighter one-man car again, and there is by no means assurance that other radical changes may not be necessary in the future. "The method of figuring depreciation used by the Municipal Railway," he said, "requires the setting aside of 14 per cent of the gross revenue for depreciation and bond redemption. In our case this seems to be ample as we have a large car-hour revenue." In view of the heavy costs of operation at present and the uncertainties of the future, Mr. Boeken did not believe that any street railway would be in danger of setting aside too much in a depreciation fund.

On the subject of competition, Mr. Boeken pointed out that during the pioneering days of a city's development competition may have much to do with hastening development and bringing service and rate of fare to a reasonable standard. Generally speaking, however, it would seem to be far better for the public to have the right to regulate service for all than to have certain districts "over-served," to the detriment of other districts not so fortunate as to have competition—a waste of service in one locality must be offset by a saving somewhere else. Then, too, competition in electric railways is confined to a narrow strip on either side of a line, and better service in one section is unlikely to be of advantage to residents of other sections.

Mr. McCants's Address

In discussing the subject of headway and rush hours, Mr. McCants stated that it is a maxim in street railway management that 10 per cent of the passengers in any day of twenty-four hours will be hauled between 8 and 9 a.m. and 14 per cent between 5 and 6 p.m. As a result, the headway must be very short at rush hours, and then it must be quickly lengthened as the traffic dwindles in volume.

Even where large factories or mills are willing to co-operate to the extent of "staggering" work-hours so that large numbers of employees will not be dismissed at exactly the same time, it would be virtually impossible to limit the load in each car to seating capacity only and still get the rush-hour crowds home in an expeditious manner. Uncomfortable though it may be to stand, rush-hour passengers must accept this condition. The attempt in Berlin to carry only passengers for whom there were seats has been anything but satisfactory; in Rome all seats are removed at the rush hour and everybody is obliged to stand.

After pointing out how radically the operation of jitneys is opposed to the interests of the common weal, Mr. McCants said: "Street railways have long been regarded as a monopoly and therefore subject to regulation. They have submitted to that regulation, and in the face of such regulation have seen such irresponsible competitors as jitneys enter the field. There is, therefore, no escape from the logic of this thesis—that if the street railway is no longer to be a monopoly, it should no longer be subject to regulation."

The highly beneficial influence of public parks should be utilized to a greater extent, and the chief need in accomplishing this end is an effective means of "selling" the parks, not only to tourists and other visitors but to residents of the city themselves. There should be more extensive and more intelligent advertising.

Greater simplification of systems of transferring and in the transfers themselves are urgently needed. Stopovers and other improper use of transfers must be prevented if the railway company would avoid serious losses. For example, one company tried out its system by sending out agents to ride as long and on as many lines as possible for one fare. One agent rode all day on the same fare and ended his day by cutting out of a newspaper advertisement a slip with the same shape and size as the regular transfer. He presented this scrap of paper and it was accepted. His report to the management, backed up by the reports of the other agents, resulted in a new transfer system and an estimated saving to the company of $1,000 per day.

On the lines of the Market Street Railway the number of transfers issued

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does not increase as rapidly as the number of passengers carried. This may indicate either or both of two things: First, that the transfer system is being operated with increasing efficiency, and, second, that the people are being educated to saving time by taking more short trips.

The law of diminishing returns, in effect, says: "Do not devote all your attention to keeping the operating expenses of your business down to an absolute minimum; instead, try so to conduct your business that it will give the greatest possible profit on the capital invested." If city fathers would properly apply that law they would ask themselves: "If the street railways are not held responsible for the upkeep of the paving between and beside the tracks, how far will they go in the construction of extensions? If an exclusive right-of-way is granted on Blank Street, how much faster service can we demand? What is the ultimate dollar value of all such improvements?"

Painstaking research on the part of the electric railway company in the matter of selecting personnel is very much worth while. The attention of the Market Street Railway to this subject, Mr. McCants thought, has a direct relation to the fact that the turnover of men employed by that company is now only 21 per cent per annum and that within the past four years the ratio of passengers to accidents has been increased 65.3 per cent.

Again, the platform men can do as much toward "selling" the city to visitors as would an extensive advertising budget. When the columns of the daily press are used to educate the public the effort is labeled "propaganda." There is no other agency nearly so potent in educating the public and creating general good will as an army of enthusiastic employees who render effective service cheerfully and boost for the "company."

MR. POTTER'S ADDRESS

Transportation systems on the east side of San Francisco Bay, Mr. Potter pointed out, extend from Richmond on the north to Alameda on the south, an area of approximately 72 square miles, with a population of about 360,000 people. Rail systems include three transcontinental steam lines, the electrified division of the Southern Pacific, the Sacramento Short Line and the system of street railways operated by the San Francisco-Oakland Terminal Railway. The combined local and interurban system trackage totals 369 miles in length, probably the most comprehensive system of transportation of any city in the United States comparable in size and population.

The demand for express or restricted service from the different municipalities, particularly between residential and business districts, is becoming more pronounced as the population increases and the peak hours of travel grow heavier. At the same time the possibility of providing restricted stop service is becoming more limited by congested traffic. As the morning and evening peaks increase the large number of units necessary to move the traffic materially slows up schedules.

In endeavoring to find some relief attention is being given to the possibility of multiple-unit control with a seating capacity of not less than fifty passengers, using cars equipped with automatic couplers and operating in two or three car units.

The Key Route transbay service is largely rush-hour business, and of the average haul of 42,000 passengers per day in 1922 on the transbay system 46 per cent rode during a two-hour travel peak. Because of this condition it was necessary to provide an average of two seats for every passenger. On the ferry system the provision was more than three seats for each passenger transported. The combined Key Route and Southern Pacific systems operated more than 54,000,000 vacant seats last year; this, despite the fact that in 1922 the Key Route had the heaviest travel since 1915 (the year of the Panama-Pacific International Exposition). These figures were cited to show how the rush-hour one-way service loads up the system with "return empty" hauls. This does not indicate the provision of more seats than absolutely necessary. An accurate log or train chart of every train, car and boat is kept to show just how much the seating capacity is above or below the demand.

Illinois Electric Railways Association

THE Illinois Electric Railways Association will hold a joint meeting with the Illinois Gas Association and the Illinois State Electric Association at the Hotel Sherman, Chicago, on Wednesday and Thursday, March 14 and 15. The morning sessions will be joint meetings and the afternoon sessions will be separate meetings for each association.

The following will be among the speakers at the morning sessions: Charles M. Thompson, dean College of Commerce and Business Administration, University of Illinois; Ralph E. Heilman, dean Northwestern University School of Commerce; Martin J. Insull, vice-president Middle West Utilities Company; Britton I. Budd, president Chicago Elevated Railroads; E. W. Lloyd, chairman N.E.L.A. Joint Committee for Business Development; George R. Jones, chairman Illinois Committee Public Speaking Bureau; E. Hill Leith, Halsey, Stuart & Company; B. J. Mullaney, director Illinois Committee on Public Utility Information.

The following papers are scheduled for presentation at the railways section: "Future of the Electric Railway Business," by W. H. Sawyer, East St. Louis & Suburban Railway; "The Sale of the Ride," by Walter Jackson, consultant, New York City; "Advantages of Americanization of Railway Employees," by C. B. Goodsell, Chicago, North Shore & Milwaukee Railroad; "The Manufacture of Railway Equipment," by C. E. Thompson, Chicago, North Shore & Milwaukee Railroad; "Paving," by John B. Tinnon, Chicago & Joliet Electric Railway; "Stores and Inventory Methods," by a representative of the Bureau of Commercial Economics.

The joint annual banquet of the three associations will be held on the evening of March 14 at the Hotel Sherman. Charles A. Luther, Peoples Gas Building, Chicago, is chairman of the banquet committee.

C.E.R.A. Meeting in July

IN THE summary of association meetings scheduled for the next few months, which was printed in the ELECTRIC RAILWAY JOURNAL for March 3, page 374, the date given for the Central Electric Railway Association summer meeting was that originally announced. Since the first announcement a change in the date has been necessary, the date of the meeting now being July 18, 19 and 20.

New England Street Railway Club

THE annual meeting and banquet of the New England Street Railway Club will take place on Thursday, March 22, at the Copley-Plaza Hotel, Boston.

At the banquet George W. Gardiner, vice-president of the Union Trust Company, Providence, will act as toastmaster. The speakers scheduled include: His Excellency Channing H. Cox, Governor of Massachusetts; Hon. James M. Curley, Mayor of Boston; William H. P. Faunce, D.D., LL.D., president of Brown University, and Robert H. Newcomb, executive assistant Boston & Maine Railroad.

American Association News

Committee of One Hundred

THE executive committee of the Committee of One Hundred met in New York on March 5. The committee listened to a report of the joint committee of the publicity committee of the Committee of One Hundred and the advertising section of the association's Bureau of Information and Service, and thereafter approved a plan for soliciting funds with which to carry on the work of the Committee of One Hundred. The plan adopted is practically the same as that by which funds were raised when the Committee of One Hundred was first organized. Each member company of the association will be requested to contribute an amount equal to 50 per cent of the annual dues paid the association. This plan was brought before the committee by the sub-committee on finance, of which Randall Morgan is chairman.

Those present at the meeting of the executive committee were the chairman, General Guy E. Tripp, and C. D. Em-

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mons, J. H. Pardee, L. S. Storrs, F. R. Coates, Henry R. Hayes, Gen. George H. Harries, J. N. Shannahan, J. H. Choat, O. D. Young, and J. W. Welsh, Labert St. Clair and J. W. Colton.

Publicity

AT ITS meeting held on March 5 the American Association committee on publicity spent most of its time hearing and discussing a report from Labert St. Clair on the work of the committee of 100. The committee also considered plans for countrywide publicity for those features of the electric railway situation on which general information seems now to be particularly needed. The committee was fortunate in having President C. D. Emmons in attendance. F. R. Coates, chairman, presided, and the meeting was also attended by J. N. Labert St. Clair and J. W. Colton.

Revised Transportation & Traffic Rules for City Operation

THE standard code of rules of the Transportation & Traffic Association for city operation, which were revised at the last convention primarily to extend their range to cover the operation of one-man cars, are now being reprinted in suitable pocket-sized form. They can be had in bound form, with the association's standard cover, or unbound to permit the use of a special cover and additional inserts if desired by a local company.

Problems of the Purchasing Agent and Storekeeper

THE Engineering Association committee on purchases and stores met in New York City on March 5, with almost a perfect attendance. Those present were B. J. Yungbluth, chairman; W. S. Stackpole, vice-chairman; W. C. Bell, J. P. Dick, J. F. Fleming, W. N. Ford and H. H. Lloyd.

A report was received from a subcommittee appointed to prepare proper instructions for putting into effect the approved "Materials Classification." A meeting of this sub-committee had been held in Baltimore on Feb. 15. As amended by the main committee, this report is as follows:

For the proper operation of a "Materials Classification" it is recommended that all items of material handled by or through the supply or stores department be designated by a class number.

All such items should be divided into the various classes as shown in the "Materials Classification" and then an inventory taken to establish the money value of material in each class, after which, in order to maintain the classification, it will be necessary to keep a record of receipts and issues under each material class listed, and to make statement of total values monthly.

The class to which material is to be charged or credited should be designated by the storekeeper, by notation against each item on stores requisition on purchasing agent, invoice, storeroom report of material received and storeroom report of material issued. The class number should be used on every transaction, and record of each item which is kept in stock. Especially ordered material not charged to supply account, need not be classified unless desired.

As a matter of convenience to the storeroom force in fixing the class to which any article belongs, some companies using "Materials Classification" find it desirable to use a numerical numbering system. To accomplish this, it is recommended that all items subdivided under each class be arranged in alphabetical sequence, writing the noun first and further description after the noun, as, say, in Class No. 31.

Arms, pressure, for GE-57 brushholder.
Arms, pressure, for GE-200-J brushholder.
Blocks, brush yoke, for WH-101 motor.
Caps, axle bearing, for WH-307 motor.
Shafts, armature, for WH-514-C motor.

After this has been done an individual class number should be applied to each item of material, the first two figures of this class number to be the same as, and to represent, the class to which the material belongs, the remaining figures to designate the numerical position of the item in its class. As an example, say, in Class No. 17, individual numbers applied to machine bolts might be as follows:

Bolts, Machine	
Class No. 1772.....	¾ x 2½ in.
Class No. 1773.....	¾ x 3 in.
Class No. 1781.....	¾ x 5 in.
Class No. 1782.....	¾ x 5½ in.

In assigning class numbers sufficient space should be allowed between numbers to provide for additional items which may be added to the material classification from time to time. In this connection it is advisable to handle the numbers in groups for each kind of material, such as assigning class numbers 1,700 to 1,799 to machine bolts, 17,200 to 17,259 for lag screws, etc.

As a form for a monthly statement showing the transactions in classified material, reference is made to Exhibit B as shown in the 1921 report of the committee on stores accounting, and the samples submitted herewith, being those used by the United Railways & Electric Company of Baltimore and Public Service Railway Company, New Jersey, as being typical ones which might be adopted with such modifications as may be deemed necessary to suit the needs of any individual company.

Supplemental detailed forms necessary to prepare this statement can be designed by companies to meet their requirements.

In this connection it was decided that a joint meeting with the stores accounting committee of the Accountants' Association would be desirable for the purpose of obtaining agreement with that committee on the method of putting into effect the proposed materials classification and agreement with regard to inventory methods. An endeavor will therefore be made to hold a joint meeting, and June 4 or thereabouts was selected as a desirable date on account of the convention of the National Electric Light Association, which will be held during the week of June 4.

The committee then discussed in detail the preliminary program for the special session of purchasing agents and storekeepers which will be held at the coming annual convention. There will be papers by prominent storekeepers and purchasing agents, with prepared discussions by carefully selected speakers. The meeting will be given special publicity to show a good attendance.

A large part of the meeting was taken up with the subject of periodic inventories, with debates on the relative merits of the stock book form presented at the 1921 convention by the joint committee on stores accounting, the perpetual inventory system and other methods of control. As the committee was not prepared to vote unanimously in favor of the stock-book plan, a vote was not taken with regard to its general recommendation, but the committee will study the system with a view to reaching a unanimous decision prior to the joint meeting with the stores accounting committee.

The chairman appointed Messrs. Ford and Bell to collect data from a selected group of companies, so as to show the outstanding feature in connection with the investment in, and the control of, materials and supplies. A questionnaire will be used for this purpose.

One-Man Interurban Cars

THE practicability of the one-man car and plans for obtaining information from all parts of the country concerning its operation were discussed at a special meeting of the committee on one-man car operation of the American Electric Railway Association at the Hotel Gibson, Cincinnati, Feb. 19. Following the conference it was announced that the committee would send out questionnaires to all electric railways to obtain their opinions on the one-man car and the advantages and disadvantages of the light-weight car. J. P. Pope, general manager Kentucky Traction & Terminal Company, was chairman of the meeting, at which the following also were present: N. W. Bolen, H. C. DeCamp, J. E. Duffy, A. L. Reynolds, Karl A. Simmon, A. Swartz, L. G. Van Ness, A. E. Wood, A. H. Clifford and T. C. Cherry.

Following the meeting the committee was entertained with a dinner at the hotel by officials of the Cincinnati Car Company and the railway department of the General Electric Company.

Association Bulletins Available

SECRETARY J. W. WELSH states that the following reports and compilations are available to association members in good standing:

Working Conditions of Trainmen: A tabulation of the replies of over 250 companies to a questionnaire sent out in February, showing hours of labor, length and types of runs, overtime rates, extra compensation allowed for special work, number of trainmen employed, labor turnover, etc.

One-Man Car Legislation: A record of unsuccessful attempts by means of statutes, ordinances, etc., to prohibit the operation of street railway cars with one man; the second supplement to a compilation originally issued May 1, 1921.

Bus Franchises: A summary and analysis of the principal provisions of the franchises or permits under which electric railways are now operating buses.

Metal Fare Tokens: A list of 105 electric railways using metal fare tokens, with a photographic reproduction of the tokens used by each company, showing all types in use and both sides of each type.

Financial and Operating Statistics of Electric Railways for the Calendar Year 1922 *as Compared with* 1921*:* Gives the combined income statement of a large group of companies reporting to the association and their operating expenses subdivided into the primary accounts in totals and on a per car-mile basis. Also gives operating and traffic statistics from which certain significant ratios are calculated to indicate the underlying conditions of the industry.

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Maintenance of Equipment

Maintenance of Car-Type Electrolytic Lightning Arresters

When Operating Troubles Occur They Point to Some Definite Cause That, in Most Cases, Can Be Overcome by Careful Inspection and Maintenance

BY L. R. GOLLADAY
Supply Engineering Department Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.

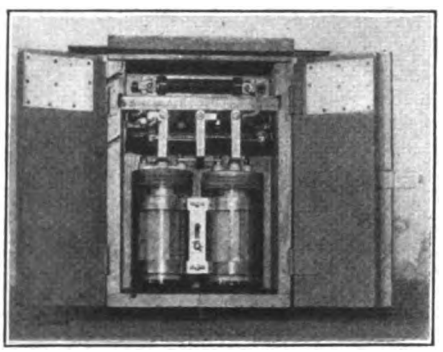
ALTHOUGH an electrolytic lightning arrester requires a certain amount of attention, it furnishes, when in good condition, a protection against storms that is unsurpassed. Consequently, if the original investment in this type of arrester was wise, it is only economic folly to lose the value of its protection by giving it insufficient or improper attention.

An electrolytic arrester for 600-volt street car service is shown in the accompanying illustration. In the top compartmenet of the case is the inclosed fuse, and in the lower compartment are the two balancing resistors and electrolytic cells. These three elements are the parts of the arrester that require the most careful attention. An arrester with a blown fuse has no protection value and, since this is the most common operating trouble, it should be examined first in the course of an inspection. The blowing of fuses can be largely avoided by charging the arrester each time it is placed in service.

The resistors should rarely cause any trouble. If one should develop an open circuit, it will usually cause the cell shunted by that resistor to overheat and perhaps boil out the electrolyte. This is an indication of a defective resistor. A resistor, broken by a severe shock, will cause such trouble.

The wearing parts of the arrester are the aluminum electrodes. Their life, as well as the protection, is increased by proper maintenance. Much care should be taken to see that the electrolyte is not contaminated by foreign matter. The electrolyte must be mixed with clean distilled water in clean glass or earthenware vessels that have first been rinsed in distilled water. The containers should not stand uncovered where dust can settle in the electrolyte. When handling the aluminum pieces, especial care should be taken that they do not touch anything.

When in good condition the electrolyte is clear and there is no sediment in the bottom of the cell. Brown spots on the cell plates do not indicate trouble in the cell. However, rapid corrosion and sludging are indicative of unsatisfactory conditions within the cells. After corrosion has once started it is not possible to stop it except by renewing the plates and electrolyte. The condition of the cells may be checked by measuring the leakage current with a milliammeter after disconnecting the resistors. If this current is much greater than 3 milliamp., the cell is not in good condition. The resistors take four or five times the current of the cells.



Westinghouse Type A. R. Arrester

The life of the cell plates and electrolyte will be somewhat prolonged if the arrester is taken out of service in the winter season, which can be done if there is no lightning during this part of the year. Good results will be obtained if the electrolyte is removed from the cells and stored in an earthenware jar while the arrester is out of service. After allowing time for the separation of the oil and electrolyte, the former may be siphoned off and kept in a separate container. If the electrolyte is in good condition and kept covered, it can be used again. If the condition of the electrolyte is not certain, however it is better to use new electrolyte. When taking an arrester out of service the cell plates should be removed from the jars, cleaned with gasoline, rinsed in distilled water, and put back in the jars.

The life of the cell plates and electrolyte will be shortened by an unusually high operating temperature. For this reason it would be better to mount the arrester underneath the car rather than inside or on top of the car, where the temperature would undoubtedly be higher than is recommended for the satisfactory operation of electrolytic arresters.

Baggage Cars Converted for Passenger Service

THE New York, Westchester & Boston Railway has recently completed the conversion of two baggage cars into passenger cars. When these cars, Nos. 201 and 202, were originally built in 1911, they were designed for combined baggage and passenger use. A partition about one-third the way from one end of the car divided it into two compartments, the smaller of which was used for baggage. A separate door to this compartment was placed where the third window of an ordinary passenger car would have been. The larger compartment was fitted up in the usual way with upholstered seats.

Soon after these cars were built, however, the railroad entered into an arrangement with the Adams Express Company, which involved the handling of more express business than could be conveniently taken care of by the small baggage compartments in the two cars. All the seats were taken out of the passenger end and the cars used solely for baggage. They were operated in that way for a number of years until the arrangement with the express company was terminated as a result of the war. Then the cars were relegated to the storage yard and gradually stripped of most of their equipment. But the effect of the war, which first destroyed the usefulness of the cars, was later the reason for bringing them back into service.

A short time ago there developed

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a need for more passenger equipment on the New York, Westchester & Boston. The cost of new rolling stock was prohibitive, and so J. T. Hamilton, superintendent of equipment, hit upon the expedient of converting the old useless baggage cars for passenger service. The partitions were taken out, bars removed from the windows, baggage doors replaced by windows and new seats installed.

In appearance today, inside and out, they are indistinguishable from the ordinary passenger cars. In spite of the fact that much expensive equipment which had been removed from the cars during their period of idleness had to be replaced, the cost of converting them was about one-fourth the cost of new cars.

Our Creed

To do a little better than is expected of us;

To be a little ahead of time rather than a little behind it;

To be as anxious to perform as to promise;

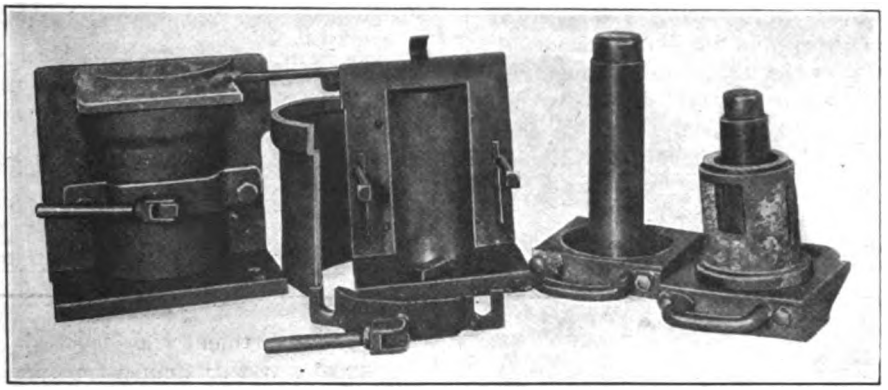
To furnish results and not excuses;

And, above all else, to remember that we are spending the company's money and not our own, and that we should therefore exercise more than ordinary care as to how we spend it.

This "creed," epitomizing the purpose of the department of rolling stock and shops of the United Railways & Electric Company of Baltimore, hangs in the office of A. T. Clark, the superintendent of those shops.

Convenient Babbitting Jigs

THE accompanying illustration shows some of the babbitting jigs used by the Eighth Avenue Railroad in New York, N. Y., for babbitting armature and axle bearings. The first and second jigs shown in the illustration beginning at the left are used for babbitting axle bearings. The two jigs shown at the right in the illustration are for babbitting armature bearings. These have a recessed base with an upright shaft in the center. The flanged ends of the armature bearings rest in the circular recess at the bottom. The base is provided with a handle for convenience. Of course, the complete circular portion is babbitted for armature bearings, while but one-half is babbitted for axle bearings.



Convenient Jigs for Babbitting Armature and Axle Bearings

The view at the extreme left shows the jig completely assembled and ready to pour the lining for a bearing. The next illustration shows the various parts. The base consists of an angle plate with a half round portion in the upright part of the same diameter as the armature shaft or the inside of the bearing after it is babbitted. The outside portion fits between the two fastenings shown at either side, and this is forced up close to the base by means of a clamping strip with a handle. A top plate is provided with an opening corresponding to the space to be filled with babbitt. This has a handle and by moving the plate across the end as the babbitt cools, a smooth end surface is produced.

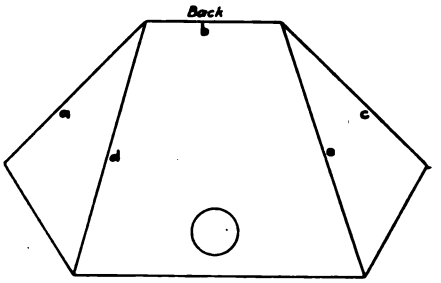
Platform for Washing Ventilator Glass

THE cleaning of cars of the New York & Harlem Railroad is under the supervision of the mechanical department. Car cleaning is done on a time basis, and the time schedule for cleaning ventilator glass and the clearstory of cars is an even multiple of that for washing the car bodies. In order to facilitate the washing of the clearstory, elevated platforms have been constructed on either side of the track used for bringing the cars into the shop for cleaning. Two men are stationed on these platforms to clean the ventilator glass and clearstory of cars due for this cleaning. This method permits of much better workmanship and better attention to the washing of the upper parts of the car bodies.

Fall River Shop Notes

THE Eastern Massachusetts Street Railway's Fall River division shops have recently been greatly improved. A visitor to these shops notices a number of little conveniences which conduce to economical maintenance. Some of these follow:

On a board conveniently mounted



Canvas Cover for Protecting Sand Spout from Wheel Splash

for the inspectors to examine are examples of well-worn and improperly-worn brake shoes, and other exhibits, which serve as a constant reminder as to how to get the most out of the wearing parts.

In order to save space all material which can be stored overhead is so stored. For example, sweeper brooms are piled on a high shelf mounted between building columns. They are thus in plain sight, but absolutely out of the way.

An old single-truck car has been rigged up as a carhouse sand car, to facilitate filling of the sand boxes on the cars. Two longitudinal bins were built in this sand car, with openings at the side, closed with slides, to permit pails to be filled. The sand car is run alongside the drying room for filling, and is then moved about as required.

A home-made trolley pole tension tester has been found useful. It consists of a trolley catcher, suitably weighted. An iron handle is attached for convenience in carrying. A rope of length equal to that at which it is desired to test the tension is attached to the trolley catcher, which keeps it wound up when the device is not in use. When the end of the rope is hooked over the end of the trolley pole and the weight just balances the tension when the weight

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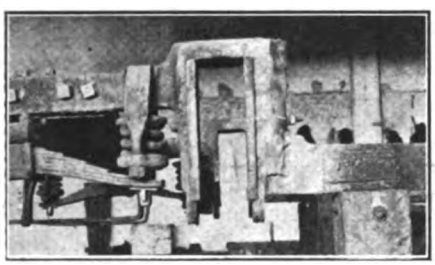
clears the ground, the tension is correct.

It was found desirable to protect the spring sand spouts on the cars from wheel splash so that they would not become damp and clog the sand. For this purpose the spouts were covered with fire or other canvas hose and a canvas shield was slipped over the spout and tacked up against the bottom of the car. This shield is of the form shown in the accompanying diagram. It is tacked against the bottom of the car along edges *A*, *B* and *C*, being folded along the lines *D* and *E*. The back is toward the wheel, the front being open. For tacking up the canvas a tack driver consisting of a weighted rod sliding in a small piece of gas pipe was found convenient.

Reinforcing Outside Corners of Truck Pedestals

THE New York & Harlem Railroad, New York, N. Y., experienced some difficulty through the breaking of truck frames at the outside corner of the truck pedestal. This trouble has been overcome by reinforcing this point with an angle



Truck Pedestal Reinforced by Angle Iron and Welding

iron welded to the upright and split at the bottom so as to extend down the side of the truck frame. The center part of the angle at the bottom is bent back so as to lie on the top of the truck frame. A 3 in. x 3 in. x ½ in. angle is used. The accompanying illustration shows one of these side frames as repaired. The welding is done by the oxyacetylene process.

Old Axles Afford Very Useful Material

THE Market Street Railway of San Francisco has found so many uses for old axles that not only does it use all those taken from obsolete trucks of its own equipment, but the purchase of old axles from steam railroads has been found economical. The old axles are first heated in the oil furnace and then hammered out under the steam hammer to smaller diameter and greater length. This reworking materially improves the quality of the metal. It is used for filler bars in built-up crossings and frogs, tongues for switches, and for miscellaneous heavy forgings.

Trolley Rail Height Gage

OFTEN it becomes necessary to gage the height and alignment of the trolley or third rail. A mechanical device for this purpose has been used in the past with some degree of success. A new apparatus using a hydraulic principle is now used on the Chicago Elevated Railroads which has proved more simple in construction and more accurate in results.

A trolley board or shoe beam is equipped with a cylinder made of 1-in. brass tubing placed vertically through the board. The piston which operates in this cylinder has on one end a yoke or harp carrying two rollers 5 in. long by 2 in. in diameter. The piston is supplied with double leathers on its upper end. Suitable couplings and hose connections are made to the upper end of the cylinder and to a graduated glass tube properly mounted in the car. The system is filled with soap solution and calibrated.

The rollers ride upon the trolley rail, and the variation in height of the rail is transmitted through the liquid by the action of the piston in the cylinder to the graduated tube. A device of this type is placed on each side of the car in order to obtain readings on lap rail and special rail. Two observers in the car take readings at intervals of 200 ft. of track and also at high and low marks, and a recorder plots these readings directly on a previously prepared chart.

The ratio of the area of the piston to the area of cross-section of the glass tube is the determining factor in the degree of sensitiveness of the apparatus. After experimenting it was found that this ratio should be 1 to 1, that is, the diameter of the cylinder should equal the diameter of the graduated glass tube.

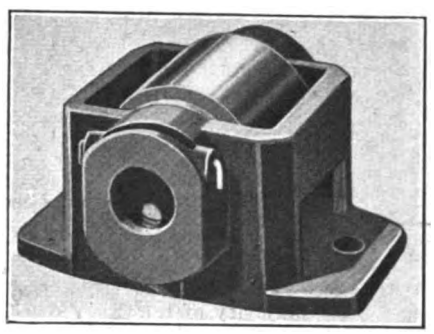
Records plotted by this method were checked and found to be more accurate, in showing the true conditions, than the foreman's rail height gage. As will readily be seen, this plotted record shows the height under operating conditions with the weight of the car on the running rail. A careful study of this record discloses conditions of the roadbed as well as of the trolley rail, and serves as a guide to reconstruction.

New Equipment Available

Continuous Roller Side Bearings

A NEW type of roller side bearing has just been placed on the market by the Burry Railway Supply Company, Chicago, Ill. The rollers and axles are of high-carbon steel, and malleable iron is used for the renewable bearing bushings, housing and wedges. The roller revolves on its axle and the axle in turn revolves in a renewable interlocked bearing bushing. This type of construction is intended to overcome trouble such as the wearing of an oblong hole in the housing, which of course lowers the roller and increases the side bearing clearance, thus making it necessary to renew such housings.

The new type bearing is being



New Continuous Roller Side Bearing

marketed under the trade name of "Paragon." The roller and the renewable bearing bushing have chafing flanges. These engage each other to prevent endwise movement. Outside endwise movement of the axle is resisted by the solid end of the housing. The renewable bearing bushings are designed so that the hexagon shape of the lower half fits in similar recesses in the housing, thereby preventing the bearing bushing from rotating with the axle, and as the surface of the bearing bushing engaging the recess of the housing is of generous width, all wear of the housing is eliminated.

The "Paragon" bearing bushings are easily renewed without removing the side bearing housings from the truck or body bolster.

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The News of the Industry

Negotiations Suspended

Winnipeg Electric Railway Temporarily Withdraws Request for Franchise Extension

After twelve months of negotiating the Winnipeg (Man.) Electric Railway has temporarily withdrawn its request to the City Council for an extension of its franchise. The city of Winnipeg has the option in 1927 of purchasing the railway property. If it does not then purchase, the franchise is automatically extended for a recurring period of five years. Negotiations looking to an agreement deferring the period at which the city could take over the railroad property for ten years—until 1937—were undertaken by the company in order to enable it to do certain financing which would mean an extension of the transportation system in Winnipeg on a large scale.

A. W. McLimont, vice-president of the company, who personally conducted the negotiations with the Council, revealed his plans for a future transportation system that would keep abreast of the requirements of the city. The plans were finally incorporated in a draft agreement referred to previously in the ELECTRIC RAILWAY JOURNAL.

Among the concessions agreed to by Mr. McLimont in consideration for the extension was a schedule of lower fares, payment by the company of a share in the cost of building bridges and subways, placing wires underground in the business section of the city, adjustment of franchises in municipalities outside the city limits and a number of important extensions to track.

While this agreement met with the favor of the majority of the City Council, the labor group objected to the franchise question being dealt with at any time prior to 1927. This opposition protracted the negotiations.

Mr. McLimont said to the Council:

> The bankers take the position that the very determined and continuous opposition to the franchise negotiations by certain members of the City Council and from influential quarters elsewhere is very detrimental to the company's financial standing and credit, and on account of the long delay that has already taken place in negotiations, the uncertainty as to when the matter will be ended, what the final outcome will be, and the general conditions now prevailing in Winnipeg, the bankers seem very reluctant to consider any arrangement which would require them to provide for the large financial obligations involved and which would be necessary to carry out the program outlined in the draft agreement now before Council, and advise us to suspend negotiations temporarily.
>
> Another matter strongly influencing the bankers is the financial showing made by the railway department of the company for 1922, which was very disappointing. Conditions are not improving so far this year, and it would be impossible in the face of these conditions to justify putting into effect the fares proposed in the agreement.
>
> Under all these circumstances we feel that the only proper action to take is to suspend negotiations for the time being.
>
> After considering all phases of the situation the bankers intimated to me that they were prepared to consider providing us with sufficient money to meet our immediate and pressing obligations, and we now have negotiations pending with that end in view. When these are concluded we expect to take up the matter of our indebtedness to the city.

The company has been successful in effecting new financial arrangements and a special general meeting of the shareholders of the Winnipeg Electric Railway has been called for March 19, to consider and deal with a formal by-law authorizing a total issue of $5,000,000 of twenty-year 6 per cent general mortgage and collateral trust gold bonds of the company, of which there are to be presently issued $3,250,000. This amount will be disposed of in retiring the company's current indebtedness for capital expenditures and for general corporate purposes and will place the company in a splendid liquid position, with its interest charges less than they are at the present time. This issue has already been referred to in these columns. In 1921 this company found it necessary to provide additional electric energy to meet the growing demands of the company and organized the Manitoba Power Company, Ltd., to produce the required additional power. The Winnipeg Electric Railway is to be the distributor of this big power load, and in order to do so considerable money will have to be expended to install the necessary plant.

Orders Report of Salaries Paid

The California State Railroad Commission has adopted a resolution requiring all public utilities of the State to file salary data with the commission and furnish an accounting of donations, contributions, subscriptions and cash balances.

All public utilities having gross annual operating revenues of $100,000 or more must file on or before March 10 a statement showing the names of all officers or employees who during the year 1922 received a salary of $5,000 or more annually. The statement must include the salary paid, expense account, fees received by and duties of each such officer.

Public utilities with revenues of $25,000 and less than $100,000 are directed to file with the commission the names and salaries of all employees receiving $3,000 or more annually, with details as to fees, expenses and duties.

The commission's resolution also provides that all public utilities having gross annual operating revenues of $25,000 or more shall file on or before March 10 a statement showing the amount of cash they had on hand for all purposes on Dec. 31, 1922, the names of banks or other institutions with which such cash was deposited, the rate of interest received, and the amount of cash in the utility's treasury.

Appeal Dismissed

The Seattle Municipal and Puget Sound Properties Must Pay 1919 Taxes—City Considers Ways and Means

Word has been received from Washington, D. C., that the appeal of the Puget Sound Power & Light Company from the imposition of 1919 taxes on the Seattle (Wash.) Municipal Railway property has been dismissed by the United States Supreme Court. The suit was brought by the power company, as plaintiff in error, against King County. King County obtained a rule in the Washington state courts that it had a right to collect $401,000 accrued taxes, now amounting, with interest, to $640,000 on the railway property for 1919, as the assessment was made before the railway became exempt from taxation by transfer of ownership to the city. The appeal followed, but no briefs were submitted, and hearing had not been held. The case was dismissed because attorneys failed to deposit with the clerk of the court an amount sufficient to cover the cost of printing the record.

Under an agreement, if the tax must be paid, the city of Seattle, which owned the railways for three-fourths of the year, must pay three-fourths of the tax, or about $480,000, while the power company must pay one-fourth.

With approximately $480,000 in unpaid 1919 taxes which the Seattle Municipal Railway must pay, and with the 5-cent fare effective March 3, city officials are anxiously considering ways and means of raising the money required to meet the railway deficit. Councilman E. F. Blaine, chairman of the finance committee, has urged Superintendent of Public Utilities George F. Russell to make a constructive suggestion as to any methods that would be helpful. The Municipal Railway has completed plans for increasing service under the 5-cent fare and taking care of the expected increased patronage.

Superintendent of Railway D. W. Henderson states that it is realized by officials that the success of the 5-cent fare, which has been restored, as noted elsewhere in this issue, depends upon the increase in railway traffic and every effort will be made to stimulate traffic.

Company Continues Fifty-four-Cent Wage Scale

The Boston & Worcester Street Railway, Framingham, Mass., has decided to continue the 54-cent wage rate during the balance of the contract with its men. The contract with the blue uniform men entered into on Sept. 1, 1922, was on a basis of 54 cents an hour until March 1, 1923, and 53 cents an hour from March 1, 1923, to Sept. 30, 1923.

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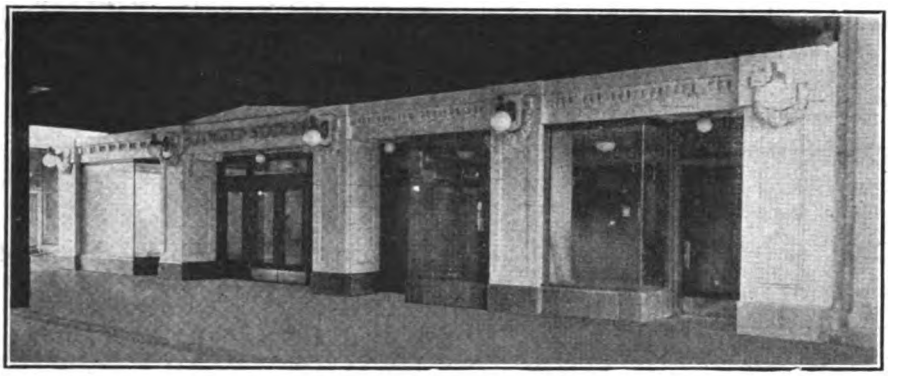


Exterior View of New Northern Elevated Railroad Station

Chicago "L" Opens New Station

To take care of the enormous growth of the uptown section of Chicago, which until the last year or two had been known as the Wilson Avenue district, the Northwestern Elevated Railroad has built an entirely new station at Lawrence Avenue, which was opened up on Feb. 27, at 8 p.m. Officials of the road, a forty-piece Elevated band and members of the Uptown Chicago Business Men's Association were present at the opening. Speeches were made by officials of the railroad and by officers of the business men's association.

The Wilson Avenue station was for many years the northern terminus of the elevated line. There was a very rapid growth about this point which centered along Wilson Avenue. More recently, however, this growth has expanded to the north, so that Lawrence Avenue, two blocks farther north and the mile-section street, on which a surface car crosstown line operates, has become a nearly equally important center. The traffic carried by the elevated to and from this district is so heavy that it has warranted the opening of this additional station, giving two stations only two blocks apart.

The station is of the new island platform type, similar to the design already in service along the newly elevated portion of the Evanston line. The street level of the station is beautifully constructed of marble and tile and includes, in addition to the space occupied by the company, a store on either side of the entrance. Due to the fact that this station was not contemplated until after the abutment wall and fill had been made for the track elevation, it was necessary to move the abutments, consisting of 250 yd. of concrete, back from the street line 65 ft. and remove that portion of the fill. The steel structure over the street was separated and moved bodily each way to make room for the island platform. The cost of the station, including the extraordinary construction work, was about $90,000, of which $30,000 was spent on the building proper. The station was designed by the company and the construction contracted for.

Court Rules Commission Must Act on One-Man Car Issue

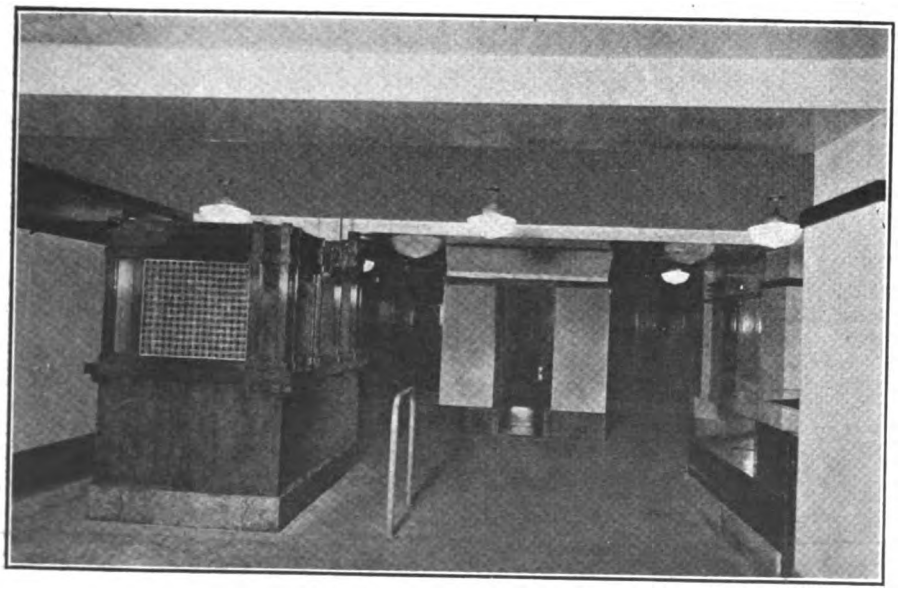
A preliminary injunction prohibiting the city of Clarksburg from putting into effect its recently-adopted ordinance restraining the Monongahela Power & Railway Company from operating one-man cars in the city was granted by Judge Haymond Maxwell at a special term of the Harrison County circuit court. Judge Maxwell's opinion granting the car company the preliminary injunction is quite a lengthy affair and one of the principal reasons set forth for granting the request is that the Public Service Commission is delegated authority to act in such matters. The Judge also assumes that if the necessary time is allowed the traction company will take the case before the commission. Immediately after granting the temporary injunction, counsel for the city, Fred L. Shinn and E. G. Smith, gave notice of action on the part of the city to have it dissolved.

In part Judge Maxwell's opinion follows:

> Upon reason it would seem that where a public service corporation has adopted a policy that may or may not be just and reasonable, the Public Service Commission is the governmental instrumentality best calculated and best equipped thoroughly to investigate the matter and then to prescribe such practices as may be just.
>
> The railway alleges in its bill that the one-man car question is a proper one for determination by the Public Service Commission. Presumably, therefore, the company will promptly take this question to the Commission if the operation of the ordinance is enjoined for a sufficient length of time to permit the matter to be presented to, and considered by, the commission. Acting upon this assumption, and being of opinion under the principles hereinabove discussed, that this matter ought to go to the Public Service Commission, and that the present status should be preserved at least for a reasonable time to afford opportunity for action by the commission, the court awards a preliminary injunction prohibiting the enforcement of the one-man car ordinance until further order of the court.

Trainmen and Police Officers Will Co-operate

To effect close co-operation between police traffic officers and trainmen, three meetings of trainmen of the Los Angeles (Calif.) Railway were held Feb. 20. Capt. James McDowell, head of the police traffic department, spoke of some of the traffic conditions peculiar to Los Angeles in which trainmen can help. After each meeting he answered questions presented by trainmen. As a result of the gatherings, arrangements have been made whereby the police department and street railway officials will prepare a small card form to be carried by trainmen. On this card they will note the license number and other necessary information where automobiles pass standing street cars or violate other city ordinances. This information has been supplied to the company's safety bureau in reports of trainmen, but, as Captain McDowell said, he is anxious to have the reports made regularly and systematically.



Interior View of Station

Dip Subway Plans Being Prepared

Engineers for the Street Railway Department of the city of Detroit, Mich., are preparing plans for a downtown subway dip system with an underground loading station at a central point. The project is to be submitted to the voters at the October primary election. An agreement has been reached with the Rapid Transit Commission and the plans will be reviewed by the engineers of that body in order to insure co-ordination with the general subway plan.

The members of the Rapid Transit Commission are of the opinion that a system that would best relieve surface

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congestion at this time may not be the best system as the population of the city increases. The present agreement between the two commissions, it is pointed out by Sydney D. Waldon, chairman of the Rapid Transit Commission, will afford relief from the downtown congestion in a comparatively short time and will permit the Rapid Transit Commission to confine its efforts to its primary purpose of carefully developing plans for the transporation needs of a city of 3,000,000 people.

Clarence E. Wilcox, Corporation Counsel, is now working on legislation planned to raising Detroit's bonding limit from the present 2 per cent of the city's assessed valuation to 4 per cent, for public utility purposes, such action being permissible under the Home Rule act. The city officials are hopeful that permission to increase the bonding limit will be granted at the present session of the State Legislature as a bond issue for the proposed subways would more than exhaust the balance of the city's present bonding limit.

It's the Car Rider that Pays for Paving

The United Traction Company, Albany, N. Y., has posted in its cars a placard showing the alleged injustice of existing laws which make it mandatory that traction companies pay for the improvement and upkeep of pavement of city streets between the rails and for 2 ft. each side of them. The bulletin reads:

THE PAVING TAX

A Relic of Horse Car Days

Back in the horse car days when street cars really wore out pavements, street car companies were required to pay for all paving inside their tracks and two feet outside.

This means from one-third to two-thirds of the entire street area.

The horse cars have been gone thirty years. The paving tax still stands.

You—the car rider—pay for it.

New System to Be Constructed

The Council of Orange, Tex., has granted a franchise on application of Harry A. Burr, general manager of the Orange Light & Water Company, and his associates, for the right to operate electric passenger carrying vehicles in the city for a period of forty years. The company is proposing to try out a system of trackless cars to be operated only on paved streets. The streets on which the cars are to be operated, fares to be charged, etc., are to be decided by the City Council and directors of the company in joint conference.

Saginaw Votes Down Bus Franchise

Citizens of Saginaw, Mich., expressed their disapproval on March 7 of the Henning-Wade franchise which offered city-wide motor bus operation with the installation of forty motor omnibuses. The vote stood 8,540 for and 6,023 against. The measure failed by 2,517 to obtain even a majority and lacked 2,714 of the necessary 60 per cent.

This was the first opportunity that the people of Saginaw had to express their choice on a definite motor bus proposal since suspension of service in August, 1921, by the Saginaw-Bay City Railway. The grantees were Leonard A. Henning, Saginaw, and John Wade, Atlantic City, N. J. There will be another vote in Saginaw on April 2 on a car-bus franchise.

Will Demand a Ten-Cent an Hour Increase

Employees of the New York State Railways in Rochester, Syracuse, Utica and Rome are organizing to demand a wage increase of from 50 to 60 cents an hour. The men accepted a wage reduction from 53 to 50 cents a year ago and now contend that the cost of living has since risen. The men contend that the operators of one-man cars should receive at least 25 per cent more than men on two-man cars. The wage agreement does not expire until June 1.

News Notes

Idea of Elective Commission Rejected.—Popular election of members of the Public Utilities Commission was rejected in the Connecticut Senate on March 2. Minority Leader McGrath's bill provided that the members be selected in this manner rather than by appointment of the Governor.

New Pamphlet Appears.—In addition to the Public Service News published by the Winnipeg (Man.) Electric Railway and devoted to activities in the railway field the company has started a monthly pamphlet entitled The Utility Optimist, in the interests of its power and light customers. The first issue is dated February, 1923.

Increases Force. — The Springfield (Mass.) Street Railway has added sixty blue uniform men to its regular force by calling back forty men that had been laid off and employing twenty new men. This addition was made in conformance to a rerouting of cars and change of schedule so as to afford more time for the round trip in rush hours and admit of more frequent service in several instances.

Seeks Repeal of Trolley Act.—The first move has been made for repeal of the Brooks-Coleman act in Minnesota. This measure put jurisdiction over the rates of electric railways in the hands of the State Railroad & Warehouse Commission. It was introduced in the House by a League member. One section proposes annulment of indeterminate permits granted the Twin City lines under the terms of the 1921 law.

Will Guard Carhouses.—The Louisville (Ky.) Railway is planning to use guards at its carhouses, temporarily at least, as a result of the two recent carhouse fires, one of which occurred on Feb. 16 and the other on Jan. 16, resulting in heavy losses. While the company has no reason to believe that the fires were of incendiary origin, it is felt that the guards at least would be useful in putting out a fire before it obtained headway. Nine men will be used for the time being.

Hardship Experienced. — A traction car on the Evansville and Ohio Valley Traction Company line leaving Henderson, Ky., was marooned on a ferry boat on the Ohio River recently for more than twelve hours. The car had about twenty-five passengers aboard. A violent storm with a fifty-mile wind made it necessary to tie the ferry to the willows on the Kentucky side. Most of the passengers were women and children. Food and fuel were taken to the passengers in skiffs.

New Railway in Prospect. — H. S. Shaner, Sand Springs, Okla., is the promoter of a new electric railway in south Missouri to be about 300 miles long. The line will connect with the Frisco line at Cabool, Texas County, and at Winona, Shannon County. Connection with the Springfield & St. Louis line will be made at Salem, Dent County. Other steam lines will be joined at Patosi in Washington County and Bismark, in St. Francis County. The charter name for the new line is the Missouri Hydro-Electric Interurban. The dam and power plant are to be located on Current River, in Round Springs.

Will Accept Company's Offer.—Linemen and electrical helpers employed by the Cincinnati (Ohio) Traction Company, who went on a strike last November because the company refused to grant them a 25 per cent wage increase, recently voted to accept the offer of their employers. Theodore H. Schoepf, chief engineer of the traction company, said that on Nov. 15 last fifty men, members of Local 101 of the Electrical Workers' Union, declared a strike, although they had an arbitration clause in their contract. Despite the fact the men called off the strike, Mr. Schoepf said he would take back as individuals such men as he needed and that they would be paid the same scale of wages that prevailed prior to the strike. Dur the strike the traction company recruited men from other cities.

Plans Made for Final Dual Transit Construction.—Plans for the construction of one of the two remaining section of the Nassau Street subway in Manhattan Borough—the final piece of construction work provided for under the dual contract—have been completed, according to an announcement made by the New York Transit Commission. A hearing will be held on the formal contracts for the whole route on March 26. The Nassau Street line will be part of the system operated by the Brooklyn Rapid Transit Company. It will extend from the Municipal Building, at Chambers Street, where connection will be made with the Center Street loop tracks under that structure south through Printing House Square and Nassau Street, to Wall Street, thence the line will continue on through Broad Street to a connection with the Montague Street-Whitehall Street Brooklyn Rapid Transit tunnel.

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Financial and Corporate

I. T. S. Merger Details

New Company to Be Organized to Take Over McKinley and Studebaker Properties

Confirmation has been obtained of the rumor that Senator William B. McKinley and others associated with him in the development of the Illinois Traction System are proposing a consolidation of the Southern Illinois properties controlled by Clement Studebaker and his associates with the properties of the Illinois Traction Company. On the other hand, the interests associated with Mr. Studebaker plan to acquire a substantial interest in the Illinois Traction Company. These interests have also associated with themselves strong financial backing for the purpose of financing the present and future requirements of the unified and consolidated properties.

In order to provide the simplified financial structure fundamental to the whole problem of future capital requirements, it is proposed to consolidate all of the operating properties of the Illinois Traction Company in Illinois into one company, to be known as the Illinois Power & Light Corporation, and to acquire through consolidation the properties operated by the Southern Illinois Light & Power Company. To accomplish this consolidation and to establish a proper foundation for a new first and refunding mortgage for the new consolidated operating company, including the creation of an attractive preferred stock, it is planned to acquire approximately $22,000,000, par value, of bonds and to call for redemption a further $9,000,000 of bonds now in the hands of the public.

It is also proposed to acquire about $9,300,000 of guaranteed preferred stock issued by subsidiary companies and $1,641,000 of preferred stock of the Illinois Traction Company. All these holdings will either be canceled or pledged under the new mortgage. In addition it will be necessary to provide for the retirement of $5,649,000 of Illinois Traction preferred stock, $2,169,000 of Western Railways & Light preferred, $1,665,000 of Southern Illinois Light & Power preferred and $631,000 of Bloomington & Normal Railway & Light preferred, all of which are now in the hands of the public. In this connection, the intention is to offer the holders of these securities in exchange therefor a like amount of 7 per cent cumulative preferred stock of the new Illinois Power & Light Corporation.

As existing legal requirements make it either impossible or undesirable to acquire direct ownership of all the properties comprising the Illinois Traction System, it will probably be necessary for the Illinois Power & Light Corporation to control through stock ownership the Illinois interurbans and the utilities operating in states other than Illinois.

Succinctly stated, the plan provides for the ultimate retirement or exchange of approximately $50,000,000 of securities and the creation of a new company, all of whose common stock will be owned by the Illinois Traction Company, which company will create a new first and refunding mortgage and an attractive preferred stock, which will make it possible to finance future requirements through the existence of securities guarded by conservative restriction. After having effected the reorganization and financing, the capitalization, subject to approval of the Illinois Commerce Commission, will be approximately as follows:

Divisional bonds (including Southern Illinois Light & Power bonds)	$36,414,800
First and refunding mortgage 6 per cent bonds	30,000,000
Thirty-year 7 per cent sinking fund debentures	10,000,000
First preferred 7 per cent cumulative stock, par $100	17,678,500
Participating preferred stock 6 per cent cumulative, par $50	1,865,500
Common stock, no par value	400,000 shares

All of the common stock of the new consolidated company will be owned by the Illinois Traction Company, the common stock of which will not be disturbed. It is expected that an offer of exchange will be made to the holders of the outstanding common stock of the Illinois Traction Company to exchange their holdings for securities upon which it is proposed to inaugurate dividends at once, the acceptance of such offer being optional to the stockholder.

The fact that a deal was pending such as is now outlined was referred to briefly in the ELECTRIC RAILWAY JOURNAL for March 2, page 384.

Reorganization of United Railways Investment Proposed

Reorganization of the United Railways Investment Company, by the division of its eastern and western subsidiaries into separate companies, is now being planned.

In the Eastern company would be combined the Philadelphia Company, Duquesne Light & Power and Pittsburgh Railways. It has been proposed that the new company purchase from the United Railways Investment Company $24,475,000 common stock of the Philadelphia Company, making payment in its common and preferred stock. To carry out this plan, a new issue of $10,000,000 bonds at 6 or 7 per cent and a new issue of preferred stock will be offered.

In the Western company would be grouped the United Railroads of San Francisco, Sierra & San Francisco Power and Coast Valley Gas & Electric Company.

North American Does Well

Net Addition to Surplus Was $1,766,672 After Making Very Liberal Appropriations

The consolidated income statement of the North American Company, New York, N. Y., and its subsidiaries shows a balance for depreciation, dividends and surplus of $11,303,731 for the year ended Dec. 31, 1922, compared with $6,711,141 for the previous year. In his remarks to the stockholders Frank L. Dame, president of the company, says that during the year several important public utility properties were added to those heretofore controlled, the most important being the Cleveland Illuminating Company. Mr. Dame explains that the earnings of these properties are not included prior to the date of their acquisition and the statement of the present earning power of the company is therefore on a conservative basis. During the year substantial progress was made in the development of the financial structures of subsidiaries in order that senior securities may be marketed under even the most adverse conditions.

Mr. Dame refers back to the report of the company for 1905 to reiterate the statement that the company holds the securities of other companies as permanent investments and seeks to establish them in the favor and confidence of the public by just methods and efficient administration and to maintain their finances on the most conservative basis. Notwithstanding large capital demands during the year, a materially larger distribution of earnings has been made to stockholders. Mr. Dame then recommends the increase in the authorized common and preferred stocks and the change in the par value of the common stock from $50 a share to $10 a share, referred to previously in the ELECTRIC RAILWAY JOURNAL.

CONSOLIDATED INCOME STATEMENT OF THE NORTH AMERICAN COMPANY AND SUBSIDIARY COMPANIES

	Year Ended Dec. 31, 1922	Year Ended Dec. 31, 1921
Gross earnings	$55,234,491	$38,853,189
Operating expenses and taxes	35,812,043	26,791,255
Net income from operation	$19,422,448	$12,061,934
Other net income	407,182	307,196
Total	$19,829,631	$12,369,130
Deductions:		
Interest charges	$6,667,283	$4,603,114
Preferred dividends of subsidiaries	1,318,172	684,565
Minority interest in subsidiaries	540,444	370,309
Total deductions	$8,525,899	$5,657,988
Balance for depreciation, dividends and surplus	$11,303,732	$6,711,142

In his report to Mr. Dame, Edwin Gruhl, vice-president and general manager of the company, calls attention to the fact that the gross earnings of the subsidiary companies for 1922 amounted to $55,234,491, an increase of $16,381,301, or 42.16 per cent. Of the total gross earnings 65.33 per cent was

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STATEMENT OF CONSOLIDATED SURPLUS OF THE NORTH AMERICAN COMPANY AND SUBSIDIARY COMPANIES, DEC. 31, 1922

Surplus, Jan. 1, 1922		$12,776,355
Additions:		
Balance for depreciation, dividends and surplus year ended Dec. 31, 1922	$11,303,731	
Other credits to surplus	953,268	
Total additions		$12,256,999
		$25,033,356
Deductions:		
Appropriations for depreciation reserves	$5,209,882	
Dividends on stock of the North American Company:		
Preferred stock	$1,061,998	
Common stock	1,857,088	
	2,919,089	
Write down in book value of securities	1,601,219	
Unamortized discount and or premium on securities redeemed or exchanged	661,439	
Miscellaneous charges	98,698	
Total deductions		$10,490,327
Surplus, Dec. 31, 1922		$14,543,029

derived from electric and heating, 18.63 per cent from railway, 4.04 per cent from gas, and 12 per cent from coal operations. Operating expenses and taxes amounted to $35,812,043, an increase of $9,020,787, or 33.67 per cent. Net income from operation amounted to $19,422,447, an increase of $7,360,513, or 61.02 per cent. Of net income from operation 76.58 per cent was derived from electric and heating, 12.46 per cent from railway, 3.13 per cent from gas, and 7.83 per cent from coal operations. The balance for depreciation, dividends and surplus amounted to $11,303,731, compared with $6,711,141 for 1921, an increase of $4,592,589, or 68.43 per cent. The corresponding balances for the three previous years were: 1920, $5,396,288; 1919, $4,580,701, and 1918, $2,549,864. The companies referred to as subsidiaries and included in the foregoing statements are only those companies of whose common stock more than three-quarters is owned by the North American company or its subsidiaries. Accordingly, gross earnings do not include revenues from very substantial interests in other utilities or industrials.

Mr. Gruhl says that the company has derived substantial revenues from investments, syndicate participations and underwritings. He explains that the greater part of these earnings has been applied to writing down book values of securities.

Total additions to surplus for the year 1922 from earnings and other sources amounted to $12,256,999. Of this amount $5,209,882 was appropriated for depreciation reserves, $2,919,087 was paid as dividends on preferred and common stock of the North American Company, $1,601,219 was applied to the writing down of book values of securities, and $760,138 was charged off on account of unamortized discount, etc. The net addition to surplus for the year was $1,766,672.

Four quarterly dividends, each of 1¾ per cent, were paid during the year on the preferred stock. The dividends on the common stock were increased to 2½ per cent quarterly beginning with the April 1, 1922, dividend, of which 1 per cent was paid in preferred stock at par and 1½ per cent in cash. The July 1 and Oct. 1, 1922, quarterly dividends on the common stock, each of 2½ per cent, were paid entirely in cash.

In conclusion Mr. Gruhl refers to the fact that upward of $25,000,000 of the securities of subsidiaries of the company are held by more than 33,000 residents of the territory they serve.

Railway Not Included in Deal for Light Plant

The property of the Piedmont Power & Light Company, Burlington, N. C., had been sold to Philadelphia and New York public service operators, according to the announcement. The power and light plant at Burlington has been in operation for thirteen years, being operated in connection with the Alamance Railway, a street railway connecting Burlington, Graham and Haw River.

The Piedmont Power & Light Company has been owned and controlled in the past by J. R. Paschall, Warner Moore of Richmond, Va., Junius H. Harden, John M. Cook and the State Realty Company of Burlington.

W. R. Dixon, formerly connected with the Kentucky & West Virginia Power Company, has been chosen manager of the concern under the new ownership. He comes from Logan, W. Va.

It is understood that the purchase price of the power and light plant was about $1,000,000. It is further understood that the sale of the power and light plant does not affect the Alamance Railway, an 8-mile line, which has been operated jointly with the power and light plant, and that the railway will be continued as usual.

Dubuque Property Bought

All the common stock of the Dubuque (Ia.) Electric Company has been purchased by Albert Emanuel Company, Inc., New York, N. Y. The new company has had much practical experience in directing various public utility enterprises. The Dubuque Electric Company operates the electric light and power and railway systems in Dubuque.

The new purchasers also acquired the majority of the outstanding stock of the Eastern Iowa Electric Company, which supplies light and power to a number of settlements near Dubuque. Albert Emanuel has been elected president of the Dubuque Electric Company to succeed I. C. Elston, Jr. O. H. Simonds, who is general manager, has in addition been elected vice-president and a director of the company.

Good Year in Columbus

Dividends Resumed by This Company and Securities Strengthened by Upbuilding of Property

The Columbus Railway, Power & Light Company, Columbus, Ohio, reports a profit and loss surplus for the year ended Dec. 31, 1922, of $1,467,196. This figure compares with $1,954,908 for 1921, but the 1922 figure takes into account dividend payments deferred from previous year. The comparative statement is as follows:

	1922	1921
Railway revenue	$3,611,590	$3,581,555
Power, light and heat revenue	3,880,440	3,386,611
Non-operating revenue	7,312	8,875
Total gross revenue	$7,499,343	$6,977,041
Operating expenses and taxes	4,497,289	4,366,757
Interest on funded debt	818,554	738,719
Interest on unfunded debt	12,342	4,375
Other deductions	77,627	130,162
Net income	$2,093,530	$1,737,029
Previous surplus	1,954,908	893,626
Other credits	234,210	56,138
Total surplus	$4,282,648	$2,686,792
Depreciation	972,000	528,000
Sinking fund	245,846	.....
Preferred dividends (in stock)	(a) 1,227,996	.....
Preferred dividends (in cash)	(b) 279,242	.....
Other debits	90,368	203,884
Profit and loss surplus	$1,467,196	$1,954,908

(a) Includes $392,376 paid in 6 per cent Series "A" preferred stock and $835,620 in 5 per cent Series "B" preferred stock on account of accumulations. (b) Includes $91,227 paid in cash on the 6 per cent Series "A" preferred stock and $188,015 on the 5 per cent Series "B" preferred stock.

Charles L. Kurtz, president of the company, says that the securities of the company have been strengthened by the upbuilding of its properties. During the past year additions and betterments representing a total expenditure of $1,930,946 were made. A large proportion of this total expenditure, namely $780,556, represented additions and betterments for track and roadway made in compliance with the obligations of the company to the city. In order to provide efficiently for the increase in kilowatt-hours sold, number of customers and connected load, it was necessary materially to increase the capacity of the transmission and distribution lines as well as the capacity of transformer and substation equipment. The items of cost, representing the additions and betterments for these purposes, approximated $1,095,001. Other additions and betterments to the properties amounted to $55,388 and represented expenditures for car equipment, office fixtures, etc.

The fares in Columbus have always been very low, and the company continues to operate its cars at a rate of fare which is much below that of other cities in Ohio, and greatly below the average of other cities in the country. The revenue passengers carried for 1922 showed a slight decrease over the number of revenue passengers carried during 1921. The transfer passengers showed a small increase over similar figures for 1921. The total passengers showed a very slight increase over the same period of 1921. The car mileage

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for 1922 totaled 9,021,094, showing an increase of 504,794 car-miles, or 6 per cent.

In presenting his report for the year President Kurtz referred to the so-called Slaymaker case. He said that in what is known as the Slaymaker case, the Court of Common Pleas of Franklin County, Ohio, on March 17, 1922, rendered a judgment against the E. W. Clark Company, Philadelphia, and the individual members thereof, in the sum of $1,512,570 with interest from Feb. 15, 1922. On March 31, 1922, he explains that the Clarks entered into a declaration and settlement of such an agreement, whereby securities of the value equal to the judgment were deposited with the Guarantee Title & Trust Company, Columbus, Ohio, which company signed the appeal bond as surety for the Clark defendents. On Oct. 10 and 11, 1922, upon the application of the Clarks the Court of Appeals heard further evidence in the case. On Nov. 9 and 10, 1922, the case was orally argued through the Court of Appeals. Printed briefs were also submitted to the Court of Appeals and the matter is now pending in that court for a decision. The progress of this proceeding before the courts has been reviewed previously in the ELECTRIC RAILWAY JOURNAL.

$319,724 Balance for Interborough in January, 1923

The Interborough Rapid Transit Company, New York, N. Y., showed a balance of $319,724 over expenses and fixed charges during January, according to a statement issued on Feb. 25 by Frank Hedley, the president. This was the first complete month under the new board of directors, chosen after the consummation of the plan of financial readjustment recently carried out. The net earnings of the Interborough for the month are shown by the following table:

Total revenues		$4,983,957
Operating expenses, taxes and rentals paid city for the old subway		3,450,116
Income available for all purposes		$1,533,641
Fixed charges:		
Interest on I. R. T. first mortgage 5 per cent bonds	$669,484	
Interest on Manhattan Railway bonds	150,685	
Interest on I. R. T. 7 per cent secured notes	183,866	1,004,038
		$529,803
nterest on I. R. T. 6 per cent ten-year notes	$8,143	
Miscellaneous income deductions	51,935	60,078
Earnings without deducting sinking fund on the I. R. T. Co. first mortgage 5 per cent bonds ($179,499 for January, 1923) which does not become operative until July 1, 1926, but which must be deducted from earnings before arriving at the sum available for dividends on Manhattan stock		$649,724
Dividend on $60,000,000 Manhattan stock at 3 per cent annual rate		150,000
Balance		$319,724

Referring to the reduction in the company's fixed charges under the plan of readjustment, Mr. Hedley continued:

With these reduced charges, despite the increase in the cost of doing business growing out of efforts to render better service to the public, in this month of January the company earned all of its operating expenses, payments to the city for rentals under Contracts 1 and 2, taxes, and one-twelfth proportion of its annual obligations under the plan of readjustment, with a margin as indicated in the statement of earnings and expenses.

As has been explained previously in the ELECTRIC RAILWAY JOURNAL, fixed charges do not include sinking fund on Interborough first mortgage 5 per cent bonds payment which, under the plan of readjustment declared operative July 1, last, is postponed until July 1, 1926. Postponement of sinking fund payments aggregating approximately $175,000 a month was assented to by holders of I. R. T. 5s in order to improve the company's cash position and temporarily to increase the amount of earnings available for betterments, additions and improvements.

13.07 per Cent Earned on Standard Gas & Electric Common

The preliminary statement of the Standard Gas & Electric Company, Chicago, Ill., for the year ended Dec. 31, last, showed a surplus after preferred dividends and reserves, available for the common stock, of $1,386,457 which is equivalent to 13.07 per cent on the outstanding common stock, as compared with $1,080,980, equivalent to 10.19 per cent on the common stock in 1921.

The revenues and expenses of the company for the twelve months compared with those of 1921 are as follows:

	1922	1921
Gross income	$4,759,702	$3,632,745
Expenses and taxes	107,586	68,624
Net income	$4,652,126	$3,564,121
Interest charges	1,840,704	1,367,753
Balance	$2,811,422	$2,196,368
Preferred dividends	1,074,965	990,388
Balance	$1,736,457	$1,205,980
Amort. and other reserves	350,000	125,000
Surplus	$1,386,457	$1,080,980

Seven Months Net Increase

Although the total operating revenues of the Brooklyn (N. Y.) Rapid Transit Company for the month of January, 1923, were $247,880 above those of January, 1922, the total operating expenses for the month in 1923 were $287,269 above those of a year ago, resulting in a decrease of $39,389 in net revenue from operation in January, 1923, as compared with January, 1922. The increase in operating expenses is due to the fact that included in the January, 1923, statement are charges aggregating approximately $150,000 for paving, track reconstruction and damage expenses on surface lines accrued as far back as 1920. In addition to these items, the cost of operation of the power plant increased from $268,820, in January, 1922, to $343,888, in January, 1923, largely due to the increased cost of coal this year.

For the seven months ended Jan. 31, 1923, the net income realized was $1,567,591, compared with $1,498,016 for the seven months period ending Jan. 31, 1922.

Broad Survey Planned

Engineer Names Nine Points Essential for Answer in Los Angeles Valuation

In connection with the proposed valuations of the railway properties in Los Angeles, Calif., to which reference was made in the ELECTRIC RAILWAY JOURNAL for March 3, it is considered that to a great extent the value of the properties of the Pacific Electric Railway has been completed, as data are available. These data were collected for the Hollywood rate case, conducted during the past eighteen months. This valuation covered both interurban and local lines operated by the company in four different counties in southern California. The Pacific Electric, as a matter of fact, operates local lines in seven other cities outside of Los Angeles.

As Richard Sachse, who will make the valuation, sees it, however, the valuation will have to be modified so as

1. To cover only such property of the company as is allocated solely to the company's local system in the city of Los Angeles.
2. To conform to such considerations of valution as should be applied when the question of sale and transfer of the property is at issue.

In the case of the Los Angeles Railway Corporation's lines locally serving the city of Los Angeles, Mr. Sachse states the task will be somewhat more extensive. This is due to the fact that the railway's property has not been valued since 1912. Since then the property has been greatly enlarged. Consequently, it will require a complete analysis of the property's financial status and its present earning power.

Briefly, Mr. Sachse believes that in order to draw sound conclusions it will be necessary:

1. To make a complete valuation of the Los Angeles Railway's properties to determine purposes of transfer for sale.
2. To make an evaluation for purposes of transfer or sale of such sections of the Pacific Electric Railway properties necessary for unifying of the lines in the city of Los Angeles.
3. To determine the purchase price the Los Angeles Railway shall pay to the Pacific Electric Railway, provided it is recommended that the former company take over the local system of the latter company in Los Angeles.
4. To determine the purchase price that the Pacific Electric Railway should and could pay to the Los Angeles Railway, provided it is recommended that the former company take over the entire local system of the latter company in the city of Los Angeles.
5. To calculate the results from the standpoint of service, fares, operating savings, revenues and expenses, provided the Pacific Electric Lines purchased the local lines of the Los Angeles Railway in Los Angeles.
6. To calculate the results from the same standpoint, provided the Los Angeles Railway purchased the local lines in the city of Los Angeles as owned and now operated by the Pacific Electric Railway.
7. To estimate the cost to the city of Los Angeles to operate the local lines of each of the respective companies separately or both lines, should the city elect to purchase either one or both of the properties in question.
8. To determine what the outcome or results would be from the same standpoint as outlined in paragraphs 5 and 6, provided the city of Los Angeles acquired and operated either one or both of the lines.
9. To determine a solution of the question of how necessary extensions can be taken care of under various possibilities, with respect to how it concerns railway extensions and bus line extensions.

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New York State Railways Has Good Year

The New York State Railways, Rochester, N. Y., made an excellent showing in the year ended Dec. 31, 1922, compared with 1921. Although railway operating revenue for the year decreased more than $190,000 railway operating expenses including depreciation decreased $824,359. Thus net revenue from railway operation increased $632,317. The surplus of $244,228 for the year was $97,426 less than in 1921, but in 1922 common stock dividends of $299,175 were paid whereas there was no payment of this kind in 1921.

In his remarks to stockholders James F. Hamilton, president of the company, explains that the company has further paid up all the arrears on the preferred stock which, at the beginning of the year, amounted to 18¾ per cent, paid the current dividend of 5 per cent, and 1¼ per cent on the common stock. He says an agreement was entered into with the employees covering wages and working conditions for one year from June 1, 1922, which involved a slight reduction in wages.

With respect to the application of the company for an increased fare in the city of Utica, denied by the Public Service Commission, Mr. Hamilton explains that this was reviewed and referred back to the commission by the courts for reconsideration, with the result that the fare was increased from 6 cents to 7 cents. At the same time the Public Service Commission adjusted the fares in the city of Syracuse from 8 cents cash and a 7¼-cent ticket rate to a flat 7-cent fare, thus making a 7-cent cash fare the prevailing rate in all the cities in which the company operates.

In April, 1922, the company sold $3,000,000 of its first consolidated mortgage 4½ per cent bonds bearing 2 per cent per annum additional interest not secured by the mortgage. The proceeds from the sale of these bonds permitted the company to refund two matured issues of underlying bonds aggregating $925,000, liquidate all its bank loans and accounts payable and partly to reimburse its treasury for capital expenditures made from income.

SUMMARY OF OPERATIONS OF THE NEW YORK STATE RAILWAYS

	1922	1921
Operating revenues	$10,500,220	$10,692,262
Operating expenses (including depreciation)	7,687,017	8,511,376
Net revenue	$2,813,203	$2,180,886
Auxiliary operations	1,544	1,261
Net operating revenue	$2,814,747	$2,182,147
Taxes assignable to railway operations	705,382	627,903
Operating income	$2,109,365	$1,554,244
Non-operating income	97,421	388,653
Gross income	$2,206,786	$1,942,897
Deductions from gross income	1,435,517	1,374,044
Net income	$771,269	$568,853
Sinking fund appropriations	34,740	34,073
Dividends preferred stock (5%)	193,125	†193,125
	$543,403	$341,654
Dividends common stock (1¼%)	299,175	.....
Surplus	$244,228	$341,654

† Paid in year 1922.

January Net Income Amounts to $70,558

For the month of January, 1923, the city of Detroit, Department of Street Railways, reported a total operating revenue of $1,712,228, against $1,650,927 for December, 1922. Included in total revenue is revenue from transportation, amounting to $1,620,210 in January, an advance of $59,547 over the transportation revenue for December. Operating expenses were $1,213,884 for December, compared with $1,221,492 in January of this year. The net revenue from railway operations was $490,736 in January and $437,043 in December. After necessary deductions the net income realized in January is reported as $70,558, against $47,271 in December, 1922. In December 38,258,194 passengers were transported and in January 40,167,868.

Toronto Award May Be Appealed

Reports from Toronto indicate that the award of $11,188,500 as the price to be paid by the city for the properties of the Toronto (Ont.) Railway may be appealed from by the city to the Privy Council in London. The president, Sir William Mackenzie, in a letter to stockholders states that if the award stands and no other contingencies arise the stock should be worth par or better. Expenses in connection with the arbitration proceedings have cut heavily into the balance of $1,000,000 expected from other properties over and above the award. The equivalent of about $33 a share for each $100 par value of stock must remain with the trustees of the $4,103 200 bonds of the Toronto Power Company until July 1, 1924, when they mature. The payment of these bonds has been guaranteed by the Hydro-Electric Commission, but under the sales agreement the deposit must remain with the trustee until the bonds are actually redeemed.

An abstract of the arbitration finding was published in the Electric Railway Journal for Feb. 10, page 247.

Auction Sales in New York.—At the public auction rooms in New York there were no sales of electric railway securities this week.

Surplus $334,625.—The net income of the Fort Dodge, Des Moines & Southern Railroad, Boone, Ia., for the calendar year ended Dec. 31, 1922, was $614,625 excluding depreciation. The balance or surplus was $334,625.

Traction Company Offers Collateral Bonds.—A syndicate headed by Tucker, Anthony & Company is offering at 92½ and interest to yield 7.06 per cent $2,365,00 Wilmington & Chester Traction Company's 6 per cent gold collateral trust bonds. In the public advertisement of the issue the purpose of the offering is not stated.

Net Income $99,682.—The Market Street Railway, San Francisco, Calif., for January, 1923, reports a railway operating revenue of $801 506 and operating expenses of $591,396. The net income amounted to $99,682.

Two New Directors for Bond & Share Company.—At the annual meeting of stockholders of the Electric Bond & Share Company, New York, N. Y., A. W. Burchard and C. E. Groesbeck were elected directors in place of Marsden J. Perry, resigned, and William C. Lane, deceased.

Large Advance in Tax Valuation in Ohio.—In the last twelve years there has been an advance of 446 per cent in tax valuations of public utility properties in Ohio. In 1910 the tax valuation on street, suburban and interurban railways amounted to $32,693,904 and in 1922 the figure was $198,362,040, an increase of 506 per cent.

January Net Income Lower.—The Eastern Massachusetts Street Railway, Boston, Mass., made a substantial gain in revenue in January as compared with the corresponding month a year ago, with a reduction in its fixed charges. The net income, however, was only $86,830 for January, 1923, as against $104,479 in January, 1922.

Net Income Increases.—The net income of the Philadelphia (Pa.) Rapid Transit Company for January, 1923, was $250,100, against $234,400 in January, 1922. The passenger revenue increased from $3,363,926 to $3,625,768 in January of this year. The number of passengers carried increased from 68,147,370 in January a year ago to 74,857,899 in January of the current year.

Bonds Offered. — Halsey, Stuart & Company, New York, N. Y., are offering $6,770,000 of first lien and refunding convertible 6 per cent gold bonds, series A, of the Monongahela West Penn Public Service Company. The bonds are dated Feb. 1, 1923, and are due Feb. 1, 1928. The price is $97.89 and interest to yield 6.50 per cent. The proceeds from this issue of bonds are to be used to retire $6,258,500 of 7 per cent bonds due July 1, 1923.

American Public Utilities Plan Approved.—The stockholders of the American Public Utilities Company, Grand Rapids, Mich., have approved the plan for the reclassification of the capital stock. As announced previously in the ELECTRIC RAILWAY JOURNAL the plan provides for the retirement of the present $4,268,200 of cumulative preferred stock and issuance of two other classes aggregating 110 per cent of the present preferred outstanding so as to fund the accumulated dividends and the scrip issued in lieu of dividends amounting to $1,406,758, which amount will constitute the only present increase in the capitalization of the company. Of the two classes to be issued under the plan, one will be a 7 per cent prior preference on which dividends will begin immediately and the other will be at the step rate of 4, 5, 6 and 7 per cent during the next four years.

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Traffic and Transportation

Pass Successful in Terre Haute

More Revenue and More Rides with Fewer Car-Miles Offset Disadvantage of Coal Strike

Although the Terre Haute lines of the Terre Haute, Indianapolis & Eastern Traction Company sell the unlimited ride weekly pass at the highest multiplier known, namely, the cost of twenty fares, the company has been most successful in demonstrating that the high riding index obtained through short headway operation, safety cars and 5-cent fares can be stimulated still further. Figures compiled by E. M. Walker, general manager Terre Haute Division, show that for the first eight months of the pass—May 1 to Dec. 31, 1922, inclusive—the riding increased 7 per cent and the revenue 0.4 per cent. This occurred in spite of the fact that the great coal strike begun on April 1, 1922, made itself felt in Terre Haute business about the time that the pass was started and continued a depressing factor until September.

What is still more remarkable is that the revenue for all of 1922, including the five months before the pass, actually was 1.21 per cent below the year 1921 and the traffic correspondingly less, inasmuch as the fares in the pre-pass months of each year were the same. An accompanying table shows that for the first eight months of the pass there was an increase in revenue from $435,728 in 1921 to $437,349 in the same months of 1922. The number of customers rose from 10,479,417 to 11,295,320.

Another table shows that much better results are being obtained in the opening of 1923 as compared with the first seven weeks of 1922. The increase in revenue was from $88,136 to $94,559, or 6.8 per cent, while passenger traffic grew from 2,110,815 to 2,378,957, or 11 per cent. Expressed in another way, the number of rides per inhabitant per annum increased from 235.8 to 265.9. This means that more than thirty rides per inhabitant were added as compared with the passless period of 1922.

During the first eight months of the pass the mileage was slightly higher (2,053,211, against 2,016,711) than the same period of 1921, but the record for the first eight weeks of 1923 is lower than the first eight weeks of 1922, namely, 488,530 car-miles against 497,203 car-miles. Revenue increased 7 per cent, while car-miles dropped 1.7 per cent.

The net rides per pass, after allowances made for transfers, ranges between four and one-quarter and four and one-half a day. Therefore, the pass rider in Terre Haute actually gets a through ride for something like 3½ cents—the lowest electric railway fare in America.

The pass, of course, is bought almost entirely by residents with a definite riding need. For this reason, no passes are on sale on the cars after Wednesday of the week of use. Recently, however, a traveling man called at the city office on a Saturday morning and insisted that he be permitted to buy a pass. He said he felt sure he would get ample value for his money even though he had but Saturday and Sunday in which to make use of his purchase. This indicates that some people must purchase the pass purely as a matter of convenience.

TERRE HAUTE BEFORE AND AFTER WEEKLY PASS
Started May 1, 1922
First Seven Weeks — 1922 and 1923

	1922	1923	Per Cent Inc.
Revenue, city lines	$88,136	$94,559	6.8
Pass rides	.....	332,356	...
Cash fares	1,760,668	1,689,439	...
Transfers	350,147	357,162	...
Total passengers	2,110,815	2,378,957	11
Passes sold	None	10,030	...
Average per week	None	1,433	...
Riding index per year	235.8	265.9	

EIGHT MONTHS, MAY 1 TO DEC. 31, 1921 AND 1922

	1921	1922	Per Cent
Revenue, city lines	$435,728	$437,349	0.4
Pass rides	.....	1,659,840	...
Cash fares	8,647,799	7,808,595	...
Transfers	1,831,618	1,826,885	...
Total passengers	10,479,417	11,295,320	7.2
Passes sold	None	46,920	...
Average per week	None	1,340	...
Riding index per year	238.6	254.7	

Total revenue of 1922 was 1.21 per cent less than 1921.

Jitneys Will Replace Discontinued Railway Line

A jitney service has been organized to take the place of the Concord, Maynard & Hudson Street Railway, which went into the hands of receivers about a year ago and then was ordered discontinued by the court because the road could not be made to pay.

The Concord Board of Selectmen has adopted a set of jitney rules, and has granted a jitney license to John F. Lovell, Woburn, Mass., who already is running a line of buses between Woburn and Reading, where the Eastern Massachusetts Street Railway tore up its tracks several years ago for lack of sufficient income from the service to pay costs.

It has been arranged for Mr. Lovell to start his jitney service at once in Concord, with three buses, to run on regular schedules and cover the same routes that the Concord, Maynard & Hudson Street Railway covered, and a few side streets in addition. The fares for adults will be 10 cents between Concord and Concord Junction, and there will be 5-cent routes, and 5-cent fares for school pupils.

Inquiry Resolution Lost

Senator McKellar Fails in the Effort to Appoint Committee for District—Material Sought Now Available

The resolution of Senator McKellar of Tennessee to create a special Senate committee to investigate various questions affecting the rate of fare in the District of Columbia, which was regarded as a national affair, inasmuch as it would have created a precedent, failed of adoption in the closing hours of the Sixty-seventh Congress when objection to its consideration was entered by Senator McKinley of Illinois.

When objection was entered, Senator McKellar asked that the objection be withdrawn. He said:

> The street car compaines have advertised here in the city of Washington in the newspapers that they courted an investigation, and I am sure they would not go back on their published statement. I hope the Senator will not object to the resolution.

Senator McKinley, however, renewed his objection. He said:

> The reading of the resolution at the desk causes me to object. If the Senator will take the trouble to write to the various public utility commissions he can get all the information the resolution calls for. The resolution provides for traveling all over the United States, bringing witnesses from all over the country to Washington, securing papers and general information which the Senator or any one interested can obtain from any of the public utility commissions in the United States.

As this occurred within a few hours of the end of the Congress, there was no further opportunity to renew the subject on the floor.

Data Sought All Available Now

The resolution was introduced by Senator McKellar as the climax of an effort he had been making for some weeks to bring about a restoration of 5-cent fares on the railways of Washington. The Senator from Tennessee, where the State Public Utilities Commission has been under fire in a recent political campaign in which Senator McKellar participated, has engaged in a newspaper controversy with members of the District of Columbia Public Utilities Commission following assertions by him on the floor of the Senate that the commission had exceeded its authority in granting an increase in fares to 8 cents cash and six tokens for 40 cents. Senator McKellar had charged that higher fares violated the franchise contracts and that they are unnecessary now, whatever may have been the case during the war. He had made several efforts to attach riders to various District of Columbia bills calling for a restoration of the 5-cent fare, with six tickets for 25 cents, before he introduced his resolution.

The resolution would have authorized a special committee to investigate the whole question of franchise rights of the electric railways in the District of Columbia, stock issues of the companies and their predecessors, the powers of the Public Utilities Commission, similar powers of other commissions and a wide range of related subjects, with directions that the committee report its conclusions regarding fares to the next Congress.

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Controversy Settled—Railway Will Supply Service

In the controversy between the Boston (Mass.) Elevated Railway and the city government of Malden, previously reported in the ELECTRIC RAILWAY JOURNAL, Mayor Kimball of Malden yielded to the elevated and refused to sign an order from the City Council authorizing jitney competition with the railway.

As a result the competing jitney service will be withdrawn from Salem Street, where it has been operating, and the elevated will not only continue its car service there but will introduce bus service at various points as feeders. Mayor Kimball sent the following letter to the trustees of the railway in reply to the letter which the trustees had sent to him:

Believing the settlement of the jitney question to be a matter of vital importance to a large section of the city, I have taken time to consider it carefully.

While the section east of Malden Square is vitally affected this condition also affects the entire city because loss of elevated service here means a curtailment of service in other parts of the community, and, after all, no one can deny that we must, for the present at least, depend upon the Boston Elevated Railway for electric car transportation to and from Boston—this section in common with the rest of the city.

This service is necessary, whereas a competing jitney simply to and from Malden Square is not necessary.

With the present car service improved, as it will be, and an elevated jitney running to Linden, which will be put on as soon as cars can be obtained, I believe this part of the city will have adequate service.

Moreover, it must be remembered that under the present public management of the elevated, every taxpayer has a financial interest in it and should be concerned in its successful operation.

To remove this electric car service from the eastern section of the city would impose a severe hardship upon a large number of people, and, unfortunately, upon those least able to bear it; beyond this the loss in property value must be considered.

Therefore, with a full knowledge of all the facts and considering carefully the appeals of those most vitally affected, I cannot conscientiously see my way clear to sign a competing jitney license and shall not do so.

In reaching this conclusion I wish it distinctly understood that there has been no attempt made to dictate to me by any one and such charges are only malicious propaganda. I have sought only to reach a decision which I believed would be best not only for that section particularly concerned but also for the entire city.

Fare Hearings Begun

The Public Service Commission has started to hold a series of hearings in Buffalo on the complaint of the municipal authorities against the rate of fare now charged on the local lines of the International Railway. The municipal authorities hope for the return of the 5-cent fare. Seven cents or four tokens for 25 cents is now charged by the company. At the initial hearing before the commission experts on behalf of the International presented evidence tending to prove that the valuation of the company is $96,539,165. W. K. Meyers, valuation manager of Mitten Management, Inc., and the Philadelphia (Pa.) Rapid Transit Company, identified the bound volumes, consisting of maps, cost sheets, etc., in order to substantiate the valuation figures. Land owned by the railway company in Buffalo, exclusive of buildings, was valued by realty experts at $1,936,000. On the rights-of-way outside the city, but near by, the experts placed a valuation of $1,111,000.

Among those who attended the hearing were C. J. Joyce, chief counsel for the Mitten interests in Philadelphia; Thomas Penney of Penney, Killeen & Ney, attorneys for the International and former president of the company; Herbert G. Tulley, president, and others. The case has been pending before the commission since 1918.

500 Jitneys Operate in Detroit Under Protection of Injunction

Jitneys are operating on the main thoroughfares of the city of Detroit under their 1922 licenses in spite of the ordinance passed by the City Council and approved by former Mayor James Couzens. The intention of this measure was to banish the jitneys, Oct. 1 last, from the streets on which there are car lines. The service now handled by the jitneys over Woodward Avenue, Jefferson Avenue, Grand River Avenue, and Fort Street is a result of an order issued by Judge Moynihan on Sept. 30, in the form of a temporary injunction restraining the Mayor, police commissioner and the sheriff from enforcing the ordinance.

The petition for the order was taken to Judge Moynihan by officers of the Red Star Motor Driver's Association and the Blue Ribbon Auto Driver's Association. The contention was that the ordinance was "unreasonable and arbitrary" and unconstitutional in that it extended immunities and privileges to one portion of a certain class and denied such immunities and privileges to others. It was sought to substantiate this statement with the assertion that buses owned by the Detroit Motor Bus Company were "allowed to operate on the several streets and avenues of the city of Detroit giving the same service and receiving the same fare as is prohibited the jitneuers." At the time jitney service was to have been stopped there were approximately 510 in operation. This number has been somewhat decreased so that there are now between 400 and 500 jitneys in operation.

A petition was filed in the Circuit Court by Corporation Counsel Clarence E. Wilcox in an effort to dissolve the injunction against the city of Detroit which restrained the officials from enforcing the new ordinance. The hearing on the motion was postponed, both sides being agreeable at the time to having the hearing adjourned.

Action on a proposed jitney and bus ordinance for the city of Highland Park, where the Ford plant is located, was postponed following a conference of the City Council with representatives of the transportation men. A loading station plan, designed to eliminate all objectional features of the bus and jitney traffic, was put into effect. Two loading stations were established in front of the Ford plant.

Mayor Wants Buffalo Motorized

Gradual replacement of trolley cars by motor buses by the International Railway in Buffalo is proposed by Mayor Frank X. Schwab. The problem already has been discussed by the Mayor with Herbert G. Tulley, president of the International, and other railway officials. Mayor Schwab's plan is to have the traction company purchase two motor buses as each trolley car becomes worn out. It was declared that 800 buses would provide adequate service for the city. Rails and wires would be removed as the service gradually becomes motorized, which Mayor Schwab thinks would be within three years.

Buffalo's Mayor has gone to the extent of obtaining tentative figures on the cost of the plan. Motor buses have been offered to the city at $6,000 each and the Mayor believes they could be purchased as low as $5,000 if bought in large lots. The Mayor believes that $8,000,000 would adequately motorize the railway company's lines in Buffalo. Mayor Schwab says that the speed of motor buses is from 25 to 50 per cent greater than electric cars.

All of the Buffalo newspapers used Mayor Schwab's plan to motorize the traction service in Buffalo as the basis of extended editorial comment. Under the caption of "Is the Trolley Extinct?" the *Express* said in part:

Are the present transportation troubles a struggle between electric power and gasoline, like the old effort of the trolley to displace the horse car? The Mayor evidently thinks that is the case and is advising the company itself to be the medium for the transformation. But a lot of ideas look good on paper which do not work out well in practice. Buffalonians will need a few years to think on the subject and some demonstrations before they will conclude the trolley car is a back number.

"Scrapping the Trolley" is the caption of the editorial appearing in the *Commercial*. It said, in part:

While there is much to be said for the motor bus as an instrument for supplement service, street car corporations will be slow to scrap the trolley. In the first place, the street car as now operated is the cheapest unit that has yet been devised for this sort of transportation. The motor bus may be operated more speedily, but when the Mayor talks about a 5-cent fare in a gasoline motor car he is talking what he would like to see done, not about what has yet been accomplished.

"It might be feasible for the International to run a line of buses on the main arteries of traffic during rush hours to relieve the trolley car congestion for those who do not object to paying a 10-cent fare and are willing to run the risks incurred and put up with certain inevitable inconveniences. But it will be a long time before the trolley is thrown upon the junk pile where the old horse car now lies."

Washington Company Seeks to Justify Use of One-Man Cars

The Public Utilities Commission of the District of Columbia will send its traffic engineer, R. G. Klotz, on an inspection tour of other cities where one-man cars are in operation before deciding the fate of that type of conveyance in Washington. This was intimated by Col. Keller, chairman of the commission, on Feb. 21, after listening all day to testimony for and against the one-man car.

Practically the entire afternoon ses-

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sion was devoted to the presentation of evidence by the Washington Railway & Electric Company to refute arguments advanced by citizens' associations that one-man cars are unsafe, uncomfortable and slow in getting over the rails.

John H. Hanna, vice-president of the Capital Traction Company, made a strong witness for the Washington Railway & Electric Company. Although his company does not operate one-man cars, Mr. Hanna said:

> If we were in the market for new equipment we probably would buy that type of car. I believe there are some of our lines where one-man cars could be operated today.

William F. Ham, president of the Washington Railway & Electric, presented voluminous testimony to show that one-man cars he is operating are the most modern cars of that type in the country, and that they are safe. He testified that the company will have seventy one-man cars in service this year and should save approximately $150,000 by their use. In answer to questions from William McK. Clayton of the Federation of Citizens' Association Mr. Ham testified that this saving would not make possible an immediate reduction in fare.

The company called to the stand Henry G. Bradlee of the Stone & Webster properties and C. E. Morgan, vice-president of the Brooklyn (N. Y.) surface lines, to testify to the successful operation of one-man cars outside of Washington.

Five-Cent Fare in Seattle—First Day Shows Increased Traffic

The Seattle (Wash.) Municipal Railway on March 1 returned to the 5-cent fare. The first day's receipts showed a slight increase in traffic on most of the lines in the city. This was particularly true on short hauls. The 5-cent fare is the "straight" fare; transfer tokens are sold at 6¼ cents or four for 25 cents. These transfers are good for use from one car line to another, and in addition a second transfer may be obtained on the 6¼-cent fare, if a double transfer is necessary.

The fare for school children remains at 3 cents cash or 2¼ cents with tokens. Children under fifteen years of age, upon presentation of certificates signed by their Sunday school superintendent, may ride between the hours of 7 a.m. and 2 p.m. on Sundays at the regular school fare. Transfers are issued upon the payment of 5-cent fare to and from the feeder lines in the city. However, when issuing the transfer, conductor detaches a coupon, indicating that no further transfer privilege is to be allowed.

On the Lake Burien line outside the city limits two tokens will be used, one white metal, for the regular fare, and the other bronze metal if a transfer is desired. The white token is for the ride to the city limits, the bronze for the city ride and transfer.

With the passage of an emergency ordinance, the City Council provided for a 5-cent fare on the municipally owned bus lines, with the same transfer privileges to and from the buses as to street cars. A passenger may now board a bus at one end of the town, transfer to a street car line, transfer to another car line downtown and to a bus line at some other point in the city, all for the payment of 6¼ cents.

D. W. Henderson, superintendent of the railway, announces that if an increase in traffic justifies, railway service can be increased at least 20 per cent at once. Fifty additional cars now undergoing slight repairs can be placed in operation on short notice.

Fare Ordinance Defeated — No Restoration of Service in Sight

At a special election in East Liverpool, Ohio, on Feb. 27, a councilmanic ordinance granting the Steubenville, East Liverpool & Beaver Valley Traction Company a fare increase in Liverpool was defeated, lagging 250 votes behind. The defeat of the measure practically means the end of overtures for restoration of street car service, suspended since May 1.

When the final count was made after the election the vote for the ordinance was 2,277, and 2,527 votes were cast against its passage. It carried by a narrow margin in the downtown wards, but the East End, the stronghold of the street car men, dealt the measure its death blow. A bitter fight had been waged previous to the special referendum by those for and against its passage. Despite the apparent interest in the controversy, the vote polled was lighter than that when the city defeated an ordinance containing the public utilities clause.

The ordinance voted on a proposed 7-cent city fare, a 10-cent intercity fare and a 1-cent transfer. It was a councilmanic ordinance, the passage of which, it was thought, would bring an end to the traction tie-up, which on election day entered its 103d day.

With the defeat of the ordinance the end of the tie-up seems more remote than ever. The failure of the measure nullifies the final step taken by the City Council to restore traction service, and since the company and its employees have failed to reach a pre-election agreement, all hope of an early settlement has dwindled.

When they learned the result of the referendum the traction officials declared that it appeared as though the people of East Liverpool did not want street cars. It was declared that the people would have their wish.

The traction company officials reiterated their statements that no attempts would be made to operate cars, stating that not a single move would be made to give the city car service until it manifested a desire for it.

After the measure was defeated there was a suggestion that the ordinance might be passed by the Council with an emergency clause, but the general belief is that that will not be the case and that the ordinance will receive no further consideration.

Wants to Try Pass Plan.—The Walla Walla (Wash.) Valley Traction Company has applied to the Department of Public Works for permission to experiment for thirty days with the $1 weekly pass system on its line. The company now charges a 10-cent cash fare and asks the privilege of trying the pass system with authority to return to cash fare if results are not satisfactory.

Have Extended Bus Service.—Motor bus operation between DeKalb and Geneva, Ill., has now been extended to Aurora to cover the entire territory of the Chicago, Aurora & DeKalb Railroad which recently, discontinued service. J. E. Joseph, who purchased the traction line, was allowed ninety days by the court to determine whether to junk the line or resume operation.

Syracuse Baiting Its Railway Again.—The announcement of a surplus of $244,228 for the New York State Railways for 1922 after the payment of charges, taxes and dividends was the signal for a new attack for a lower fare by the city authorities. Corporation Counsel Frank J. Cregg, who has been leading the fight for a 5-cent fare, said that the report showed more than a "good return." He is also demanding restoration of two-man cars. Adrian M. Landman, adviser to the city, will investigate the company affairs in connection with the expiration of 7-cent fare period on April 1.

Returns to Higher Fare.—Fare in Waterloo, Iowa, was raised from 7 cents to the old charge of 10 cents in March, C. D. Cass, president of the Waterloo, Cedar Falls & Northern Railway, notified the City Council. In December last year the company agreed upon the recommendation of the Council to lower the fare to 7 cents for a two months test period to determine whether or not such a move would increase the revenue of the company by inducing a larger number of people to ride. Monthly and daily reports of the number of passengers carried and the gross revenue submitted to the Council disclosed the fact that the number of passengers did increase slightly but that the volume of increased riding was not sufficient to change the financial result.

Hearing on Railways' Rights to Run Buses.—A hearing was held recently on the bill introduced in the New Jersey Legislature granting permission to electric railways to operate buses. The bill was drawn by Assemblyman David F. Barkman at the request of Otto G. Schultz, manager of the Morris County Traction Company, Dover. Mr. Schultz, in discussing the bill, said that a traction company may wish to use the bus in supplementary service in territory where trolley lines could not profitably be built, and that these extensions should be in the hands of responsible people. So far as his company was concerned it was in the transportation business and wished to give the public the best possible service. As Mr. Schultz saw it the bill was in the interest of the public. He appealed to the members to pass the measure.

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Personal Items

Chris Dahl, Master Mechanic

Muskegon Man Has Served Local Railway There Thirty-five Years—Sons Also with Company

Chris Dahl, aged seventy-three, is probably the oldest master mechanic, both in point of service and years, employed by an electric railway in the United States. Mr. Dahl does not believe in changing jobs. He started to work for the Muskegon Traction & Lighting Company, Muskegon, Mich., in 1888, when horse cars were in use. He is still at work for the company. Not only has Mr. Dahl held the job for thirty-five years, but he lives in the house he constructed for himself in 1871 across from the carhouse.

Chris Dahl

"I don't believe in changing jobs if you are satisfied," said Mr. Dahl as he knocked off work at the shops the other day. "I have always remained here, for I like my work."

In view of the fact that the local line at Muskegon was the first in Michigan to adopt electricity and one of the first in the United States to use that form of propulsion, Mr. Dahl comes by his record without much chance for dispute.

"In 1888," said Mr. Dahl, "I started keeping the old horse cars in shape. In 1891 the horse cars gave way to the queer machine propelled by electricity. State officials were here that day and great crowds gathered to see the strange car. Just after the car started it come to a stop. No one could learn the cause. There were shouts to bring out the horses and much good natured joking. Finally, somebody placed the trolley on the wire and the car was started again, amid applause.

"People lined the streets for days in order to ride on the cars. Joy riding was a popular sport in those days just as it is now, only the vehicle then was a different one from that used now. I remember the next year Battle Creek obtained its electric line. They were still using horse cars in Detroit and most other cities.

"You know, we didn't know much about electricity in those days. There were no books on the subject or instruction such as the present worker has. You had to experiment. It was the only way to learn. Often in those days something happened and it took hours to learn the trouble.

"People didn't complain in the old days as much as they do at present. it seems. They accepted things with better grace. All the tools I had in the shop at first were a grindstone and a hand drill. Most of the work was sent out to shops."

Mr. Dahl has seen twelve superintendents go and come during his time and he recalled that as a little girl the mother of E. H. Hammer, present secretary and treasurer of the company, was present at his wedding. Mr. Dahl has been quick to appreciate new machinery, and he is always pleased when the latest tools are purchased by the company for use by him on his job.

The aged mechanic supervises all the work at the local shop and he takes great pride in the ability of his two sons, Alfred and Oscar, who are his assistants.

"Mighty good boys, but they still come to me when they get stuck on a job," said Mr. Dahl with a smile.

Mr. Ready Succeeds Mr. Sachse on California Commission

Lester S. Ready has been made chief engineer of the California State Railroad Commission. He succeeds Richard Sachse, resigned, who will take up private practice in Los Angeles and handle the appraisal of the local lines of the Los Angeles Railway and the Pacific Electric Railway in Los Angeles with a view of the unification of the properties of these two systems so far as local service in Los Angeles is concerned. Mr. Ready is thirty-four years of age. He has served for ten years as an assistant engineer on the commission, in which capacity he has devoted a large amount of time to the gas and electrical division of the commission's engineering department. In October, 1919, Mr. Ready was promoted from assistant engineer to assistant chief engineer. He was graduated from the University of California in 1912. He is a native of California.

O. R. Hill, formerly master mechanic of the Rockford & Interurban Railway, Rockford, Ill., has now the title of superintendent of equipment.

W. A. Underwood has succeeded O. W. Rudin as electrical and signal engineer of the Chicago, Lake Shore & South Bend Railway, Michigan City, Ind.

R. W. Williams District Manager

Appointed by Westinghouse Air Brake Company to Succeed the Late Mr. Adreon in Southwest

R. W. Williams has been appointed to the office of Southwestern district manager for both the Westinghouse Air Brake Company and the Westinghouse Traction Brake Company, with headquarters in St. Louis. This is the position recently made vacant by the sudden death of R. E. Adreon, who, in addition to his duties as president of the American Brake Company, had held the title of acting Southwestern manager since C. P. Cass left the St. Louis office of the Air Brake Company several years ago to become president of the Westinghouse Pacific Coast Brake Company, at Emeryville, Calif.

Coincident with the announcement of Mr. Williams' promotion in the Air Brake Company, the American Brake Company announced his election as vice-president of that organization.

R. W. Williams

Mr. Williams has been connected with the Westinghouse Air Brake Company since April 1, 1902, when he went to Wilmerding to accept the position of secretary to John F. Miller, now vice-chairman of the board of directors.

Mr. Williams was born in Renovo, Pa., in 1878. His boyhood was spent in Williamsport, Pa., where he attended public school. He was graduated from high school with the class of 1897 and immediately entered the employ of the Pennsylvania Railroad, serving in the freight and maintenance-of-way departments at Williamsport until joining the Air Brake Company.

After remaining in the general offices of the Air Brake Company at Wilmerding for seven years, he was transferred to the Southeastern district office in Pittsburgh. In 1910 he went to the Cincinnati office and two years later was appointed representative and assigned to the Atlanta office. He returned to the Pittsburgh office in September, 1920, where he has served since.

Mr. Williams is widely known in railway and traction circles and is actively identified with a number of clubs and

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associations, among which are included the American Electric Railway Association, the Central Electric Railway Association, the Air Brake Association, Railway Club of Pittsburgh, Pittsburgh Athletic Association and the Edgewood Country Club.

Change in Dubuque Officers

Albert Emanuel Heads Dubuque Electric Company, with O. H. Simonds Vice-President

At a recent meeting of the board of directors of the Dubuque (Iowa) Electric Company, I. C. Elston, Jr., president of the company for the last seven years, withdrew from any further active connection with the operation of the local utility.

The action is a further manifestation of Mr. Elston's desire to relieve himself of the cares and responsibilities which for many years have rested upon him. More than a year ago he withdrew from the presidency of the investment banking house of Elston, Allyn & Company. About the same time he disposed of his utility property at St. Charles, and more recently turned over the management of the electric light and street railway company at Vicksburg, Miss., to operators and owners of several other utitlities in the South.

Mr. Elston has been succeeded as president of the Dubuque company by Albert Emanuel, New York, chief executive of utility companies elsewhere in the West and the purchaser of a controlling interest in the Dubuque Company as noted elsewhere in this issue.

O. H. Simonds, general manager of the company at Dubuque for the last five years, will continue in that position, and in addition becomes vice-president of the local company and a member of its board of directors. This means that much company business formerly handled at Chicago will hereafter be done in Dubuque. Mr. Simonds said:

> The change in presidency of the company will not affect the policy of the present management or the local personnel of the company. As heretofore, we always will have the best interests of the city at heart. In fact, there is a community of interest between any city and its utility companies, for one cannot prosper without the other. We desire sympathetic co-operation and assistance to help us to serve the people of Dubuque adequately and satisfactorily and to aid in the progress of our city.

James Stewart has succeeded J. H. McCahan as roadmaster of the Topeka (Kan.) Railway.

F. W. Broerman has replaced John Moore as roadmaster of the Chicago, Ottawa & Peoria Railway, Ottawa, Ill.

Robert W. Vote has replaced George W. Wilson as auditor of the Evansville & Ohio Valley Railway, Evansville, Ind., and of the Owensboro City Railroad, controlled by the former property.

B. B. Kraus has succeeded D. Zerhusen as purchasing agent of the Washington, Baltimore & Annapolis Electric Railroad, Annapolis, Md. H. T. Connolly, formerly superintendent of power, is now electrical engineer.

Mr. Masengill Appointed Superintendent

W. T. Masengill was made superintendent and general freight and passenger agent of the Pacific Coast Railway, San Luis Obispo, Calif., on Feb. 1. This promotion came after only seven months' service with the company as Mr. Masengill entered its employ in July, 1922, as assistant superintendent. In his new capacity he succeeds J. M. Sims.

Mr. Masengill's association with railway work began in 1897, when he entered the employ of the Southern Pacific Company on its coast division as agent-telegrapher. In 1901 he was promoted to train dispatcher at the office in San Francisco. He served also as chief dispatcher in San Francisco, Tucson, Ariz., Guaymas, Mexico, and San Luis Obispo, Calif., until July of last year, when he joined the forces of the Pacific Coast Railway. The latter property, which operates a little more than 100 miles of track, connects Guadalupe and Santa Maria.

W. T. Masengill

Railway Man of Long Experience Represents Manufacturer

George A. Saylor, has recently been appointed Western sales manager of the electrical division of the Johns-Pratt Company, Hartford. Mr. Saylor accepted his first important position in the electric railway industry in 1900, when he became general superintendent of the Indianapolis, Columbus & Southern Traction Company, in which capacity he served for six years. At that time Mr. Saylor enjoyed the distinction of being the youngest traction superintendent in the United States.

In 1906, when Johns-Manville, Inc., sought sales representation in the West, Mr. Saylor was selected to serve in its electrical department, rising to the position of manager of the electrical, automotive equipment and specialties departments of that company. He devoted much time and effort during these years to advancement of the industry in general, and was particularly active in the Sons of Jove, serving as statesman and Jupiter of the Wisconsin order of that organization. During these years he made a comprehensive study of protective devices, particularly fuses, specializing in the Noark lines, which were at that time sold through Johns-Manville, Inc.

It was logical of Mr. Saylor to accept the position of Western sales manager of the Johns-Pratt Company, for although this meant a change in the name of his principals, he continues to handle the same products, as the Johns-Pratt Company manufactured the Noark line of electrical protective devices and molded insulation from their inception as marketable products.

J. M. Yount, master mechanic of the Market Street Railway, San Francisco, Calif., has been nominated for election to the office of first vice-president of the Pacific Railway Club.

T. G. Hamilton, formerly general superintendent and purchasing agent of the Gary (Ind.) Street Railway, is now performing the duties of vice-president, superintendent and purchasing agent. J. P. Gannon is master mechanic.

Frank D. Conley, formerly superintendent and chief engineer of the DeKalb, Sycamore & Interurban Traction Company, is now known as division manager. Charles Glossof is chief engineer and Elmer Reese is electrical engineer.

Obituary

William Penn White

William Penn White, identified for the last eleven years with the railway department of the General Electric Company at its New York office, died in the Garfield Hospital, Washington, following a major operation. It was while attending the midwinter convention of the American Electric Railway Association in Washington, D. C., that Mr. White first developed the sickness which caused his death on March 6.

Mr. White was born in Washington in 1876. After being graduated from the Lehigh University with the degree of electrical engineer, he entered the employ of the General Electric Company at Schenectady. He served in the testing department, calculating and drafting department and then transferred to the railway engineering department. He was in this work until June, 1912, when he was transferred to commercial work in the railway department of the company in New York. Since his transfer he has been engaged in the activities of the railway department in the Metropolitan district and vicinity.

Mr. White was a member of the American Institute of Electrical Engineers and was also a member of the Engineers' Club of New York and of the Mohawk Club of Schenectady. He had just completed a term as president of the General Electric Club of New York. Mr. White is survived by his wife and three daughters.

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Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Details of Philadelphia Order for 576 Cars

On Jan. 22 the board of directors of the Philadelphia Rapid Transit Company authorized the lease and purchase by car trust agreement of 576 new cars of which 520 will be passenger cars. A brief note in regard to this order, which is said to be the largest single order for trolley cars ever placed in this country, was made in the Jan. 27 issue of the ELECTRIC RAILWAY JOURNAL. Details regarding these cars and their equipment are now available. Three hundred and eighty-five of these cars are to be for single-end operation and 135 for double-end.

The exact design of the double-end cars has not yet been decided, but the accompanying illustration shows a seating plan and elevation for the single-end type. As will be seen they are of the side-entrance pay-as-you-pass type. Provision will be made so that these cars and also the double-end cars can be operated by one man during off-peak periods.

Both types of cars will be 45 ft. 6 in. over all. The single-end cars will seat fifty-three, while the double-end cars have a seating capacity of forty-four. The type of seats is also different for the two cars. Brill standard Winner double-rod pressed-steel seats will be used for the double-end cars, with wooden slat construction, while the Brill Cleveland type of seats will be used on the single-end cars. These also will be of wooden slat construction.

The estimated weights for the two types are 34,000 lb. for the single-end cars and 35,000 lb. for the double-end cars. The motor and control equipment will be the same for both types.

MANUFACTURERS OF EQUIPMENT, TOGETHER WITH TYPE FURNISHED

Air brakes	G.E. Co.
Armature bearings	Plain
Axles	Carnegie Steel Co.'s heat treated
Bumpers	Six-inch Channel reinforced
Car signal system	Brill's standard and push button contact bases—Faraday Type-E
Car trimmings	Malleable and bronze statuary finish
Center and side bearings	Brill's standard
Conduits and junction boxes	Galvanized
Control	G.E. 2-K-68 with ratchet attachment
Couplers	Drawbar pockets
Curtain fixtures	Curtain Supply Co.'s No. 88
Curtain material	Double face pantasote
Designation signs	Hunter
Door operating mechanism	National Pneumatic Co.
Wheelguards	H. B. Life Guard
Gears and pinions	Tool Steel Gear & Pinion Co.
Hand brakes	Peacock staffless
Heater equipment	Consolidated Car Heating Co.'s
Headlights	Crouse Hinds semaphore lens
Journal bearings	Plain
Journal boxes	Plain cast-iron
Lightning arresters	M. D.
Motors	Two per car, G.E.-275A outside hung
Registers	International Type R-7
Sanders	Ohio Brass Co.
Sash fixtures	Bronze statuary finish
Seats	Brill's standard Winner double rod for double end cars and Brill Cleveland type for single end cars.
Seating material	Wood
Springs	Brill's helical and elliptic
Step treads	Universal anti-slip smooth safety
Trolley catchers	Ohio Brass Co.
Trolley base	Two U. S. No. 14
Trolley wheels	Star Brass Foundry
Trucks	Brill No. 39 E-2
Ventilators	Garland Type C-1 Jr.
Wheels (type and size)	Steel 28-in. and 22-in. diameter
Special devices, etc.	Birney Safety Car devices equipment

DETAILS OF PHILADELPHIA'S NEW CARS

Length over-all	45 ft. 6 in.
Width overall	8 ft. 6 in.
Height, rail to trolley base	11 ft. 0½ in.
Bolster centers: Double-end cars	22 ft. 6 in.
Single-end cars	24 ft. 6 in.
Truck wheelbase	4 ft. 10 in.
Weight total: Double-end cars	35,000 lb.
Single-end cars	34,000 lb.
Seating capacity:	
Double-end cars	44
Single-end cars	53

The cars will be built by the J. G. Brill Company. The interior trim will be bronze statuary finish, the headlining will be Agasote and the roof will be arch type.

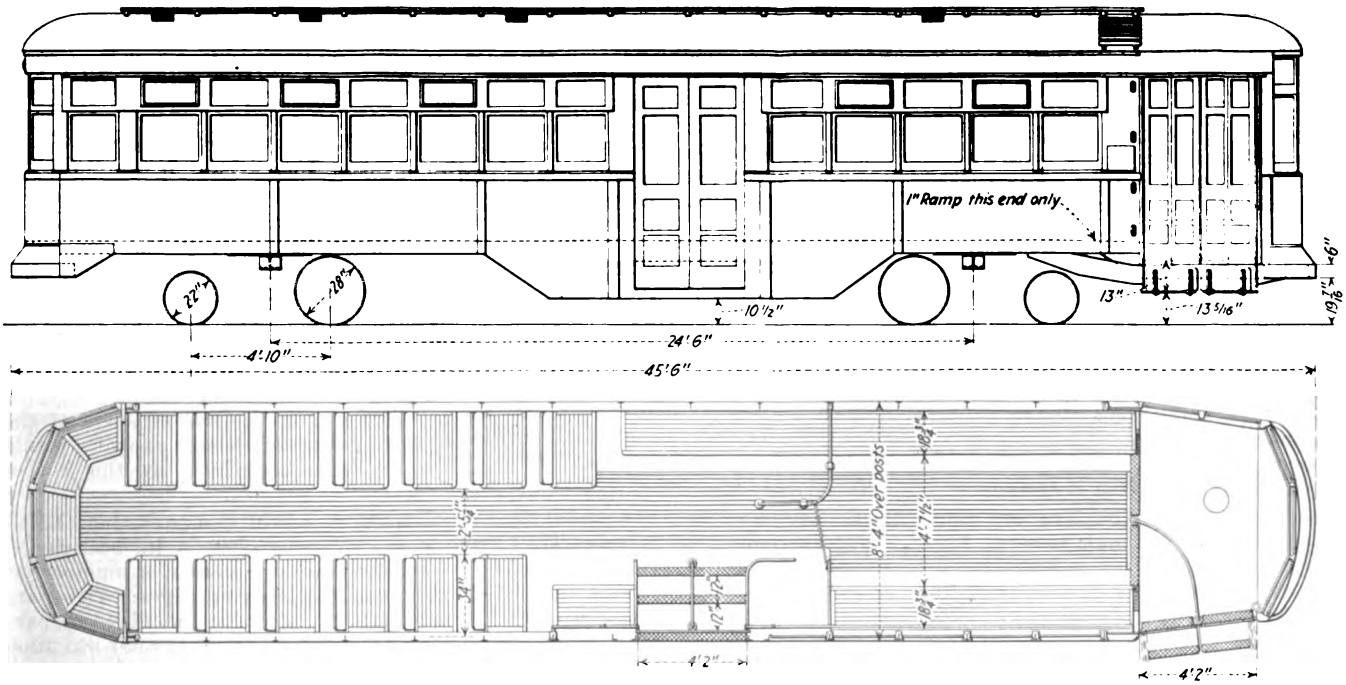
Two G.E. type 275-A motors will be used, with General Electric Company's 2-K-68 control with ratchet attachment. Accompanying tables give details of weights and dimensions, and also details of the equipment which will be furnished.

In addition to the passenger cars, the following double-truck, four-motor, double-end utility cars were ordered:

Twenty-four share-type snow plows.
Ten snow sweepers.
Eight standard differential dump cars and five differential trailers.
Six flat-bottom, drop-side work cars.
One crane car for surface service.
One crane car for elevated service.
One line tower car.

Metal, Coal and Material Prices

Metals—New York	March 6, 1923
Copper, electrolytic, cents per lb.	16.937
Copper wire base, cents per lb.	19.125
Lead, cents per lb.	8.25
Zinc, cents per lb.	8.70
Tin, Straits, cents per lb.	47.00
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$6.175
Somerset mine run, Boston, net tons	3.75
Pittsburgh mine run, Pittsburgh, net tons	2.75
Franklin, Ill., screenings, Chicago, net tons	2.375
Central, Ill., screenings, Chicago, net tons	1.30
Kansas screenings, Kansas City, net tons	2.625
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.	7.50
Weatherproof wire base, N.Y., cents per lb.	19.50
Cement, Chicago net prices, without bags	$2.20
Linseed oil (5-bbl. lots), N.Y., cents per gal.	1.01
White lead, (100-lb. keg), N.Y., cents per lb.	13.375
Turpentine (bbl. lots), N. Y., per gal.	$1.54



Plan and Elevation Showing Seating Arrangement of P. R. T. New Single-End Type Car

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Rolling Stock

Lima (Ohio) Street Railway has received five of a total of twenty one-man cars ordered. The twenty cars are expected to be in operation by April 1.

Pittsburgh, Harmony, Butler & New Castle Railway, Pittsburgh, Pa., has purchased three Packard cars for bus service between New Castle and Ellwood City.

Springfield (Mass.) Street Railway has placed an order with the J. G. Brill Company's Wason Manufacturing Company plant at Springfield for ten new double-truck cars. The company's intention of buying the cars was referred to in the ELECTRIC RAILWAY JOURNAL issue of Feb. 17.

Brooklyn (N. Y.) City Railroad has placed an order with the Westinghouse Electric & Manufacturing Company for fifty-four two-motor equipments and control for motorizing as many cars now in use as trailers. The motors will be the type 535-A, of 60 hp. each, and the control will be type K-68-A arranged for double-end operation. The control will be interlocked with the doors by type 801-E line switches. The 535-A motor is a comparatively new type, which makes possible the use of a 60-hp. motor with 28-in. wheels, which will be the plan followed in Brooklyn. These trailers at present weigh 31,000 lb.

Pacific Electric Railway, Los Angeles, Calif., has just placed an order for ten additional electric freight locomotives, which are to be of the latest improved type and to cost $475,000 for the entire order. Delivery of two of the new locomotives is anticipated within sixty days and it is contemplated the remaining locomotives will be delivered early during the summer. The new locomotives are to be of 60-ton type and will be capable of handling fifty loaded cars on level track. When delivery is completed the company will have a total of fifty-three electric freight locomotives in its freight service. The company has also placed large orders for car equipment, those now in course of construction aggregating an expenditure of $1,750,000. This equipment, delivery of which will commence within a short time, consists of 400 dump cars, 300 box and 150 flat cars.

Track and Roadway

Orange, Tex.—A franchise has been granted on application of the general manager of the Orange Light & Water Company for the construction of a trackless trolley system in Orange.

Buffalo & Lake Erie Traction Company, Erie, Pa., through General Manager Myers, is seeking a franchise for the construction of a double-track line connecting curves in Twenty-first Street from State to Peach Street.

Public Service Railway, Newark, N. J., may be asked to build a trolley loop from Haddon Avenue to King's Highway. A petition has been presented to the borough commissioners of Haddonfield, N. J., asking for this improvement.

Puget Sound International Railway, Everett, Wash., will use steel rails aggregating 360 tons for replacement on the Everett-Seattle interurban line, between Foy and North Park stations. The new rails will be 70-lb. size, replacing 50, 56 and 60-lb. rails.

Market Street Railway, San Francisco, Calif., will begin within thirty days the relaying of rails on Market Street from the Ferry to McAllister. This improvement will mean about 6 miles of single track. Rails, joint plates and other material have been purchased and is already delivered in San Francisco.

Los Angeles (Calif.) Railway has started the construction of an extension from Third and Larchmont Streets along Larchmont to La Brea. The extension involves a little more than a mile of double-track construction. This new track will serve new territory in South Hollywood.

Power Houses, Shops and Buildings

Cleveland (Ohio) Illuminating Company is planning to take over the $1,000,000 power house owned by the Lake Shore Electric Railway in Avon Beach Park, east of Lorain, Ohio.

Oklahoma Union Railway, Tulsa, Okla., expects to build a new interurban depot at Red Fork, Okla. Work will begin within a few weeks. The new depot will be modeled after the passenger depot in West Tulsa, but will be somewhat smaller.

Ohio Valley Electric Railway, Huntington, W. Va., contemplates spending $2,250,000 on additions to the Kenova power plant. This plant now generates all the electric current which the company supplies between Guyandotte, W. Va. and Hanging Rock, Ohio, and demands for service are increasing at such rate, officials say, that additional facilities are imperative. To cover this and other improvements the company is planning an issue of new securities.

Trade Notes

Nichols-Lintern Company, Cleveland, Ohio, has reprinted in the form of a blotter a recent editorial from the ELECTRIC RAILWAY JOURNAL entitled "Work—Thought—Character."

Haskelite Manufacturing Corporation, Chicago, Ill., has received the order for roofing the fifty-two trail cars which have been ordered by the city of Detroit. These roofs will be of the ⅜-in. three-ply construction and will be furnished in five sections per car.

Link-Belt Company, Chicago, Ill., announces a cut of 14 per cent in the price of its portable belt conveyor, the "Cub." The new price is $585 complete with a 2-hp. electric motor. Portable belt conveyors are used for unloading and loading cars, trucks and wagons of any loose material.

Burry Railway Supply Company, Chicago, Ill., reports orders received for Hartman center plates and Perry, Paragon and Peerless side bearings from the following: Philadelphia Rapid Transit Company, Detroit Municipal Railways, Macon Railway & Light Company, American Electric Power Company, Grand Rapids, Grand Haven & Muskegon Railway, Tri-City Railways, Texas Electric Company, Dallas Street Railway, Chicago Surface Lines, British Columbia Electric Railway and the Eastern Wisconsin Railway.

Uehling Instrument Company, Pittsburgh, Pa., manufacturers of CO_2 recorders and other power plant gages, has placed Charles J. Schmid in charge of sales in greater New York and Long Island. Mr. Schmid is well qualified for his duties in this important territory due to his close contact with power plant operators in the interest of fuel economy when formerly in charge of the Boston office. Temporarily Mr. Schmid will make the home office in Paterson, N. J., his headquarters.

B. Olney Hough, for many years past editor of the *American Exporter*, has relinquished that position to establish himself as export counsellor, consultant and adviser to banks, exporters and manufacturers, with offices under the style of B. Olney Hough, Inc., 17 Battery Place, New York. It may be regarded as significant of the esteem in which his opinions and advice are held that his first retainer in his new profession is from the *American Exporter*, for which he will continue to act in a capacity similar to some extent to his former position, as export and technical adviser and writer, with the title of contributing editor.

New Advertising Literature

Wagner Electric Corporation, St. Louis, Mo., has issued descriptive bulletin No. 131, giving instructions for ordering and adjusting repair parts.

Railway Improvement Company, New York, N. Y., has issued an illustrated booklet on the Ransom vacuum oiler. It shows the oiler installed on motors on a large number of properties.

J. G. White Engineering Corporation, New York, N. Y., is distributing a booklet, called Steam Power, which is illustrative and descriptive of some of the more important steam power plants which have been built by this corporation.

W. S. Goodwin Company, Inc., Baltimore, Md., describes in its bulletin N, on steel paving guards, a number of types of steel paving edges. These are designed to preserve the edges of paving of different types, special attention being given to the edges abutting on electric railway track rails.

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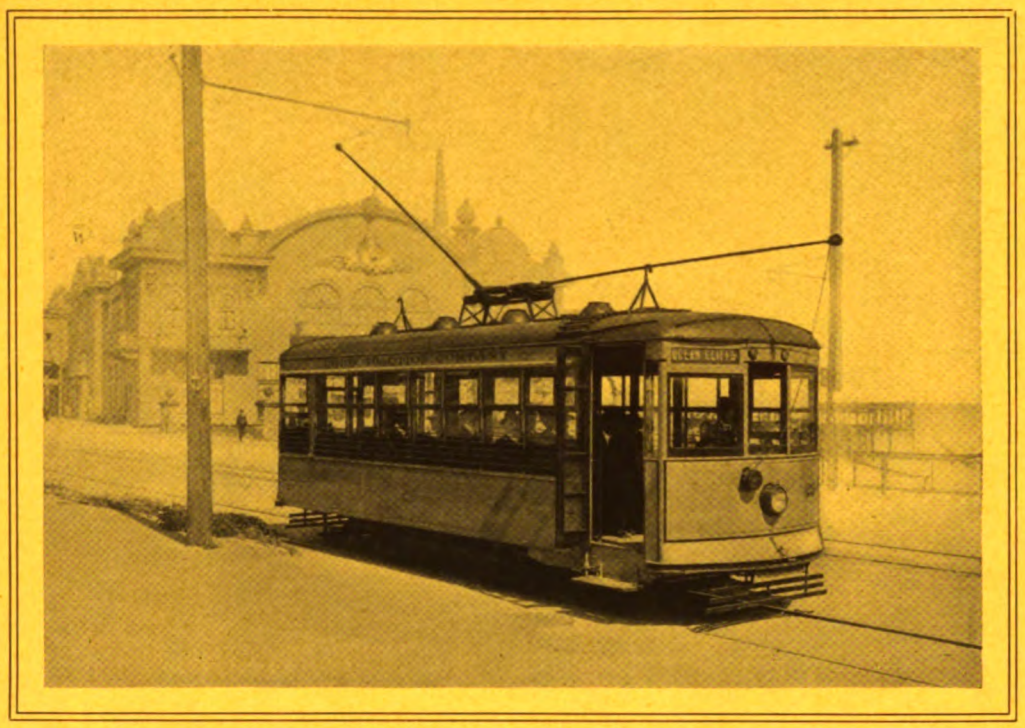

Birney Safety Car at Santa Cruz, Cal. Built by the American Car Co.

Maximum Economy

The large number of Birney Safety Cars in service today is evidence of their success. Over 3,600 cars have been built by us for service on over 200 railways. Their introduction at a time when economical operation and increased receipts were necessary proved to be the solution of many difficult financial problems.

Today the Birney Safety Car is just as capable in providing the most service at the lowest cost as it was when the industry's financial pulse was at its lowest ebb.

Figured on the basis of its seated passenger load the Birney Safety Car is the lightest car yet developed, and consequently the maximum saving in power and maintenance is worth taking advantage of.

THE J. G. BRILL COMPANY
PHILADELPHIA, PA.

AMERICAN CAR CO. ST. LOUIS MO. — G.C. KUHLMAN CAR CO. CLEVELAND, OHIO. — WASON MANF'G CO. SPRINGFIELD, MASS.

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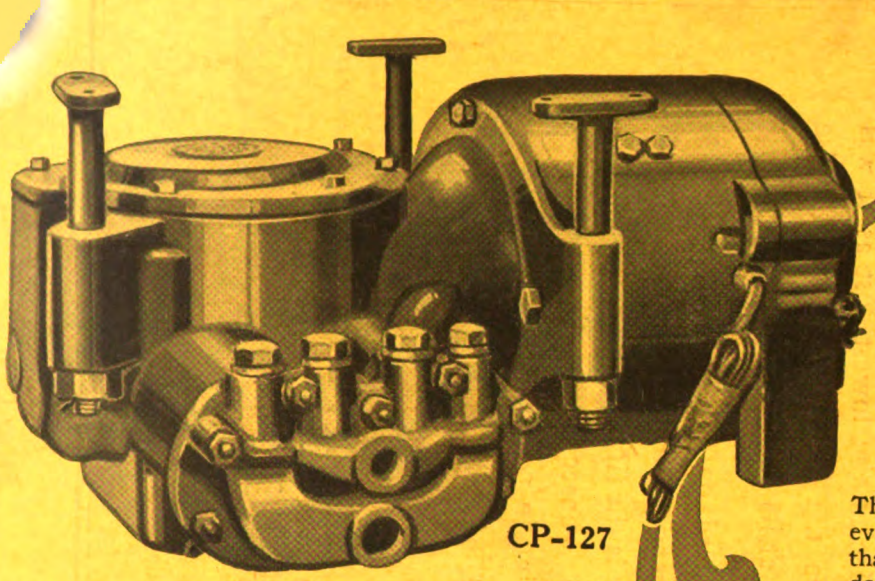
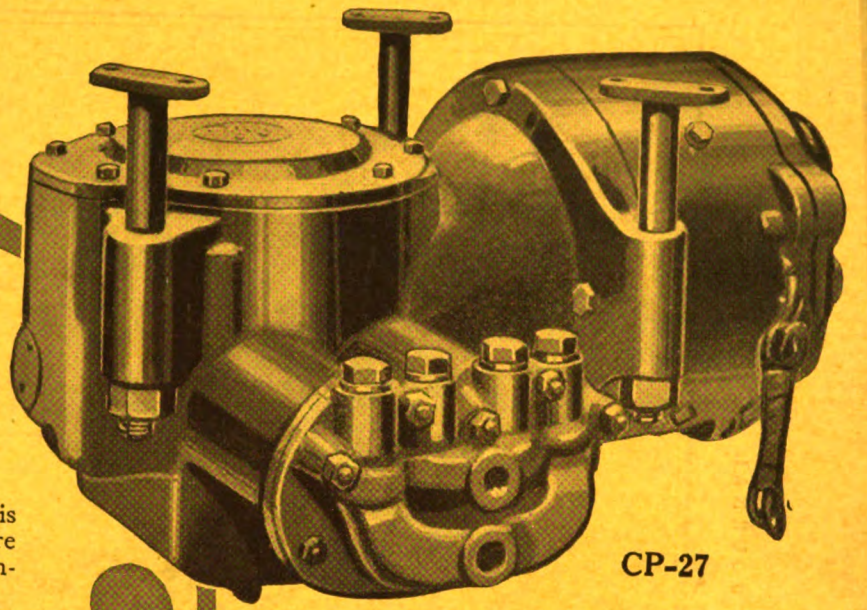
Type CP—*the Low-Maintenance Compressor*



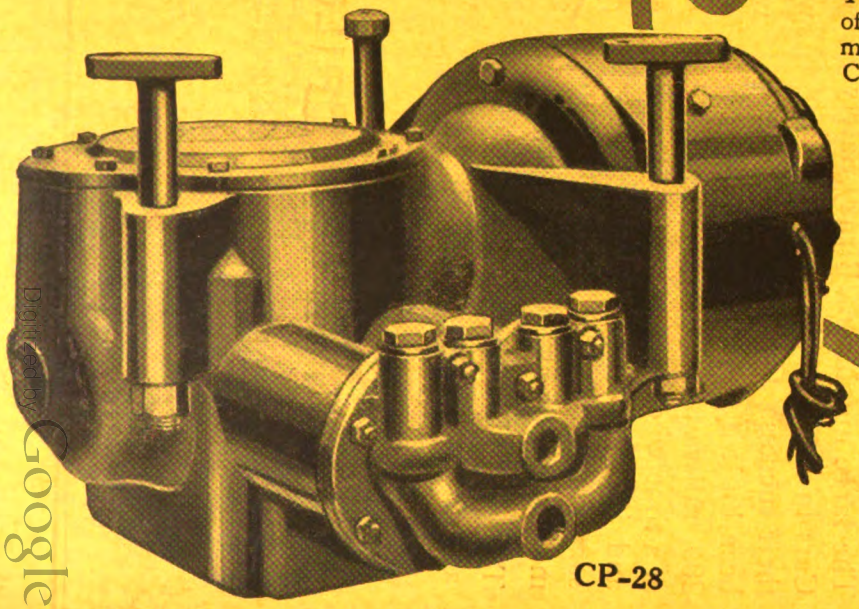
CP-127



CP-27

The popularity of the CP Compressor is evidenced by recent repeat orders for more than 750 new units,—the best recommendation for any equipment.

The CP line includes designs for any class of service, city or interurban. And the maintenance cost averages only $3 per Compressor per year.



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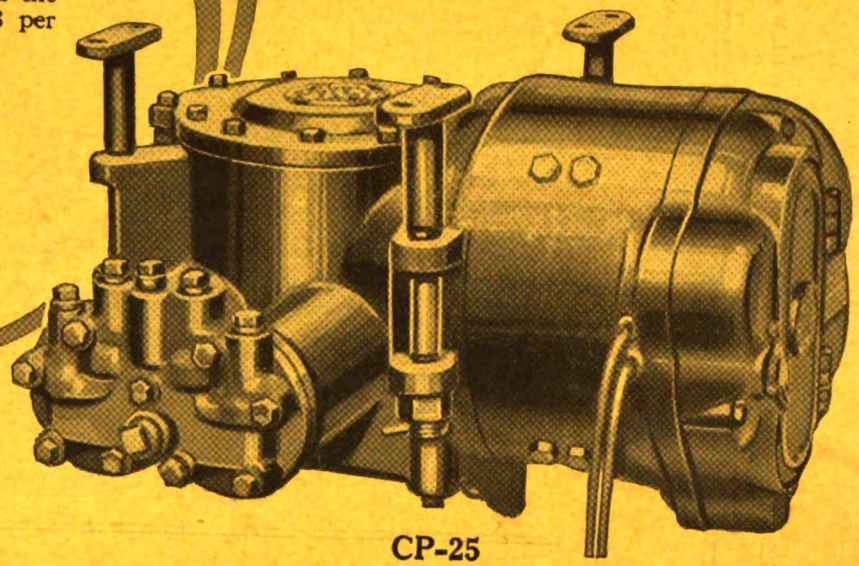

CP-25

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MEMBER NATIONAL ELECTRIC LIGHT ASSOCIATION AERA

General Electric Company

General Office
Schenectady, N.Y.

Sales Offices in
all large cities

25-173

ANNUAL MAINTENANCE NUMBER

ELECTRIC RAILWAY JOURNAL

McGraw-Hill Co., Inc. March 17, 1923 Twenty Cents Per Copy

Meet These Authorities On Steel Tie Track Construction

AFTER all, those who *know* the economy of Steel Tie Construction are those who have laid it. On their calm and experienced judgment, as it is displayed in their re-orders, we rest our case with you.

The figures in the table below are compiled from our records and our 1923 Order File, covering a few representative customers who have placed early Spring orders.

General Location Property	First Installation	Total Mileage of Twin Tie Track as of Dec., 1922, Miles	1923 Spring Order, Miles
An Indiana Interurban Company	1911	10	1.75
A Northern Ohio Company	1913	20	3
A Southern New England Company	1915	14½	2.80
A Massachusetts City Company	1915	5.62	0.50
A Southern Colorado Company	1917	4½	0.82
A Michigan Interurban	1917	3	0.75
An Eastern Pennsylvania Company	1918	2	3
A Tidewater Virginia Company	1921	0.11	0.30
A New York Urban Company	1922	2.38	3.75

Our sales method is a sincere effort to co-operate in your investigation of Steel Tie Construction as to its performance and cost on other properties and its adaptability to your local conditions. It will be a pleasure to put this service at your disposal.

The International Steel Tie Company
Cleveland, Ohio

Steel Twin Tie Track

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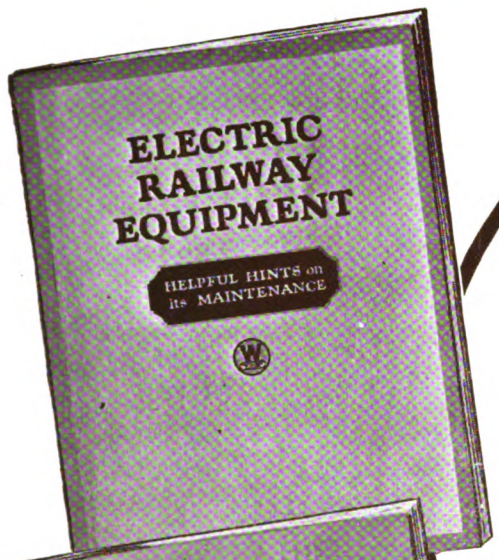
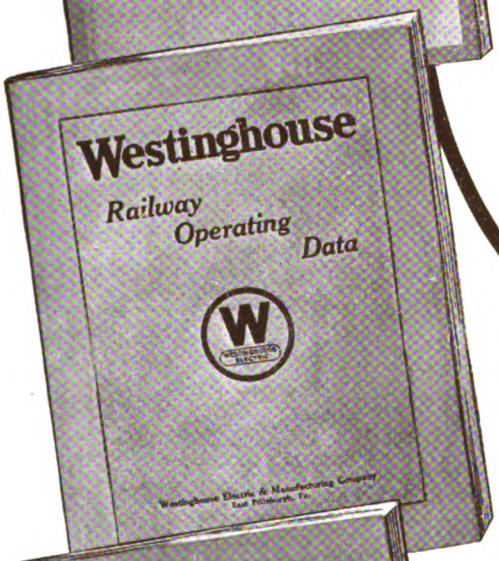
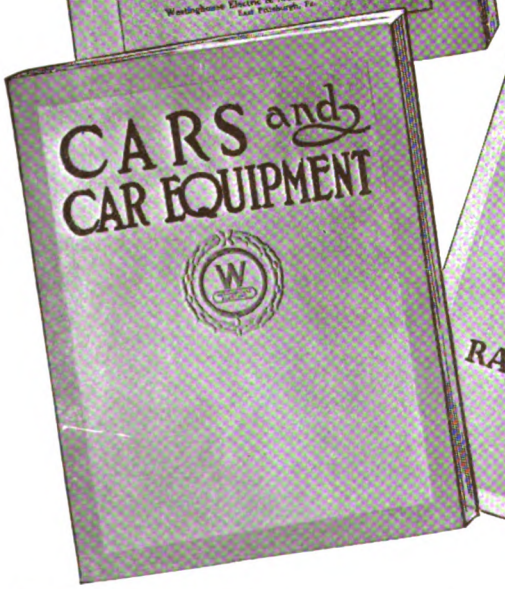
Helpful Hints On Maintenance







Publications

Recognizing the great importance of the proper maintenance of electric railway systems, the Westinghouse Company issues numerous publications to assist railway operating men.

The illustrations show some of the more important of these publications, as follows:

Electric Railway Equipment illustrates more than fifty items of electric railway equipment, showing the important features of each and describing and recommending maintenance practice.

Railway Operating Data are used in many shops as text books for the maintenance of electric railway equipment.

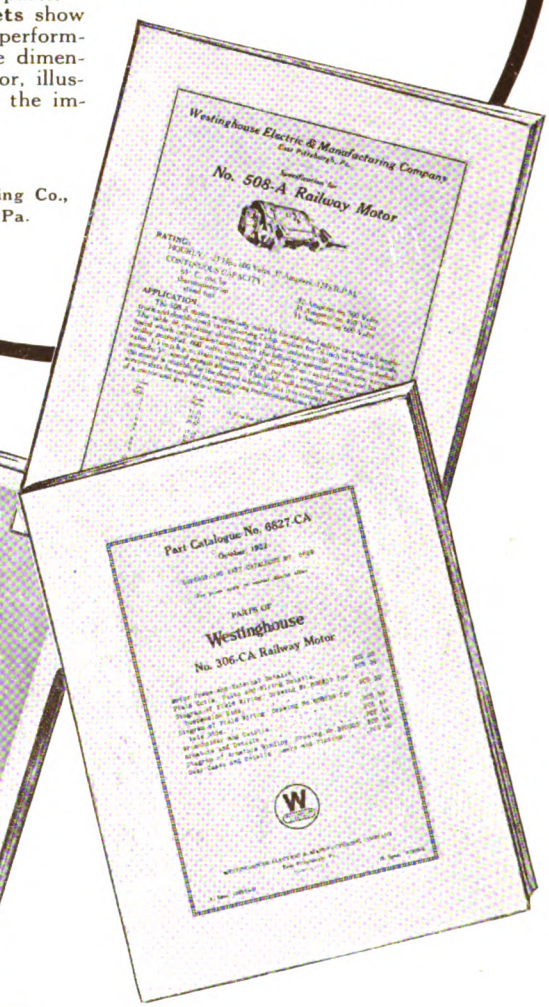
Cars and Car Equipment is a reference guide in the selection of car designs and motor and control applications.

Westinghouse Standard 600-Volt Railway Motors is of great help to superintendents of equipment in selecting from our standard line of motors the proper equipment for new or rehabilitated cars.

Part Catalogues illustrate and describe every part of the motor, and give the style number and other information necessary in ordering renewal parts.

Railway Motor Leaflets show the rating, application, performance curve, and outline dimensions of a specific motor, illustrating and describing the important parts.

Westinghouse
Electric & Manufacturing Co.,
East Pittsburgh, Pa.



Westinghouse

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New York, Saturday, March 17, 1923

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review
Published by McGraw-Hill Company, Inc.
HENRY W. BLAKE and HARRY L. BROWN, *Editors*

Volume 61 *Number* 11

Annual Maintenance Number

Opportunity Lies in Shouldering the New Responsibilities

NOW on the threshold of success, the electric railway industry faces the need for a reconsecration to its ideals and commitments. There has come a public understanding of transportation, which, if fostered, will redound to the welfare of the industry. But this public appreciation, now gained in part, challenges the industry to make good its acclaimed responsibilities and intentions.

Let the spirit of frank, fair, open dealing with the public continue wholeheartedly and even more completely and genuinely. Let the railways improve their service. They must spend money to rehabilitate, to modernize plant, methods and equipment. They must grasp every advance in the art to reduce the cost of service, and savings must benefit riders, employees and stockholders.

Employees must take a new hold of their jobs, cast aside the old idea of merely keeping the cars going with the least possible expenditure, and think of bettering operation. True economy now comes through new thinking, new tools, new methods, and the will to achieve a new standard of service.

The manufacturers, too, must accept new responsibilities. They have long been a great impetus in the development of the railways. Today, creative engineering thinking more than ever is needed, and the time has again arrived when it can be rewarded.

The public service commissions face a tremendous responsibility and a splendid opportunity. Their opportunity is truly to serve the best interests of the people. Their responsibility is to see that the utilities have fair treatment. Only when the electric railways are prosperous and healthy can the best interests of the people be served. Let commissions be above politics. Let the principle prevail that as a company serves, so shall it prosper.

Finally, ELECTRIC RAILWAY JOURNAL pledges its utmost effort in gathering and disseminating the best thinking and the best information for the aid of the railways, the manufacturers and the commissions. As friend, and as friendly critic, the JOURNAL will spare no labor or expense in helping the three other parts of the industry to carry on more intelligently, more effectively.

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A Familiar Machine Used in a New Way

THE difficulty of teaching an old dog new tricks is proverbial. Every new method of performing a familiar operation is sure to meet with opposition from those who are used to the old way. But when it can be shown definitely that the new way is better than the old, then habit should not be allowed to block progress. The tests of the centrifugal separator for dehydrating transformer oil, described elsewhere in this number, seem to indicate that this method is superior to the filter press. A high dielectric value was restored in much less time than the old method required. Where these tests were made, it is the usual practice to take the transformer out of service during dehydration. Not every company can do that, however, and it may sometimes be a little dangerous to dump back into the top of a live transformer the first oil that passes through the separator. However, the filter press is not above criticism in this respect, when it is carelessly operated, and either apparatus can be so handled that the danger of a transformer breakdown is negligible. The fact that the centrifugal separator is already widely known as a purifier of lubricating oils may make easier its introduction as a machine for the dehydration of transformer oil. Its increasing use for that purpose is to be expected.

An Increased Use May Be Expected of Labor-Saving Machinery

WHETHER the present bill restricting immigration is responsible for the situation or not, labor, particularly common labor, is scarce, and the unemployment problem, so prominent two years ago, has disappeared. This means that increased attention must be given in all industrial work to developing the use of labor-saving machinery in every direction. This need was considered at the last meeting of the committee on procedure of the American Engineering Council, which recommended to that organization that it make an engineering study of industry for this purpose, particularly those kinds of work where great numbers of men could be replaced if power-driven devices did the work.

There is no doubt that labor-saving equipment is being used to a constantly greater extent in the electric railway field. The one-man car is an example in the transportation department, but the same condition holds true in all the other departments, shops, track and even in accounting.

In one respect an electric railway company is peculiarly well situated to introduce machinery of this kind, because it has conveniently at hand an inexhaustible supply of power, wherever power need be used. One need only compare the condition in track rehabilitation, for instance, with the steam railroad. Above the track, on an electric road, whether it is in a city paved street or in the country, is the trolley wire, from which power to any amount can be taken to drive concrete mixing and distributing machines, pneumatic tampers or riveters or any of the equipment needed in rehabilitating or renewing track. Even electric welding can be done directly at any point. Moreover, these machines not only work more cheaply and quickly than the unaided track gang, but the work usually is better; that is to say, the concrete is mixed more evenly and sets better because laid more promptly, the ballast is tamped more solidly, etc. Hence it is not surprising that there has been almost a revolution in track methods during the last few years, and it is perhaps along these lines that the greatest economies in an engineering way within the early future are to be expected in the industry.

Piece-Work Plan Tends to Induce Craftsmanship

NOW that labor conditions in the mechanical departments of electric railways are more nearly normal, it is not out of place to give attention to economies of a nature different from those which have been necessarily more prevalent. Among these is the piece-work system, which, when properly administered, cuts costs and improves the morale of the working force. This system owes its chief value to the fact that it is an approach to a man's being in business for himself, which means independence, interest in production and better workmanship.

The principal saving in piece work is the elimination of lost time. When a worker is paid for the time he puts in on a job, regardless of the work he does, there is almost sure to be lost time for there is not the clearly apparent incentive to make every minute count. This is likely to be true even if he is reasonably conscientious. To be sure, there are foremen on duty who are paid to see that men earn their money, but the foreman is neither omniscient nor omnipresent. No foreman can get men to do much more work than they do naturally under the day-wage system, and this is usually much less than they could easily do, and which they would enjoy doing, under the piece-work plan.

Also, when men are on piece work there is probably a greater incentive to the management to furnish them with the best machines for the work in hand. This follows because the system tends to make good machinery highly profitable. If the men are striving to get the most out of the machinery assigned to them, it requires obviously only ordinarily good perspicacity on the part of the management to see that poor machinery neutralizes part of the men's efforts and discourages them. To illustrate, suppose that in a routine operation a turret lathe could be utilized efficiently, with an output several times that possible with an ordinary lathe. Under these conditions the cost of the better machine would soon be earned by the increased output per man and per cubic foot of shop space. The contract prices for the output of the machine would be set at a fair value with due consideration of the facilities afforded.

The Interborough Rapid Transit Company, New York, as told elsewhere in this issue, has been very successful with the piece-work plan applied to a great many shop operations. With an experience dating back some fifteen years, the plan is on a basis that neither company nor men would abandon it. The Milwaukee Electric Railway & Light Company has also had conspicuous success with a similar plan, as shown in the ELECTRIC RAILWAY JOURNAL, issue of March 19, 1921, page 529, and issue of April 2, 1921, page 647. One very large company which was forced to abandon piece work for reasons beyond its control and against the sentiment of the men in the shop has since been confronted with shop costs about 50 per cent increased. This is another illustration of what the scheme means to a company in the way of lower costs.

Hence where the piece-work plan is practicable but not now in use it would be worth while to study the

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maintenance work to see if some jobs could not be put on piece work. It is not necessary to have this on a large scale at first. Try it out on a few jobs.

Operating the Old Power Plant at Its Best

THIS is the year of checking up on everything. Because the system or any part of it has been operating with fair satisfaction is not always evidence that the best use is being made of it. Because the power plant may be old and really ought to be placed with a new one is not a very good reason for neglecting to get the best possible efficiency out of the present plant while it is continued in use. An illustration of what can be done in this direction is given in the article published this week dealing with the power plant of the Kansas City Railways. Rather than adopt a narrow policy of retrenchment, the management made a thorough study of all the factors bearing on high operating costs, and by complete revision of methods was able to eliminate more than half the labor charges and reduce the cost of power production some 35 per cent.

The salient feature of this example is that the changes did not involve any expenditures for extensive equipment, but only called for a more effective use for the existing plant. It would be interesting to see how much more could have been done had the superintendent been free to modernize the old plant as far as possible by providing such new auxiliary equipment and apparatus as steam flow meters, CO_2 recorders, new stokers and similar economizing apparatus in addition to the general checking up on waste practices.

There are many other electric railway systems which have power plants where savings of similar magnitude could be made if the problems were handled in the same thorough-going manner as was this one.

Looking Toward Standardization of Gear Blanks and Wheel Removal

ELECTRIC railways throughout the country are using a large assortment of special devices to assist in wheel removal work. A large number of these devices and the methods used are described in an article in this issue, written as the result of a survey of this work on fifty properties. It is evident from this that the problem of wheel removal is closely interlocked with that of gear design, since fully one-half the electric railways of the country make use of the web holes in the gears in connection with the pressing off of wheels.

Gear design has advanced considerably since electric railway operation first started. The need for small diameter gears with large hubs has decreased the space once used for spokes and later for web holes, until now some types are made entirely solid. Other types have very great differences in the diameter and spacing of the web holes. This has led to numerous complaints from the users and increased expense to the manufacturers in that frequently gears are rejected because the web holes do not correspond to those furnished on some previous order.

Some of the leading gear blank manufacturers have endeavored to build up a series of standards that will simplify conditions, and the American Gear Manufacturers' Association has also had a committee actively at work on this standardization problem for some time. It has been suggested that the proposed layout for web holes be submitted to the equipment committee of the American Electric Railway Engineering Association, and its co-operation asked toward some definite standardization. The subject of car gearing has already been assigned to the equipment committee for study and report this year, and it appears a very opportune time for all concerned to get together on this important subject.

From the information obtained in the JOURNAL'S survey it appears that standardization along the following lines will meet the needs of the majority of users. There should be four holes in the webs of gears spaced 90 deg. apart. The holes should be not less than 2½ in. in diameter. The diameter of the circle on which the holes are located must be governed by the hub diameters of the gear blanks, and a further detailed study of this one point will be necessary before it is possible to arrive at the several definite standards necessary.

In regard to standardization of wheel removal methods and appliances it is possible to draw these conclusions: Where both gear and wheel are removed at the same time, a space of ⅛ in. should be left between gear and wheel hubs to eliminate excessive starting pressures. Where the jack-pin method is used a device with the ends of the jack pins firmly anchored as in the stool type appliance is most satisfactory, and a collar should be used between the gear and the wheel. Of the devices for applying pressure to the wheels outside the gear, the split cylinder appears to have the most advantages.

Improved Appearance of Cars Is an Encouraging Sign of the Times

RECENTLY in a suburban community the people were not satisfied with their trolley service. Their chief objections were that the cars were dirty in appearance, inside and out, and that they were cold in winter, that the buzzer signal systems were too often out of order, and that the windows frequently stuck and could be neither opened nor closed. A committee was formed to wait upon the trolley company and present these complaints.

After receiving a polite greeting from an executive of the railway, the committee was led outside to where the cars were stored, and conducted down into the pits. It was explained to them that the trucks were of the latest pattern, and that the motors were new and powerful—in short, that the equipment was really of the best. The specific faults of which the people complained, the railway dismissed airily with the remark that they were all superficial. The committee was silenced but not convinced. In truth they were not particularly interested in trucks and motors and gears. But they were very much interested in nice looking, clean, warm cars, with buzzers that worked and windows that could be opened and closed. The trolley company, instead of trying to give the people what they wanted, tried to make them satisfied with what they had.

Such a policy is usually a mistake, for the public cannot be made to look at the question from the railway man's point of view. While it must be admitted that the upkeep of the running gear is more important than the upkeep of the car body, nevertheless appearance counts with the passenger. It is one of the most encouraging signs of the times to see again bright new paint on many cars everywhere, to discover heaters and buzzers in good order, and to find clean windows that slide easily.

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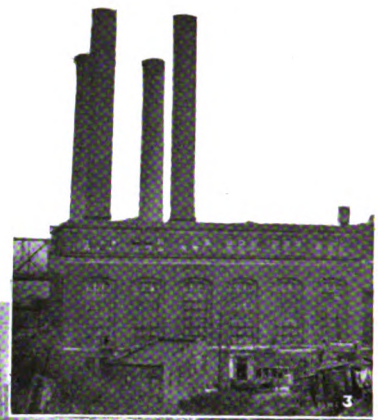
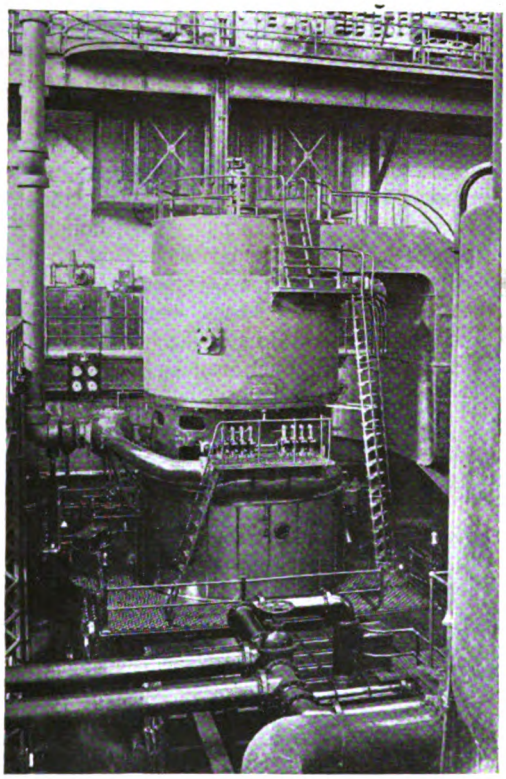
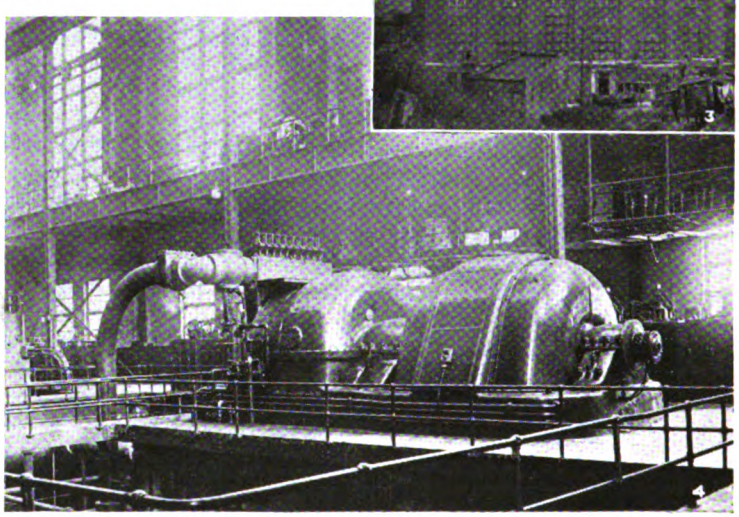
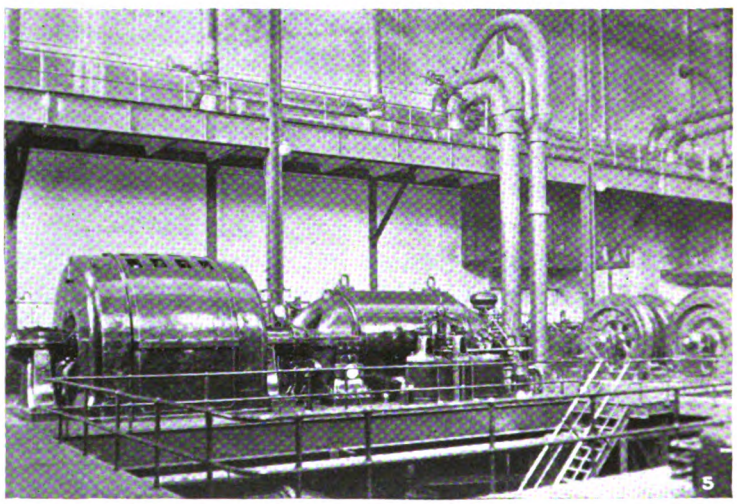
Missouri River Power Plant, Kansas City, Mo.

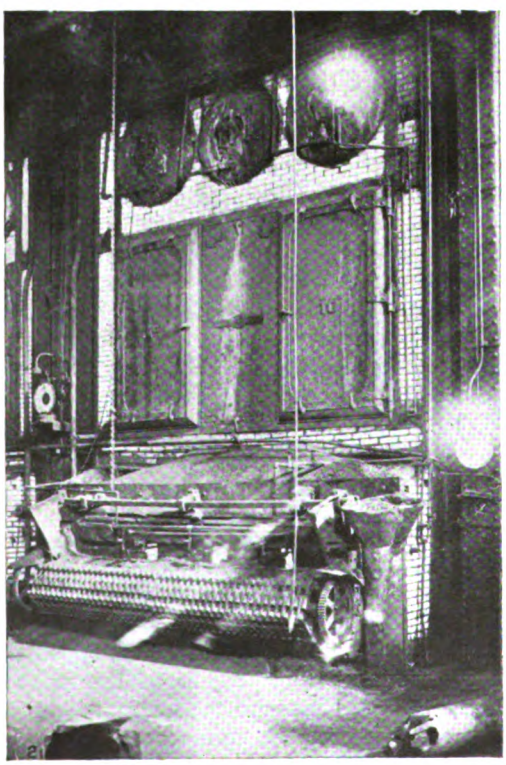
The existing equipment in the Kansas City Railways power plant was all installed prior to 1910. These views give an idea of the kind of station on which special maintenance attention has produced a high degree of economy

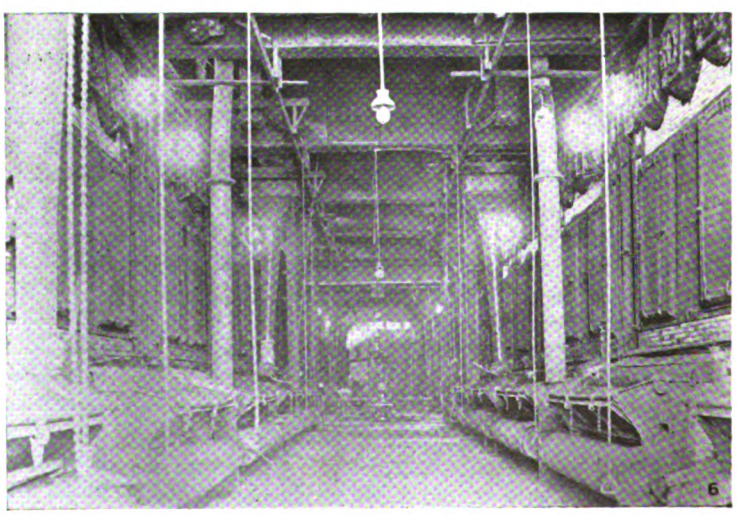












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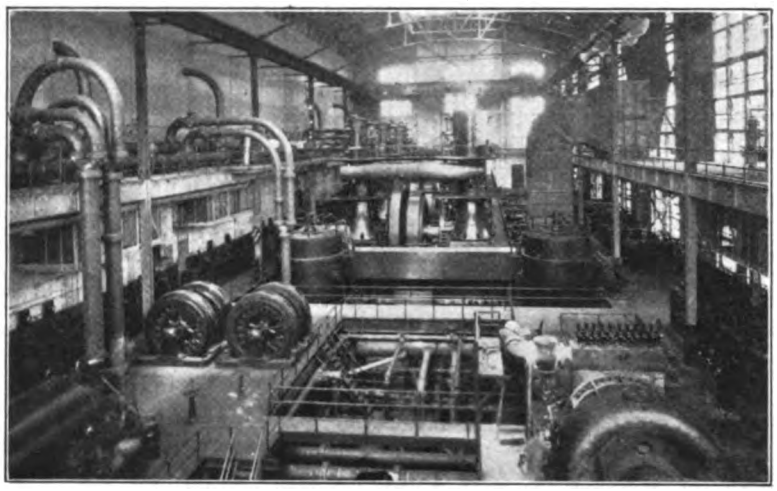
Power Generation Costs Reduced 35 per Cent

Elimination of Waste by Improvements in Practices in 50,000-Kw. Station of Kansas City Railways Has Resulted in a Saving of $1,000 a Day—This Has Been Accomplished by Methods Readily Available in Many Railway Power Plants

By D. E. Druen
Assistant Superintendent of Power, Kansas City (Mo.) Railways

RAPID advances in the design and operation of modern generating stations during the past few years, producing 45,000 to 60,000-kw. generating units and boilers of proportionate size operating under high pressures and temperatures, have tended to obscure the practices and ingenuity demanded of those operating older plants. While the new plants are equipped with all the recently developed facilities for obtaining maximum economy and for making their operation easy, the many antiquated plants scattered over the country still offer unrecognized possibilities of economies. It is not an exaggeration to say that by taking advantage of such latent economies operators working with old equipment may often reduce generating costs close to those of stations erected during the past ten years.



This General View of the Turbine Room Shows the Variety of Machines in Use

Such a problem was encountered in the Missouri River power plant of the Kansas City Railways. Though the work is not yet completed, the results accomplished to date have amply justified the efforts put forth. The Kansas City Railways passed into the hands of receivers in September, 1920. In line with reducing operating expenses of the property as a whole, an endeavor was made to effect economies in power generation. That the newly completed station of the Kansas City Power & Light Company had taken over practically all of the commercial load formerly supplied from the railway plant gave a further reason for every possible economy. While in 1920 the energy sales amounted to more than 40 per cent of the total output, in 1921 a drop to about 17 per cent was faced. This meant that besides the loss of the profit on the sales and a decreased total generation over which to distribute many of the operating charges, the plant would be operating at a load factor from 8 to 10 per cent lower. The decrease in the load gave the opportunity to overhaul equipment that in the past had been loaded to the limit to maintain service.

The station was built twenty years ago with an initial installation of three 3,000-kw. generators direct connected to vertical, compound engines taking steam from ten 575-hp. water-tube boilers. By 1910 the installation as it exists today was completed, the station having, in addition to the three original engine-driven units, which now are used only in emergencies, two 15,000-kw. vertical turbines and two 10,000-kw. horizontal turbines of later design. These four turbines are all equipped with old-type square condensers having tubes 1¼ and 1½ in. in diameter, arranged in solid nests. With condensers of this type a rapid falling off of the vacuum accompanies an increase in the circulating water temperature and a considerable depression of the hotwell temperature during the winter months. The circulating water, which is drawn from the Missouri River, carries a considerable amount of silt in suspension. Its temperature ranges from 33 deg. F. in the winter to 84 deg. F. during the hot summer months. Under these circumstances and the best conditions of loading, it is possible to obtain from the turbines water rates ranging from 14.8 to 15.8 lb. per kilowatt-hour.

The boiler room contains forty water-tube boilers arranged on two floors, one directly above the other. Two rows of ten boilers each face a common firing aisle. Twelve boilers on the first floor are fitted with old-style underfeed stokers and the remaining eight are equipped with natural-draft chain grates. On the upper deck nine more boilers also have chain grates, while the stokers have been removed from the other eleven and oil burners installed. All the boilers still have the original headroom of 8 ft. from the floor to the bottom of the front tube header, giving a furnace volume of 6.6 cu.ft. per square foot of grate area for the underfeed stokers and 3.4 cu.ft. for the chain grates. Steam is generated at 185 lb. pressure with 85 deg. of superheat.

In 1921, on account of the various fields from which fuel was procured, coal showed only a balanced average heat value of 9,574 B.t.u. per pound. The average analysis of the coal as fired was as follows:

Fixed carbon	44.2 per cent
Volatile	25.1 per cent
Ash	18.8 per cent
Moisture	11.9 per cent

In 1920 the average calorific value of the fuel used was 9,670 B.t.u. per pound; last year it ran about 9,460.

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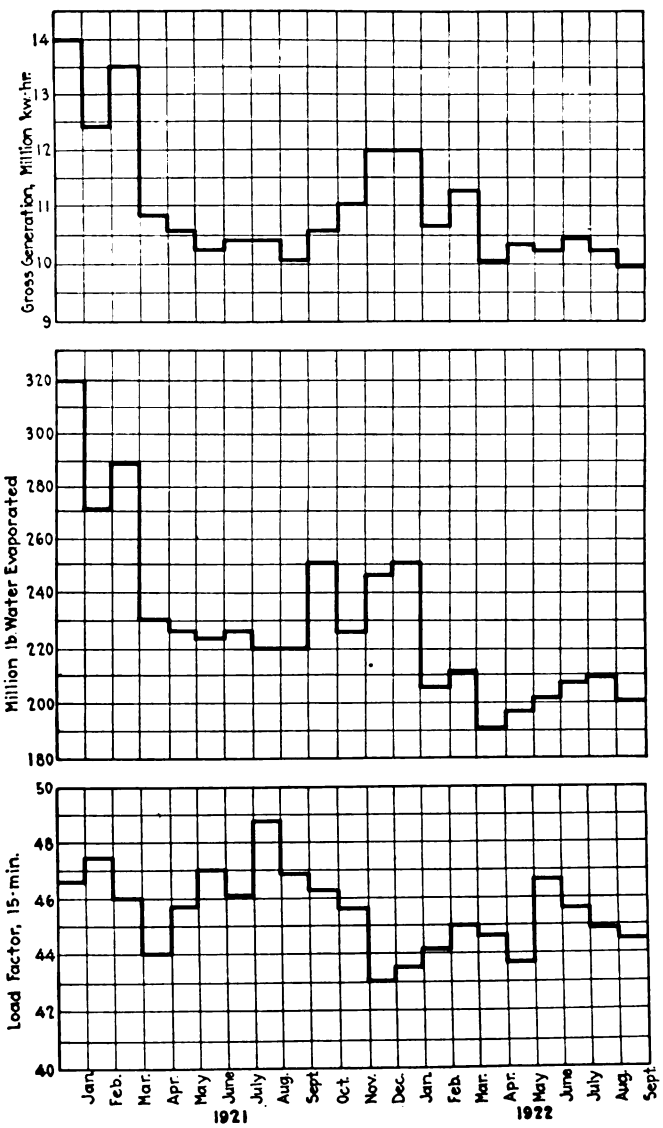

Reduction in Load and Load Factor Which the Operating Force Had to Face

Coal is spouted from an 8,000-ton concrete storage bunker above the second deck of boilers to hand-propelled lorries serving the boilers. Ashes from the upper deck are spouted to the ash hoppers of the lower deck boilers located in the basement. From there they are hauled by means of a 2½-ton gasoline mine locomotive to a skip hoist at one end of the plant that raises the ashes to an overhead spouting device delivering them to standard railroad cars.

This brief description of the plant furnishes a general idea of the equipment in the station as it exists today and as it was on Jan. 1, 1921, when steps were first taken to reduce production costs. What savings have been obtained were effected with the addition of no new apparatus except a master steam gage, three boiler feed pump regulators and a centrifugal oil purifier, all representing an investment of perhaps $2,500.

It is difficult to figure accurately what savings have been brought about as a result of the general house cleaning and the adoption of an organized program of operation based on an analytical study of conditions in the Missouri River plant. Had 1920 operating costs, when the plant was running under more favorable conditions as regards load factor, total generation and quality of coal, been applied to 1921 conditions of load, it is estimated that the cost would have exceeded the actual amount spent by $275,000. In a like manner the year 1922 shows a saving of $450,000, making a total saving in twenty-four months of about $725,000, or an average of about $1,000 per day. Such a comparison seems conservative when it is considered that the price of coal for both years was practically the same and it was of lower B.t.u. content in 1921 than in 1920, that the load factor was from 8 to 10 per cent lower and the annual output about 31 per cent less. Coal has been slightly cheaper in 1922 than in 1920, but the average load factor was not quite as good as in the previous year and the total generation ran a little behind that of 1921.

Actual cost figures show that the average energy cost per car-mile for 1921 was reduced 1 cent under 1920 and another ½ cent during 1922. In all this period the energy consumption per car-mile was practically constant. The reductions cited are the difference between almost steady conditions obtaining in 1920 and a period when costs are continuously falling, so that the ultimate saving will not be reached until the station has been operated at the new economical level for some time.

During 1921 the coal required per kilowatt-hour was reduced on the average about 0.52 lb. as compared with 1920, and a further reduction of 0.68 lb. was effected in 1922. The actual consumption is now running 1.2 lb. per kilowatt-hour below the average of two years ago. The B.t.u. per kilowatt-hour is now about 12,000 less than two years ago, which represents about 1.1 lb. of coal. The increased economy meant a real saving of around 38,000 tons of coal in 1921 and about 68,000 tons in 1922, or a total of 106,000 tons in twenty-four months. Coupled with this are savings in every other phase of plant operation, so that we have been producing in 1922 a kilowatt-hour on the average at a reduction of 35 per cent compared with 1920 costs. The lowest figure reached so far was in December, 1922, when the cost per unit was 47 per cent under the average for 1920.

The accompanying curves show the tendency with the new operating practices for the thermal efficiency to go up and for costs to drop. Certain limits of efficiency of the station are imposed by the existing equipment. It is estimated that without the addition of more economical units the best economy with present operation will be reached by the end of this year. That the entire plant organization is directing its efforts to this end is indicated by operating costs in January, 1923, which were lower than any in 1922.

Continuity First Essential

When the new régime took charge of the plant at the beginning of 1921, it was apparent that a radical departure from practices in vogue would have to be made without delay. The initial efforts were directed toward insuring continuity of service. The station had suffered fifty-two service interruptions in 1920, varying from a few minutes to two hours, making the solution of this difficulty imperative. A careful analysis, supplemented by information gathered from the station operators, revealed most of the sources of trouble. The immediate elimination of the faults responsible involved hasty repairs to auxiliary equipment, the overhauling and adjusting of machine governors, oil switches, disconnects, control wiring, feed lines, boiler feed pumps, etc. Rigid rules for the regular inspection of every unit were laid down, and operating methods were adopted that not only would minimize the possibility of service interruptions but would also permit the reestablishment of service with the least delay. Every

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cause of breakdown was sought out and eliminated or provision made to lessen the hazard. As a net result of these efforts the station has had but three interruptions since Jan. 1, 1921. The maximum tie-up, of about nineteen minutes, was due to an error in switching and not to failure of any apparatus. This record shows the benefit derived from making deferred repairs and enforcing rigid operating rules.

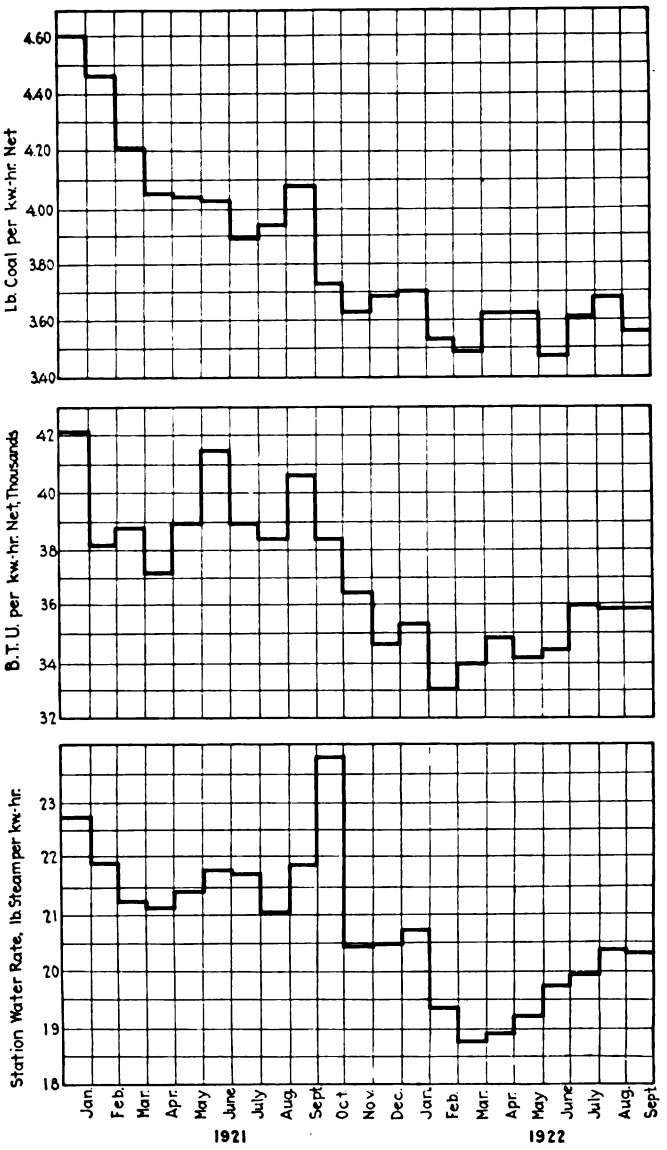
Building an Organization

The building up of an efficient and capable operating organization has been a most interesting and fruitful phase of the work. It would have been comparatively easy to form a group capable of operating the plant at the existing economy and do nothing but improve the service reliability. But in addition it was necessary to bring the thermal efficiency of the station to the maximum possible with the available equipment, while maintenance on the building and equipment that had been deferred for years had to be completed, and radically different operating methods had to be adopted. Old traditions and customs that had become law had to be wiped out. In fact, it was first thought the most feasible plan would be to replace the major portion of the station employees. But among them were many old and loyal men worthy of every chance and assistance, so that this plan was abandoned and instead it was decided to build the new organization, if possible, from those already employed. The result is that the present employees were nearly all in service during 1920.

In December, 1920, 360 men were regularly employed in the station. It was estimated that 170 men should be sufficient, so that a weeding-out process began in January, 1921. Among the old employees quite a few were physically unfit for central station work, and they were the first to go. In many instances it was found unnecessary to fill their places, but when one of these men had to be replaced a man was picked from another crew. The next step was to eliminate the undesirables. We felt that no organization could function properly with men in its ranks who had a tendency to promote dissatisfaction in any way. One of the most difficult things we had to do was to develop an entirely new attitude in the minds of the men, as they had become listless and absolutely disinterested in the success of the plant. Having little or no knowledge of operating costs, they accepted service interruptions and equipment failures as a mere incident in the day's work.

Another line of investigation was carried out to determine easier and better methods of doing work and of increasing the output per man, enabling us to get rid of the non-essential workers. This third reduction in forces was reflected on the weekly payroll curve during March, 1921. Following this, further improvement in operating methods and a careful study of the characteristics of individual employees showed that some were incapable of adapting themselves to the changed conditions, and they were weeded out. From that time on, no employees were dismissed before they were critically studied. These studies revealed that in some instances men had held positions for years and yet they were capable of other work in the station that would make them more desirable and valuable employees. The rate at which these changes in organization were made and the effect of force reductions is indicated on the accompanying graph.

At the end of twenty-four months of this organization building we find that 150 men now comprise our entire



The Reduction in Coal and in Station Water Rate Show the Progress Made

station force as compared to 360 in 1920. This force of 150 men has completed deferred maintenance on building and equipment and made it possible for the station to render practically 100 per cent service at a unit cost for power in December, 1922, of 47 per cent less than the average for 1920. Probably the one greatest factor that made it possible to accomplish this was the changing of the attitude of these men from the defensive to the offensive.

We have endeavored to produce an organization that would operate as one large family with the common incentive of ever decreasing the cost of producing a kilowatt-hour. Today one would look far to find as contented and efficient a power plant organization as that operating the Missouri River power house. A visitor will find that almost any one in the station, from the chief engineer down, can tell him the exact number of pounds of coal per kilowatt-hour required last month and the month previous. Only through such organization has it been possible to accomplish what has been done during the past twenty-four months, as it must be remembered that this group was gleaned entirely from the force found in the plant at the beginning of 1921. A power plant committee, composed of five representatives chosen from the workmen and five from the engineers and foremen, with the plant superintendent as chairman, handles all matters pertaining to

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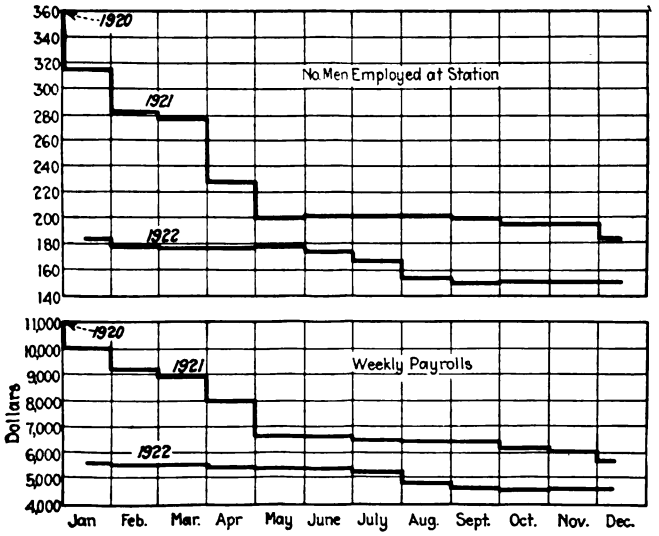


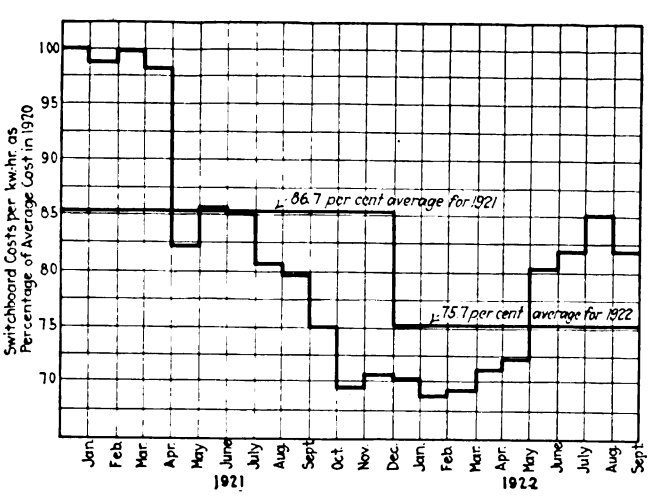
Reduction in the Number of Men and Corresponding Change in Payroll Were Made While Obtaining Better Operation

wages and working conditions, welfare and safety. This committee meets twice a month.

While the work of building up the personnel and the physical condition of the plant was under way, progress was being made in improving the thermal efficiency of the station. As every operator knows, the greatest possibilities for increasing economy of a given installation exist in the boiler room. On the basis of a series of boiler tests on the losses in warming up and banking of the boilers and on their efficiency at various loads, a method of boiler dispatching has been established which reduces banked boiler-hours to a minimum and allows the boilers to be operated at a maximum boiler efficiency.

These tests showed that it was not economical to force the boilers to a rating much above 150 per cent because of the limited combustion space, and there are enough boilers so that it is seldom necessary to exceed this rating. Formerly the boilers had been operated at 180 to 200 per cent of rating, with considerable drop in the efficiency. At these higher ratings, gas passages and furnace volumes were too small, and consequently when operating at ratings much over 150 per cent, furnace and stoker maintenance reached an abnormal figure, ashpit losses were large and considerable trouble was experienced with slag on the boiler tubes.

Four of the forty boilers have been arranged for service by an independent feed pump and heater, so that all make-up water may be passed through them.



Progress in Reduction of Switchboard Costs Shows the Combined Result of All Changes

All scale deposits are thereby localized and scale-free water is fed to the remaining boilers. The make-up water drawn from the city mains averages from sixteen to twenty grains of hardness and is treated with soda ash to neutralize as nearly as possible the scale-forming tendency. We are just beginning to realize the benefits of this scheme and expect to make a material saving in fuel by it in a short time. A sand filter for the blow-off water has produced a substantial saving by conserving scale-free water. The city water bill has been reduced from an average of $1,800 a month to $850, and by using the generator air washers to reduce the temperature of cooling oil and jacket cooling water, we anticipate reducing the city water bill in 1923 to approximately $400 per month.

The adoption of the various methods described has raised the average boiler efficiency from 59 to 67 per cent. Four oil-burning boilers are being revamped to give more efficient combustion for use over the peak loads, thereby reducing the banked hours on the coal-fired boilers. All fuel and ash are analyzed, the ash analyses being grouped by the boilers fired by different men. The tabulated results are posted in the boiler room so that every man knows what he is doing.

Generator dispatching has been worked out on a B.t.u. input-output basis, and economies from this source are already apparent. The most economical unit carries the base load, and the other units are put on the line for the additional load in the order of their water rates. As the load may be predicted a day in advance, the probable load curve is drawn to the correct time plotted for connecting and disconnecting machines from the line. On the same sheet a similar curve is drawn indicating the number of boilers and the time for them to be put on and off the line. On the day following, a bulletin is posted commenting on the previous day's operation.

Each morning all data covering the previous day's operation are figured and plotted. The curves, which are carried out for a complete month, are posted each morning with the figures of the day before. These sheets show the gross generation, boiler horsepower-hours in service, total evaporation, station water rate, individual machine water rates, combined machine water rate, plant load factor, machine load factors, average barometer, temperature of circulating water, individual machine vacuums, water evaporated per boiler horsepower-hour, average kilowatt-hours per boiler horsepower-hour, and total evaporation. Each month a comparative report is prepared showing the station efficiencies. It is circulated throughout the plant and compared by the men with previous months.

Further Economies Contemplated

To reach our desired goal we have several plans which do not involve the purchase of additional equipment. We contemplate obtaining a better balance by bleeding two turbines to the heater through thermostatic control valves. Steam "laning" in the condensers is planned by the removal of tubes. Thus steam can reach the lower tubes directly without cooling the steam already condensed. From this change we expect a slight increase in vacuum and also a decrease in the depression of the hot-well temperature.

It is also planned to install an evaporator for handling the make-up feed water, and also assist in maintaining the proper heat balance.

A lubrication survey completed last September indicated that the cost of lubrication may be reduced about

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50 per cent. Progress made thus far indicates that the contemplated figure undoubtedly will be reached. In this survey each piece of station equipment that required lubrication was given a page in a lubrication handbook on which was noted the equipment number, manufacturer, speed, kinds of lubrication required, times of lubricating, the recommendation for oil and quantities, lubricator attachments, etc. Thus the proper oils for the lubrication of the unit and the approximate quantity required per 100 hours of operation were determined. On the generating units with circulating oil systems, oil levels were set and the oil maintained at this level. On the fifteenth and first of each month, a sample is drawn from the oiling system of each turbine and examined in the laboratory for the determination of acidity, saponification, viscosity, emulsification, dirt, etc. The test results and the average maximum bearing temperatures are plotted on curve sheets, one for each generating unit. Piping from each turbine oiling system has been arranged to bypass the oil to a centrifugal oil purifier which is also arranged to purify miscellaneous oil reclaimed from auxiliaries.

A similar analysis is now being made covering all packings used in the station. The grade and size required for any particular location will be determined and mandrels will be provided for cutting the packing to exact size. Already we have standardized valves for all types of service from 2½-in. sizes to the smallest in use. By studying the necessary amount of maintenance supplies, the stores stock has been reduced by about two-thirds.

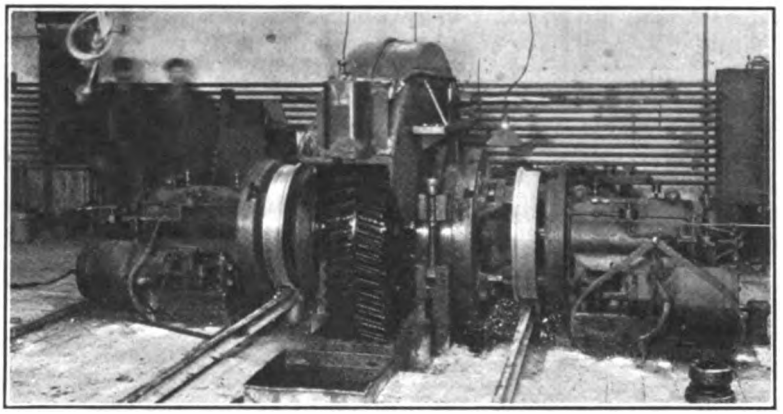
The above are but a few of many schemes we are working on to assist in obtaining the lowest possible production costs from the station.

While the results as shown might have been accomplished in less than two years, the reorganization of the plant forces involved much more than a reassembling of men under different lines of authority. A sudden radical departure from methods in vogue for years would not only have upset the organization, but would have defeated the very ends we wished to attain. Today we have a competent, willing and confident working unit, whose efficiency has made possible all the savings so far, and which ultimately will obtain every available economy within the station's possibilities.

Piece-Work System in Car Maintenance

Interborough Rapid Transit Company, in New York City, Has Secured Excellent Results from Its Use on Routine Jobs—Men Make More, and Company Saves Money—Men Take Great Pride in Developing Special Skill

THE piece-work plan of payment of workmen is highly developed in the manufacturing field and has been used to a limited extent on electric railway properties. A pioneer in this field was the Interborough Rapid Transit Company, which for fifteen years, more or less, has used the plan on all shop operations which are sufficiently standardized to render this possible. As early as 1912 the system was producing satisfactory results so that the management was willing to have its working described in the ELECTRIC RAILWAY JOURNAL, which was done in the issue for April 6, 1912, page 576. Since that time there have been minor adjustments in detail, but the fundamental principles which governed then are followed today. These principles are, in brief, as follows:



This Powerful Lathe Illustrates the Types of Machines Which Have Helped Make Piece Work a Success on the Interborough

First, in general it is to the interest of both workers and employer to get the maximum output from the maintenance plant, to the extent to which the work does not overtax the men.

Second, the men are more contented with, and interested in, their work when assured that they will be compensated for their own efforts. This results in a constant endeavor to eliminate lost time.

Third, while the company pays the men more under this plan, its return is greater both as to direct cost per unit produced and in economy in the use of shop space and facilities.

Fourth, the system tends to the development of specialists, who realize that by doing their work better than others could do it they insure steady work for themselves, as well as better remuneration.

The men who are on piece work like it, and there is a constant incentive to day workers to get on piece work when they can. Further, the industriousness of the piece workers sets a good example to the force generally.

THE PIECE-WORK PLAN IN PRACTICE

An example of the good results of the piece-work plan is furnished by the operation of wheel turning. The men on this job have studied it so carefully that they are now putting a pair of wheels through in twenty-two minutes on the average, at a contract cost of 34.1 cents. Under the plan of paying for work by the day the output in this operation was three or four pairs of wheels per day per man. With the improved machinery now used, with high-speed tool steel and with operation at 100 per cent efficiency due to the use of the piece-work plan, the output has been increased to

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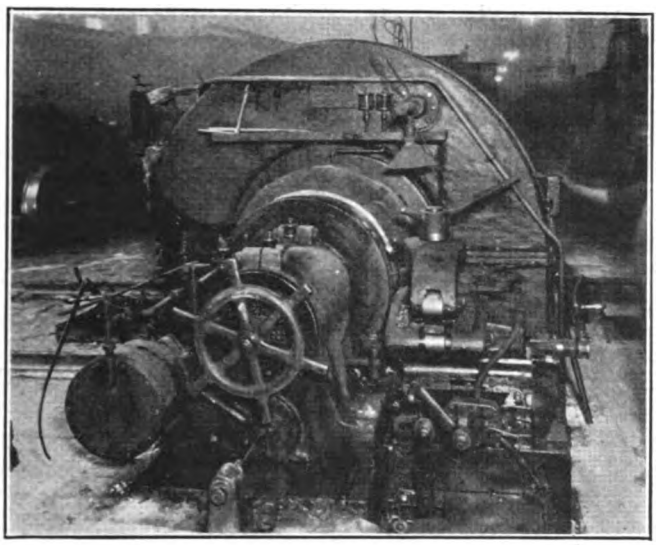

Looking at the End of the Big Wheel Lathe Which Turns Wheel Treads and Flanges in Twenty-two Minutes

twenty-five pairs of wheels per day per man, and the men are able to earn on the job about $200 per month. This has been made possible by the elimination of lost motion, and the forcing of the cut to the maximum of efficiency.

The piece-work plan is used not only on routine operations but on new installation work as well. This work is kept separate from the maintenance work, and the regular force is not employed upon it.

One of the most interesting jobs of recent years is one now under way, the equipping of nearly four hundred cars, now in use, with high-voltage, multiple-unit car-door control. This involves considerably more than 150 contract items, large and small. For example, one contract calls for the cutting, threading and reaming of about 600 pieces of electric conduit and air pipe (for one car), for which the contract price is $16.10; another calls for the bending of these pipes to template, at $11.60, etc.

To make this illustration somewhat more tangible the following excerpts from the schedule are given:

Disconnect brake rigging for jacking car bodies, disconnect and remove air piping and conduit for installation of multiple-unit door equipment. Remove fitting from pipe and deliver to stock room. Motor car, per car A. W. I. (All work included)	$9.50
Same, trail car	2.40
Drill holes under car body for installation of air and conduit pipe clamps. Motor car, per car, A. W. I.	9.60
Same, trail car	5.00
Cut to length and pull in all wires for multiple-unit equipment, excluding pulling from master controllers to cutout switches and door contact shoes to reversing springs and switches. Motor car, per car, A. W. I.	37.00
Same, trail car	32.00
Dismantle vestibule light cluster on high-voltage trail cars, per car, A. W. I.	0.20
Install vestibule light cluster on high-voltage trail cars, per car, A. W. I.	0.35
Install the following apparatus in motor-car body interior: two door-lock cylinders, two cylinder relay boxes, two interlock boxes, two car-door unit cutout switch boxes, one electric brake resistance coil and one governor resistance coil with necessary bolts and brackets. Motor car, per car, A. W. I.	3.00
Rethread and plug thirty holes in back of door. Motor car, per car, A. W. I.	1.80
Install door-engine bedplates: Spot ten rivet heads with drill and remove seat separators, clean floor, set up drilling jig, drill four ⅞-in. holes and bolt bedplate in place. Install door engines as follows: remove magnet valves and engine levers, install door slide rods and brackets, drill two ⅞-in. holes, line up machine, bolt in place, connect and adjust so that door operates free. Motor car, per car, A. W. I.	15.00

TIME STUDIES ARE CONSTANTLY BEING MADE

The aim of the equipment department is to have as many jobs as possible on piece work. To that end a constant study is made of all day work with a view to changing it over. The detail of this falls to the "data collectors," one to each department, who are expected to report on all possibilities, with facts to back up their recommendations. They not only do this but also suggest changes in the procedure on an operation when, in their opinion, it is not being done to the best advantage.

The machine shops, paint shops, wood mills and blacksmith shops are practically all on a piece-work basis. All types of bearings are babbitted, brush-holders overhauled, commutators removed and replaced, and armatures stripped, rewound and banded on the same basis.

Take, for a detailed example of the way in which a routine job is put through, the treatment of a car which comes into the paint shop for repainting. The foreman has a complete list of the items which may

INTERBOROUGH RAPID TRANSIT COMPANY

PAINT DEPARTMENT OPERATION SHEET

Manhattan Division

Car No.												
Date In												
Date Out												
Cost												
Work	Contract No.	Price	Amount	Pass and Date	Amount	Pass and Date	Amount	Pass and Date	Amount	Pass and Date	Amount	Pass and Date

Fig. 1—Check Sheet Used for Preventing Duplication of Charges

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possibly require attention, although usually a car does not need to have everything done to it that is included in the list. The following are the items and contract prices on Manhattan Elevated cars, which have wood bodies and have been in service for many years:

Scrub exterior	$3.02	Paint seats	$0.73
Prime exterior	1.26	Varnish seats	.642
Putty and sand, oil enamel	.321	Paint motor truck	.389
Second coat exterior	1.90	Paint trailer truck	.282
Number ends exterior	.0243	Putty and sand reinforced cars, having panels	.788
Number ends interior	.0243	One coat color	.282
Letter boards	1.57	Putty and sand reinforced cars, having sheathing	.428
Door posts, burn off	.0603	One coat color reinforced sheathing	.272
Paint deck	.389	Remove paint and varnish	.96
Paint canvas roof	.428	Sand body sash	.428
Paint gates	1.20	Paint heater wires	.073
Black off ironwork	1.26	Scrape body sash	.86
Door posts, putty and plaster	.122	Paint new canvas roof	.321
Scrub motor car interior	1.81	Truck shoe beam	.122
Scrub trailer interior	1.43	Seat frames	.37
Clean and oil curtains	.48	Clean motor truck	.341
Clean hand straps	.389	Clean motor car trailer truck	.525
Putty and paint lining	1.11	Clean trailer truck	.428
Enamel head and side linings	1.35	Spray motor truck	.171
Sand and varnish motor interior	2.22	Spray trailer truck	.122
Sand and varnish trailer interior	1.81	Safety gate	.073
Number glass, 1 fig	.418	Paint heaters	.321
Number glass, 2 figs	.515	Scrub floor strips	.96
Number glass, 3 figs	.60	Paint floor	.219
Number glass, 4 figs	.681	Remove varnish trailer	12.24
Warning notice seats	.564	Remove varnish motor	15.01
Scrape and clean sash	.0243	Remove varnish, sand strips, etc.	2.77
Body sash burn off	.0243	Remove varnish, sand parting strip	3.55
Body sash scrub two sides	.0122	Varnish trailer	3.16
Body sash scrub one side	.00603	Varnish motor	4.34
Clean embossed glass	1.18	Body sash	.049
Sash to loft	.108	Varnish sash stops, etc.	1.90
Body sash, finish one side	.049	Window capping	1.43
Body sash, finish both sides	.073	Remove varnish in part	.788
Cleaning glass	1.35	Remove varnish swing door	.321
Blinds, scrub two sides	.0122	Bleach, etc., in part	1.26
Blinds, prime and enamel	.0185	Paint steel posts	1.59
Scrub seats	.63		

In a case like this it is sometimes possible to group some of the jobs, in which case the group is given a combination number and is priced at the sum of the component contract prices.

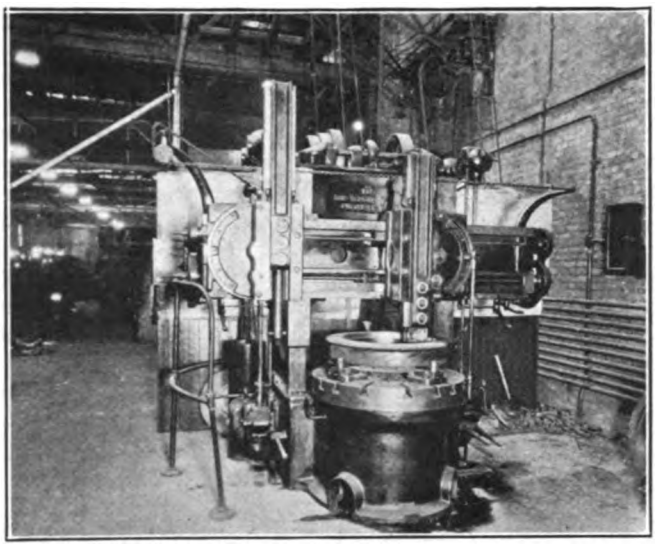
In the operation of the piece-work system everything depends upon the proper determination of the contract prices. These are set in the Interborough shops on the basis of careful and detailed time studies. By the term "detailed" is meant the actual measurement of the time of each component part of an operation. When a special construction job develops, such as the equipping of the large number of cars with door control already mentioned, sample cars are equipped by careful workmen and time studies are made as the work proceeds.

In routine operations a man is selected for test who is average as far as production is concerned. He knows that the time studies are being made. A large number of timings are made, say seventy-five or more, and maximum, minimum and average values are noted.

Then comes the task of fixing the rates. In doing this allowance is made for odds and ends of things that must be done during working hours and also for a reasonable amount of speeding up under the stimulus of the piece-work plan. This work is done in great detail and, once done, the contract prices are not disturbed unless conditions change or the job is modified.

As an example of the making up of a price, take a small piece like the wood base-block for a car-door cutout snap switch. This is a piece which requires a finish all over, rounding of the corners, slotting underneath and a little shaping on the bandsaw machine.

First, a study is made of the time required to get the several machines ready for use. For this the workman



This Boring Mill Is a Valuable Unit in the Interborough Piece-Work Scheme

is allowed 81 cents, regardless of the number of pieces ordered. He is then allowed 3.913 cents per piece, which is the sum of the following items, each of which has been made the subject of careful time study:

A—Cross cut to over length	0.015	cent
B—Rip to over width	0.03	cent
C—Joint to give true edge	0.054	cent
D—Re-rip	0.02	cent
E—Dress to thickness	0.047	cent
F—Square and cross cut	0.135	cent
G—Cut slot, single cut	0.092	cent
H—Band saw to shape	1.1	cents
I—Bore four $\frac{1}{2}$-in. holes, six $\frac{3}{4}$-in. holes, jig work	1.45	cents
J—Round off all edges	0.97	cent
Total	3.913	cents

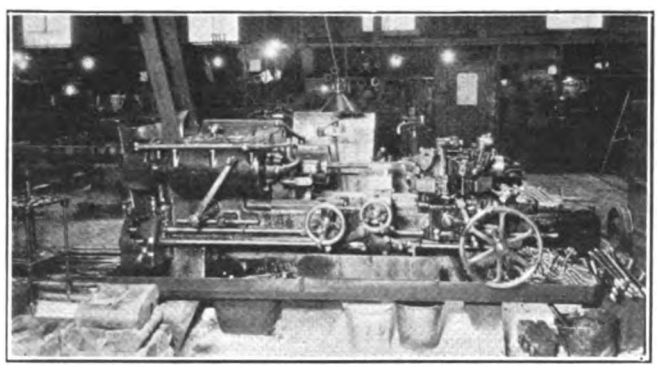
Thus on an order of 200 base blocks the workman would get

$$81 + (200 \times 3.913) = \$8.636, \text{ or}$$

4.318 cents each, whereas if he made but ten pieces the price would be 12.013 cents each. This, of course, illustrates the importance of getting out large quantities on each order.

The advantage of having a detailed analysis like this lies not only in the accuracy of it, but it renders very easy the changing of the contract price without new studies if one or more of the parts of the operation are omitted. Of course, if the job is expanded the new items must be priced from additional time-study data.

In keeping track of the work of each man, and of the group or gang engaged upon a given job, the daily form shown in Figs. 2 and 3 is used. Fig. 2 shows the



This Turret Lathe Turns Out Bolts at an Amazing Rate

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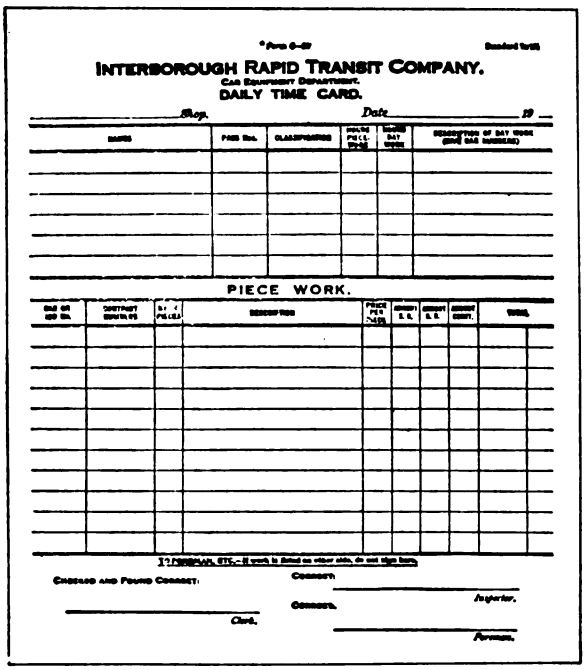
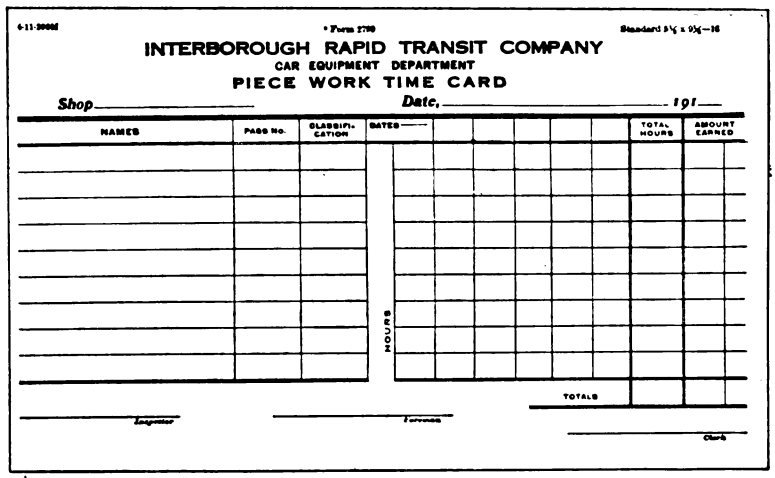
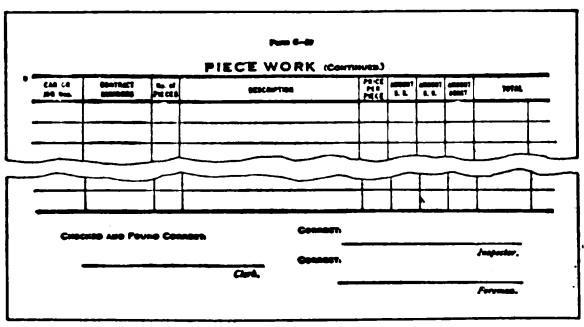
face of the sheet, which is 7x8 in. in size; while Fig. 3 shows the back, used in case extra space is required.

This form comprises two sections, one for a general summary of each man's work for the day, the other for a detailed statement of the work done by the gang as a whole on each contract. It will be noted that the work is detailed by contract numbers, every job of piece work being so identified. The particular job is noted also, or if it is a routine job on a car the car number serves as identification. The number of pieces, nature of the job, price per piece and amounts charged to slight repairs (S. R.), general repairs (G. R.) and construction are also given.

This slip is signed by the inspector or checker and the foreman or his clerk, these having agreed that







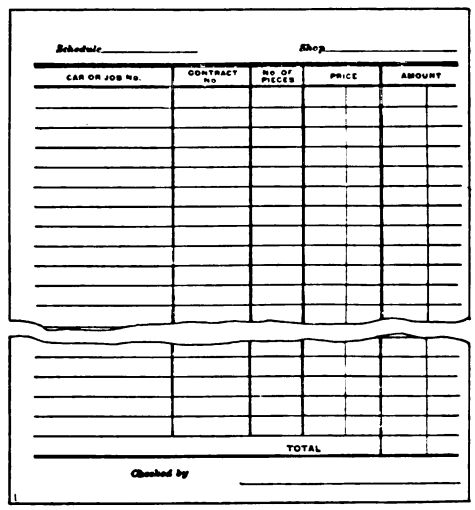


Fig. 2 (Above, Left) —Front of Daily Time Sheet Used on Piece Work, Interborough Rapid Transit Company

Fig. 3 (Below, Left) — Back of Daily Time Sheet

Fig. 4 (Above, Right) — Front of Weekly Piece-Work Time Card

Fig. 5 (Below, Right) — Back of Weekly Time Card (Printed lengthwise)

the work was properly done and in the quantity stated. The inspector and foreman co-operate for the purpose of insuring compliance of the work with specifications as to quality, and the inspector for this purpose is assistant to the foreman. He, however, is responsible to the head of the piece-work department.

Each week there is compiled also the piece-work time card for each gang, summarizing the information on the daily slips. This form is 5½x9½ in. in size. It is shown in Figs. 4 and 5. This form on its face calls for the total hours worked by each man and the amount he earned. On the back is a summary of the work done by the gang, the costs being segregated by contract numbers.

A third form (blueprinted) which is found useful is known as the "check sheet." This is shown in Fig. 1. Its main purpose is to prevent duplication. On this sheet, of which there must be one copy for each major job such as repainting, as covered in the list on page 445, the work is itemized in a column for each car. Then as work on an item is reported for a car it is entered at the appropriate point, furnishing a check against a second charge for a given contract on one car at the same time. It also checks against a car coming back too soon for a given repair. In this case if the repetition is found to be due to poor workmanship the workman is expected to "make good" by repairing the part without pay.

The piece-work plan is used by the Interborough for practically all jobs on which the workmen can be paid in accordance with the work done. However, as suggested earlier, some work is done under a bonus plan, principally car cleaning. To this work considerable attention was given in the 1912 article previously mentioned. The base daily wage rate is fixed for a reasonable number of cars washed per day. For all cars washed above this number the workman receives one-half of the rate per car that formed the basis of the daily wage. This plan seems better adapted to the class of labor employed in car cleaning as the men appreciate the assurance of receiving at least a minimum daily wage.

The equipment department of the Interborough is thoroughly "sold" on the piece-work system. The maintenance work is costing possibly 25 per cent less than it would under the time system and the men are better paid and more contented.

W. E. Strait, superintendent of economy, has direct charge of this department.

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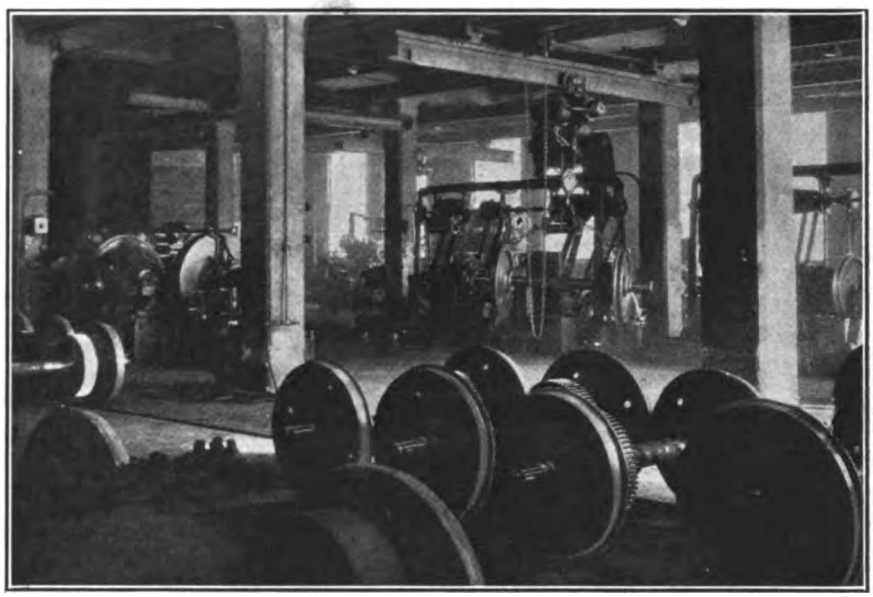
A Study, Covering Fifty Shops, of the Various Methods Employed in Pressing Off Wheels to Bring Out the Function of the Holes in the Gear Blank, Looking Toward a Standardization of the Number, Size and Location of These Holes—The Principal Methods and Devices Used Are Described and Pictured

Methods and Equipment for Removing Wheels

By C. W. Squier
Associate Editor ELECTRIC RAILWAY JOURNAL, New York, N. Y.

A PROBLEM of considerable proportion in wheel maintenance has gradually been forced upon electric railways, due to the trend of car and motor design. This problem is as to how wheels at the gear end of axles can best be removed without bending the axles or breaking the wheels. In the days of split gears, these could be removed readily and hence did not present any obstacle to wheel removal. When solid gears were first introduced, they were made from steel castings, and in order that gear weight might be reduced, the designer put as large holes as possible into the web. Where spokes were used there was a large space between them. With these designs there was no difficulty in pressing off the wheel at the gear end and leaving the gear in place, as there was ample room for jack pins, which could be inserted in most any desirable position through the holes in the web or between the spokes of the gear.



Wheel Shop of the Twin City Rapid Transit Company, St. Paul, Minn.

This shop occupies a space 50 x 80 ft., adjoining the truck shop. It contains the following machine tools: One wheel-turning lathe, one 200-ton hydraulic press, one standard wheel-boring machine, one double-head 48-in. boring mill, two wheel-grinding machines, one cutting off and centering lathe, one axle turning lathe, one axle grinding machine, one lathe equipped for boring a 2-in. hole through axles end to end, one milling machine, one key seater used on pinions, one gear cutter, capacity up to 60 in.; two cast-iron axle racks, one 100-ton hydraulic axle straightener and four electric hoists for serving the various machines.

When forged gears were first introduced, manufacturers followed the same general practice of putting as large holes as possible in the web. These holes were usually 3½ in. in diameter and were usually spaced on a 14½-in. diameter circle. This was in the days when practically all gears used with railway motors in city service were three pitch and usually had in the neighborhood of from sixty-five to seventy-one teeth. With these gears there was ample room for holes in the web, and the use of jack pins for removing wheels was the general practice.

When forged gear blanks began to be made for use on interurban cars, it was found necessary to use large hubs for the gears and frequently the outside diameter of the gears was very small. As a result, the space for web holes was considerably reduced, and the sizes dropped to as small as 1¾ in. in some cases, and in others it was found necessary to eliminate web holes entirely. With the introduction of the safety car, it was found impossible to maintain the same center distance between the web holes or to use the same diameter for these holes.

As a result of these advances in car design and service, nearly every gear has now developed into a special engineering problem for the location of the web holes. If the railway operator has a dozen different types of motors, the gears that are furnished for the different motors may have a dozen different sizes of web holes and different spacings of centers.

Some time ago the Carnegie Steel Company, which was the leader in forged gear blank production, endeavored to build up a series of standards for the size and spacing of the web holes. Considerable difficulty was experienced, however, in deciding on sizes which would cover satisfactorily the large range. Another complication arose from the fact that a different die may be used for two gears that, from the customers' standpoint, seem alike, one, however, being used on a larger axle than the other, which necessitates a larger hub and therefore a different die. Of course, this affects the space available for web holes. Another difficulty which prevents location of the holes close to the hub comes from the sloping web of the gear. This makes it necessary to locate the center of holes at the bottom of the dish and also to limit the size of the holes. Otherwise, in starting to drill the web hole, the drill point would not touch the web, so that in effect it would be trying to drill a hole with the side of the drill. At the present time, the American Gear Manufacturers' Association has a committee working on this subject and the Carnegie and Cambria Steel Companies

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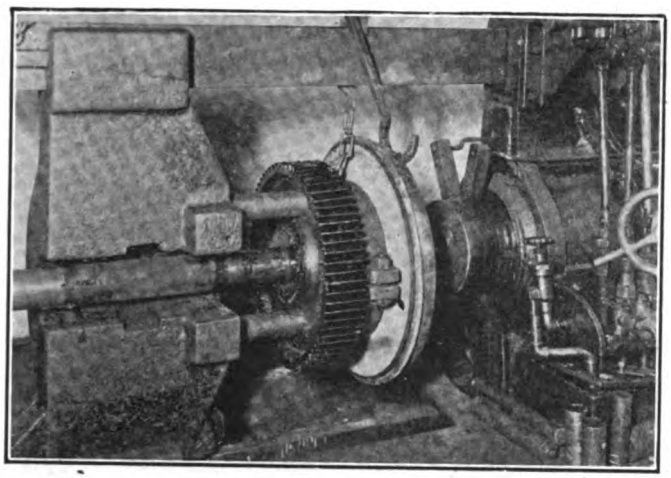

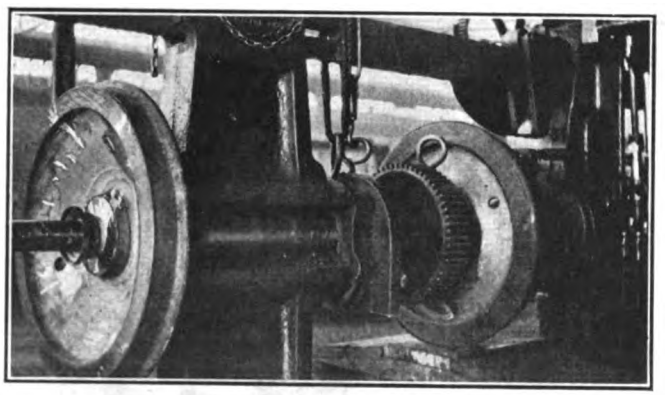

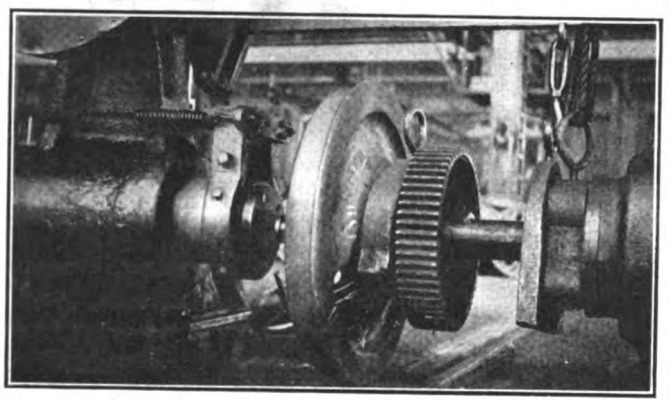

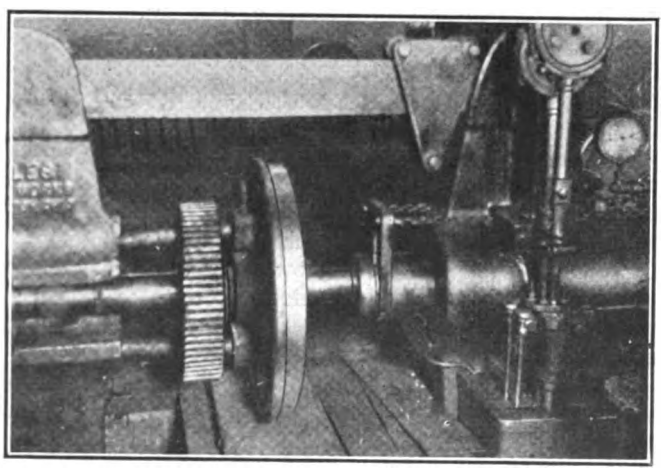

Jack Pin Methods of Wheel Removal

At top—Jack pins through web holes in gear, together with clamping collar between gear and wheel, used by the Capital Traction Company, Washington, D. C.

Second and third views—Jack pins through web holes in gear, together with yokes at ends of jack pins, used by the Louisville Railway.

At bottom—Jack pins through web holes in gear, with U-shaped yoke between gear and wheel, used by Twin City Rapid Transit Co.

have developed some tentative standards which are being considered for recommendation to various committees interested in this subject.

"JOURNAL" MAKES STUDY OF PROBLEM

The foregoing summary of the development of gear blank design indicates how the problem of removing wheels at the gear end of axles has gradually been complicated for car maintenance men, and a large variety of special tools and fixtures have been designed in order to care for the new condition. Realizing that this problem was of particular interest to the operators, the ELECTRIC RAILWAY JOURNAL sent out a questionnaire to obtain information in regard to the various practices in use and the difficulties which were experienced. This information has been added to through personal visits to a large number of electric railway shops, so that altogether information has been obtained from more than fifty electric railways regarding the practices used.

Before taking up a description of some of the methods used and the special equipment found necessary for removing wheels, it will be interesting to note the various sizes of wheel presses employed and the maximum pressures found necessary for removing wheels. Information obtained indicates that the wheel presses range in size from 150 to 400 tons. By far the largest number of electric railway shops, however, are using the 300-ton size. Pressures used for removing wheels vary from 70 tons to 350 tons. However, with pressures in excess of 150 tons, there is danger of breaking the wheel or bending the axle, and a large number of railways heat the hub of the wheel where high pressures are found necessary rather than to increase the pressure to dangerous amounts. From the information gathered, it appears that for cast-iron wheels safe working pressures range from 75 to 100 tons, and for steel wheels from 125 to 200 tons.

SOME METHODS USED FOR REMOVING WHEELS

Various devices have been developed by electric railway shops in order to utilize their presses for removing the wheel without removing the gear. Some roads, particularly those which have interurban service or high-speed rapid transit service, such as elevated or subway trains, have adopted the practice of removing both the gear and wheel at the same time. These roads take advantage of the wheel and gear removal to examine the axles for flaws and to test them for trueness. The majority of cars in this class of service have large motors, and as a result, the gear and wheel hubs come very close together. Where both gear and wheel are removed at the same time, the usual method consists of holding the gear stationary by means of a heavy yoke, which rests against the stationary yoke of the wheel press. Pressure is applied to the outside end of the axle, so that this is really pushed through the gear and wheel. Where possible most roads leave a little space between the hubs of the gear and wheel, so that the gear will move first. This, of course, reduces the pressure necessary for the initial movement. When the axle is moving through the gear the pressure, of course, is again increased when the gear hub comes in contact with that of the wheel. After the wheel is started, the pressure again reduces. Of the various railways from which information was obtained about one-sixth were found to employ the practice of pressing both gear and wheel off simultaneously. In general, the practice is to return the gear to the same size axle.

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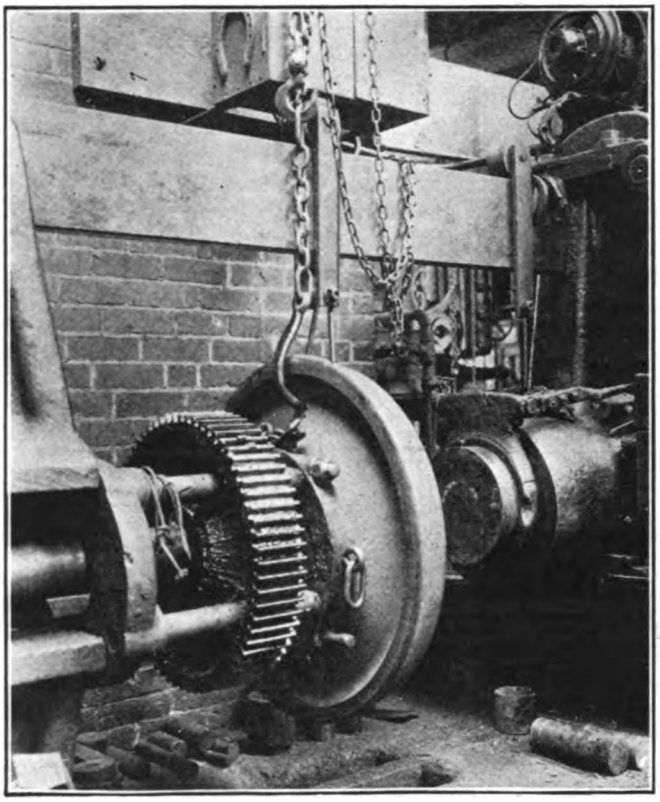
The methods used for removing wheels without removing the gears can be divided into two general classes: First, the use of jack pins or a device with pins which operate through the web holes in the gear and thus press against the wheel as near to the hub as possible. The second class of devices are those which are applied outside of the gear diameter, and in most cases the wheel is pushed off by having a rigid support for the wheel at the rim. With this latter method care must be used to make certain that the pressures are not excessive, otherwise there is danger of breaking the wheel or bending the axle, since the point of support is so far from the axle. From the information gathered, it is learned that more than one-half the railways use the web holes in the gear and either jack pins or special devices to apply pressure to the wheel; one-third use devices applying pressure to the wheel outside the gear circumference.

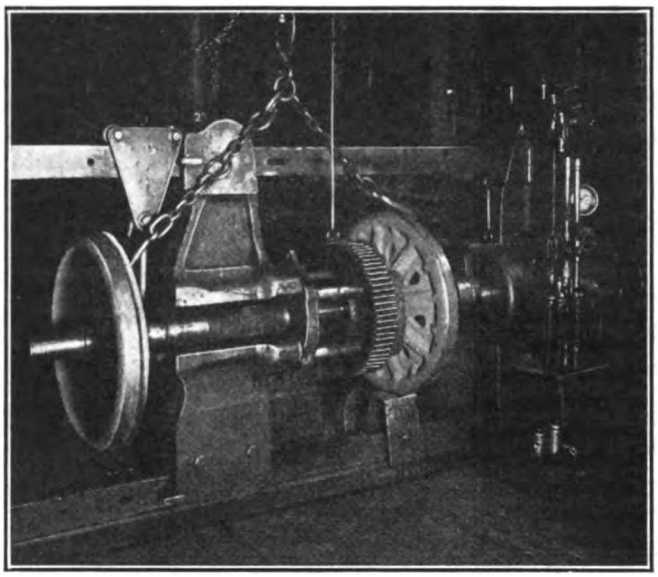
Of the railways using jack pins, the most common method seems to be to employ a split collar between the gear and the wheel. This type of collar usually has lugs on either side and the two parts are held together by bolts. An accompanying illustration shows this method as used by the Capital Traction Company, Washington, D. C. In this case the cast-steel collar or "wedge block," as it is termed on that system, has a plane surface on one side, while the other side is turned to fit the contour of the web of the wheel. The web of the gear shown in the illustration has holes 3 in. in diameter, spaced on a 14½-in. diameter circle. As the wedge block is made in two pieces and bolted together, this can be enlarged, if found advisable, so as to accommodate a different diameter for the spacing of the web holes or even to such an extent as to put the pressure outside the gear if necessary. In the illustration the gear is a seventy-tooth three-pitch type, and the wheel is 31 in. in diameter.

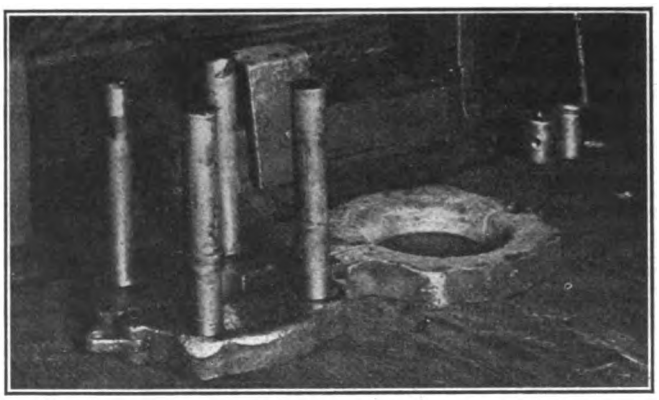
One railway which employs this method reports that eccentric jack pins are used so as to overcome the difficulty when web holes in all the gears are not uniformly spaced. This latter road uses a U-shaped block bolted to the head of the wheel press, and four eccentric jack pins. The collar between the gear and the wheel is of cast steel, having one side straight and the other concave to fit the wheel surface.

Other roads which use this method have found it necessary to enlarge the holes in the web of the gears by cutting out with an acetylene torch. Thus, one road reports difficulty where the holes were but 2 in. in diameter. The small jack pins necessary buckled under the pressure. These holes in the web of the gear were cut to 2½ in. diameter, and larger push pins have been used satisfactorily. In this connection care should be used in the manipulation of the torch, as it is possible to injure a treated and hardened gear so as to decrease its durability and set up serious strains. Chrome nickel or nickel steel push pins may also be used to give a stiffer construction with less tendency to buckle.

Several roads use a horseshoe-shaped yoke between the gear and the wheel instead of the split collar. Jack pins are then used through the web holes, resting with one end against the yoke and the other end against the frame of the wheel press or against other U-shaped yokes to take up the necessary space. Accompanying illustrations show this method as used by the Louisville Railway, and also by the Twin City Lines in St. Paul, Minn. The yokes are fitted with an eye-bolt for convenience in handling and have one side shaped so as to







Stool-Type Equipment for Wheel Removal

At the top—Stool with legs through web holes in gear, together with clamped collar between gear and wheel, as used by the United Electric Railways, Providence, R. I.

Center and bottom—Four-legged stool split and hinged to provide for placing around axle, together with clamping collar, used by the United Railways of St. Louis, Mo.

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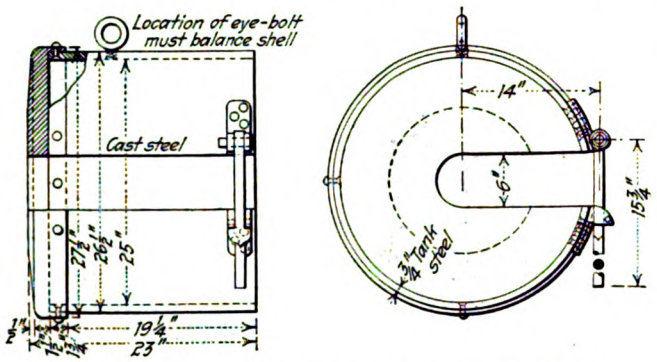
form a good bearing surface against the wheel face, where they fit around the axle. On some roads which have wide gage lines so that there is considerable space between the hub of the wheel and that of the gear, the yoke is made to fit against the hub of the wheel with a projection at the top to reach the wheel web.

Some roads employ the jack-pin method with a yoke between the gear and wheel where gears are provided with web holes, but where the gears are not furnished with holes or with holes of small diameter, a heavy bar



Thimble Attachment for Pressing Off Car Wheels Used by the Birmingham Railway, Light & Power Company, Birmingham, Ala.

is placed against the rim of the wheel and the jack pins are then used outside the gear.

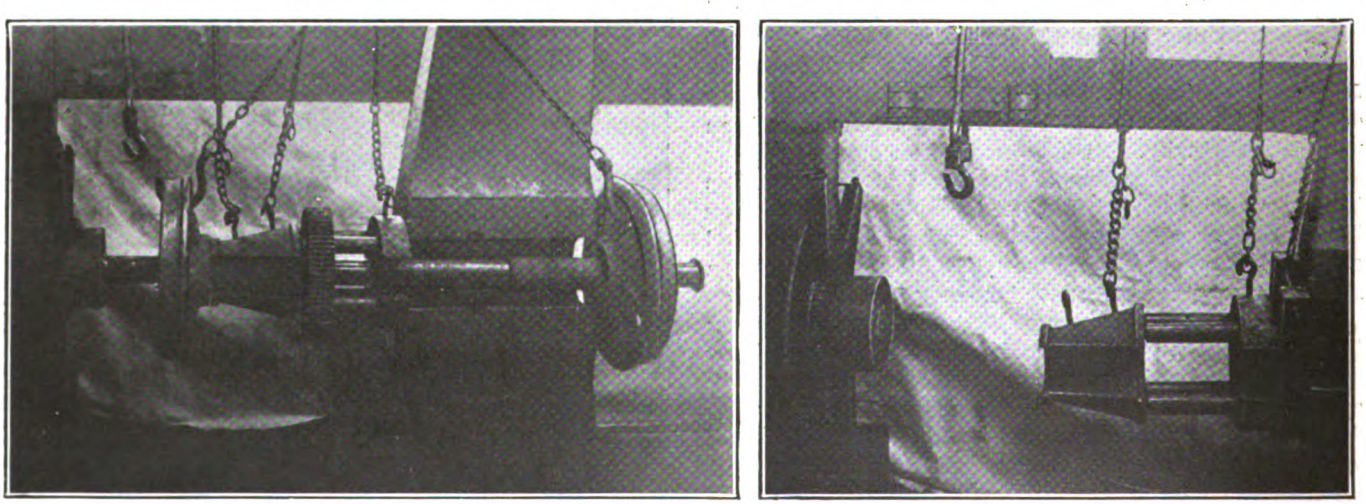
A number of roads which reported using the jack-pin method made no mention of using either yoke or a split collar between the gear and wheel. Due to the sloping surface at the hub of the wheel, however, there is danger of bending the jack pins or of causing excessive strains to the gear or wheel which may result in breakage of the wheels or bending of the axles unless some sort of plane surface is provided for the ends of the pins to rest against. One road reported the use of a special head, which it had welded to the wheel press. This head is provided with receptacles for the jack pins, so as to give them a somewhat firmer support than that provided by simply resting against the press frame.

Several roads which essentially employ the jack-pin method report a much more elaborate fixture in the shape of a stool with one side left open so as to pass over the axle. Stools are provided with either three or four legs, depending upon the number and spacing of the web holes. The legs extend through these holes and rest against a collar between the gear and wheel, or a U-shaped yoke. Accompanying illustrations show this method as used by the United Electric Railways of Providence, R. I., and the United Railways of St. Louis, Mo. The use of such a stool makes it unnecessary to use an additional yoke for the jack pins to rest against at the wheel-press end, and in addition the legs have a very firm support at one end so that there is less danger of buckling or bending. The form of stool used by the St. Louis Company is split through the center and has a hinge arrangement at one side, so that this can be opened and inserted around the axle, and then clamped together.

The Wilmington & Philadelphia Traction Company has wide gage track. It uses a slotted stool type of fixture, and in addition a casting which fits between the wheel hub and the gear. This casting is slotted so that it can be installed over the axle. One end is made small enough to fit against the hub of the wheel while the other end is considerably larger in diameter and has a flat surface against which the ends of the stool legs rest. The head of the stool fits against the frame of the wheel press as shown in the accompanying illustration. Hook bolts are installed in the various parts for convenience in handling, and also to provide a support by means of chains while the wheel pressing operation is taking place.

Present Practice Regarding Size of Web Holes and Spacing

In connection with the use of jack pins or the stool method for removing wheels, it is interesting to note the present practice in regard to the size of holes used and also the spacing desired. Information was obtained from the various roads in regard to this point. The sizes of holes vary in diameter from 2 in. to 3½ in., with the majority using 2½ and 3-in. holes. In regard to the spacing, all seem to agree that it is desirable to have the holes as close to the hub as practicable. Present practice indicates the use of either two, three or four holes on a circle varying in diameter from 11½ in. to 15 in. The majority of railways expressed the opinion that some definite spacing was desirable, although several stated that they could accommodate their tools to almost any spacing, but of course permanent devices would require modification if the diameter or spacing



Four-Legged Stool, Together with Special Collar to Go Between Gear and Wheel Hub, as Used by the Wilmington & Philadelphia Traction Company

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was changed from the present practice. If a standard were adopted, however, they could readily arrange their devices to take this standard, and then there would be no further changing.

Information was also obtained as to how the various railways remove their wheels, if the gears have web holes, diameter of holes, or spacing differing from their standard. The following are some of the answers received to this question:

"With small gears we remove the wheels by using a cast-iron block, putting pressure against the rim of the wheel. I should object very strongly, however, to the entire elimination of the holes in the web of the gears which are large enough to have them, as they prove of considerable advantage."

"As yet have not had to remove any wheels with small gears. When the time comes, we will probably use a steel thimble to surround the gear and push against the rim of the wheel and will heat the hub of the wheel so as to facilitate removal."

"Where gears do not have holes in the web, we use a yoke on the front block on the wheel press, and then use the push pins on the outside of the gear, with the ends against the rim of the wheel."

"Where gears are not provided with web holes, we either press off both gears and wheels at the same time, or our most recent practice is to burn web holes in the gears with our oxweld outfit."

"We have no such condition at present, but if such was the case, we would use a shell over the gear, with one end resting against the press and the other against the rim of the wheel."

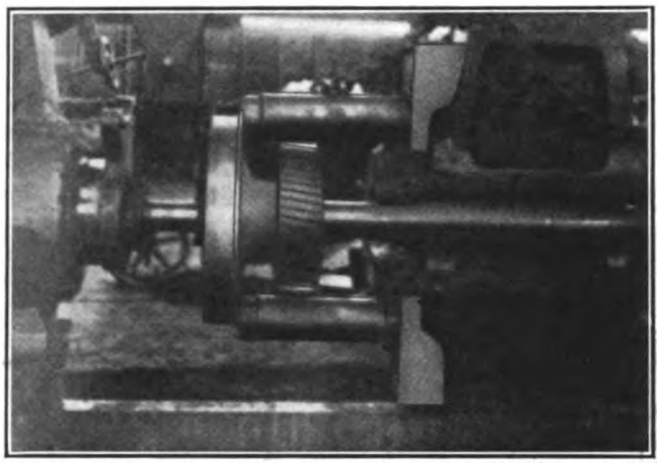
"Where the web holes do not fit our fixture, we cut holes or enlarge them with the oxyactylene torch. We have not removed any wheels without holes in the gears so far, but for our safety car wheels we will probably make a special fixture to go over the outside of the gear."

"In some cases we are able to remove the wheel by placing two steel blocks against the rim of the wheel outside of the gear, but if the wheel does not start at a pressure less than 70 tons, we then press off both gear and wheel together. On the larger sizes of axles we usually heat the hub of the wheel with a gas burner in order to reduce the pressure necessary for pressing off."

A considerable number reported that where gears have no web holes both gear and wheel are pressed off at the same time.

Use of Devices Over Outside of Gears

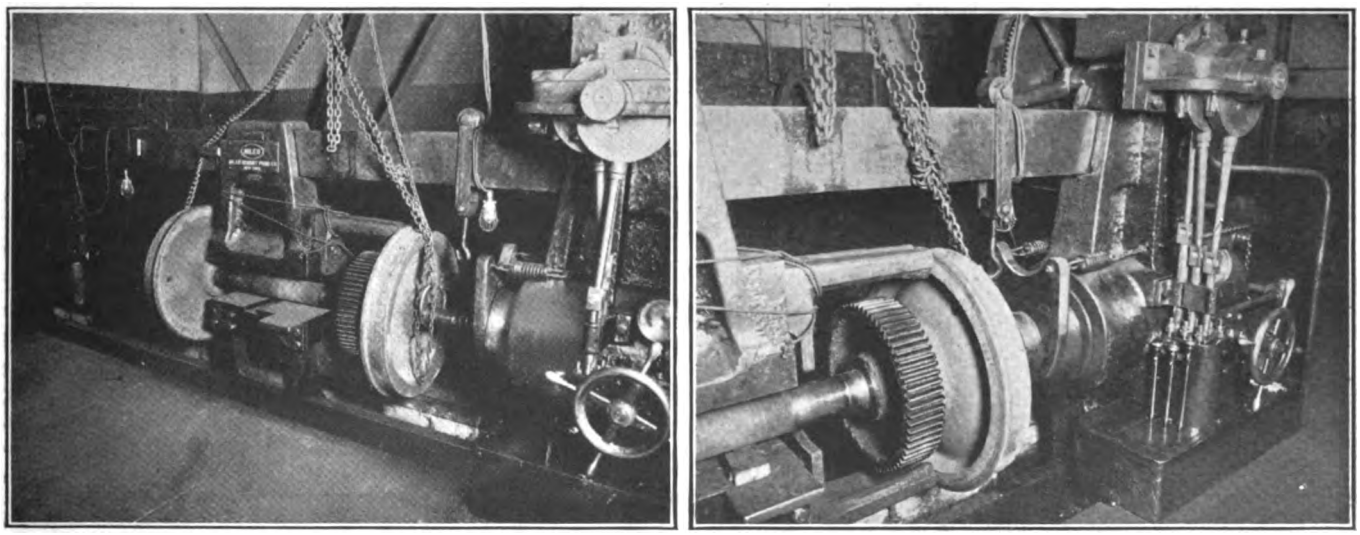
Another class of devices used is of the type which passes over the outside of the gear, and either presses directly against the rim of the wheel or else has collars or extensions to go down to the hub of the wheel. In the information obtained it was found that a large number of roads use rectangular steel blocks, with the ends resting between the frame of the wheel press and the rim of the wheel. A slight modification of this is used by a number of railways which consists of the use of a steel collar, which is inserted between the gear and the wheel. The rectangular bars then rest against the top of this steel collar, and the strain is transmitted over a larger surface of the wheel than would be the case with bars resting directly against the rim of the wheel. The steel bars most generally are about 2 in. x 6 in. in cross-section and of varying length depending upon the space necessary to provide clearance for moving the wheels.



Large Round Bars Outside of the Gear, with Special Yoke on Wheel Press, Used by the Northern Ohio Traction & Light Company, Akron, Ohio

An accompanying illustration shows the equipment used by the Northern Ohio Traction & Light Company in its Akron shops. Round bars are used over the outside of the gear and rest against the rim of the wheel. A special casting has been made to receive the ends of the bars as they rest against the yoke of the wheel press.

The line cut shown on page 450 illustrates a steel thimble as used in the shops of the Birmingham Railway, Light & Power Company. The cylindrical portion passes over the gear and the closed end portion rests against the wheel. A. Taurman, superintendent of equipment, reports that since putting this tool into operation he has found that the pressure necessary to remove a wheel from the axle is greatly reduced. This is due to the fact that there is a more even distribution



Special Yoke with Arms Extending Over Gears Used by the East St. Louis & Suburban Railway

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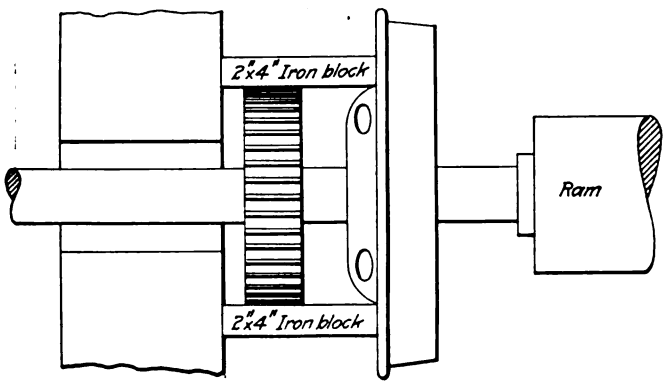
of the pressure on the wheel than is possible to get with any device which depends upon pins projecting through the gear. The pressure necessary to remove the wheels in the Birmingham shops at present corresponds very closely to the pressure with which they are applied, which was not the case before this device was used. The bending of axles has been entirely eliminated.

The Tri-City Railway in its Rock Island, Ill., shop uses a large semicircular steel collar, which extends around the circumference of the gear and fits snugly against the frame of the press and the flange of the wheel. A description of the method used by this company in removing its wheels was published in the ELECTRIC RAILWAY JOURNAL for Jan. 17, 1920, page 161. The use of special devices in connection with wheel mounting and wheel removal work has greatly simplified the process, so that it is carried out by one man



Push Bars Over Gear Used by the Eastern Massachusetts Street Railway, Chelsea, Mass.

with practically no lifting and requiring very little special skill.

The East St. Louis & Suburban Railway uses a U-shaped casting with two arms which extend outside the gear for removing wheels. This device is made of cast steel, and the ends of the two arms rest against the rim of the wheel to be removed. Accompanying illustrations show this device and its method of use in removing wheels. It is pictured in use with steel wheels, but the company reports that it works equally well on cast-iron wheels and that no difficulty has been experienced in breaking or bending of axles.

Some of the comments made by master mechanics regarding their practice and what is desired in order to produce simpler and more universal methods of wheel removal practice are of interest and are given in the following:

"We use both the yoke and push pin method. Our only reason for preferring holes in gears is to kill the noise and stop the ringing, which we have found particularly annoying with solid gears."

"We remove gears at the time the wheels are removed, so that the axles may be placed on lathe centers and tested for trueness and to permit an examination for flaws. Experience has shown us that it is a dangerous practice to try to remove the gear and wheel at the same time where the hubs meet, because the starting pressure for each is so great that in order to start them moving a sprung axle often results. Our road operates interurban cars with steel wheels."

"On interurban wheels we have never tried to remove the wheels without removing the gears. The holes through the web of the gear in this class of equipment do not come in such a position that it is possible to use them, as they are opposite the curved surface of the web of the wheel, which makes it impracticable to apply sufficient pressure to remove the wheels. For interurban service, it is necessary that the gear and wheel hubs come very close together. We have made it a practice to see that there is space left of at least ½ in. between the gear hub and the wheel hub, so that in pressing off the gear and wheel, the gear will be started first, as we find that the pressure required to remove the wheel and gear at the same time is very much in excess of that required by this practice. As a rule, the minimum pressure required on a 7-in. wheel fit is 70 tons, being 10 tons per inch of diameter. The maximum pressure for this fit is around 85 tons. We frequently find that a pressure of 150 tons is insufficient to remove the wheels. In cases of this kind we heat the wheel slightly with a large kerosene oil torch in order to avoid excessive pressure, which is liable to spring or bend the axle."

"We have found it good practice to remove the wheels with the gears, due to the fact that on a cast-iron wheel you cannot get a solid or true enough surface in order to press the wheels off, and with high pressures there is danger of bending the axle. Very high pressures are necessary with steel wheels, and consequently the danger of bending axles is more pronounced. It appears to us that steel wheel manufacturers should provide a flat space on the face of the wheel and thus give a solid foundation for pressing the wheels off without pressing the gears off at the same time."

"On our 26-in. and 27-in. diameter wheels, we are preparing to use a steel casting in the form of a cylinder large enough to fit over the outside diameter of the gear and press off the wheel by bearing against the back of the press. If this steel cylinder will do the work, the need for openings through the web of the gear will, of course, be eliminated, and I am in hopes that the results will prove satisfactory."

From the foregoing it is evident that wheel removal practice is closely connected with gear design. It seems to be quite essential that the web holes be incorporated in gears wherever space will permit, since more than one-half the railways now make use of them in pushing off wheels. Their presence provides a convenient method of wheel removal and allows pressure to be applied to the wheels at points close to the hub, so that there is less danger of wheel breakage or bending of axles. Aside from their use in connection with the removal of wheels, they are also of advantage in reducing weight and breaking up vibration which results in noise. All concerned, however, will be benefited by a standard size and location of the web holes, and any changes in special wheel removal fixtures that might be required if definite standards were adopted could be easily made.

Where web holes cannot be incorporated conveniently, or where they are of insufficient size to permit of use for wheel removal, it is evident that with proper precaution the method of wheel removal with the use of devices placed outside the gear will prove entirely satisfactory. Roads using this method prefer it to the jack-pin method, and when the devices are once made, there is no further need to worry about the size and location of the web holes.

Engineering Symbols and Abbreviations to Be Standardized

AT THE request of a number of national societies, the American Engineering Standards Committee recently called a conference of representatives of interested organizations for the purpose of starting a movement to standardize symbols and abbreviations. The conference decided to include, as part of its project, the graphical symbols used in engineering drawings, diagrams and the like, for representing instruments and apparatus and component parts of them. The work will go forward under a committee organization developed in accordance with the rules and procedure of the A.E.S.C. The co-operation of foreign standardizing bodies will be sought.

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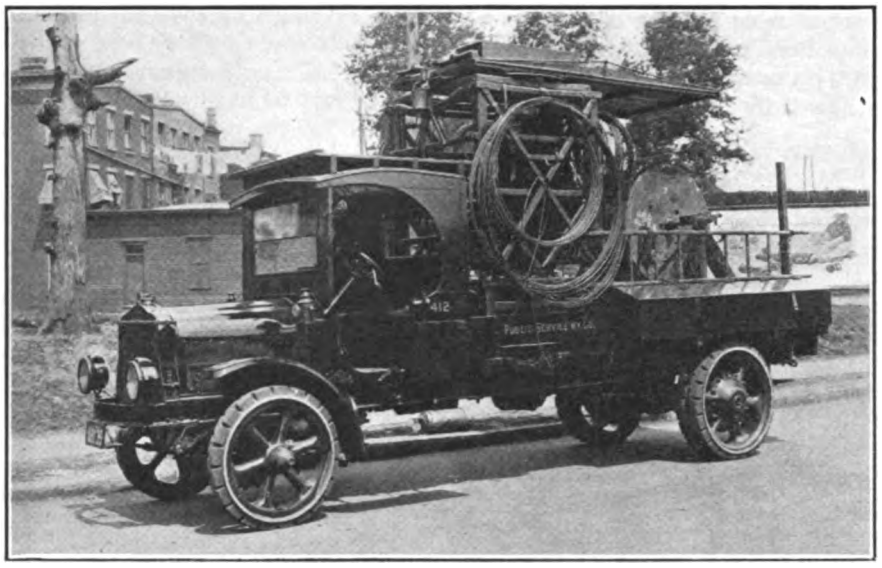

Gasoline-Driven Tower Truck

The Power Distribution System and Its Maintenance

A Summary of the Elements of a Good Distribution System with Detail of the Plans Used on a Large Railway Property for Keeping the Overhead in Condition—Records Play an Important Part in This Work

By M. B. Rosevear
Superintendent of Distribution, Public Service Railway, Newark, N. J.

ELECTRIC street railways are an important element of our national transportation facilities, and the power distribution system of an electric railway has as its center the power station, from which radiate the feeder cables which must deliver to the cars under all conditions the energy required for successful operation.

The first problem of the distribution engineer is the proper location of this source of power, This is true not only in the case of a new property but should be kept prominently in mind even on established systems.

We may now be said to be in the third stage of development with respect to the source of power supply. The first stage was that of the engine-driven, direct-current generator, which, if properly planned, was so located that coal, water and other essential supplies were conveniently available in sufficient quantity, of proper quality, and at reasonable cost. This resulted in the concentration of heavy loads at single stations and it was necessary to transmit power at high cost for long distances.

The second stage was that of the manual substation, power being transmitted from the generating station to the substation at high voltage and therefore with greater economy, and then distributed from the substation to the cars at trolley voltage. This method was an improvement over the first, power being generated in greater quantities by more efficient plants, which did not need to be located so close to the car lines as with direct-current stations. The load was divided among several substations, and this better distribution made possible the satisfactory operation of larger electric railway systems. But even then there was still too great a concentration of load at single stations and the feeding distances were still too long.

The automatic substation has marked the third stage, bringing our direct-current supply source even closer to the car, the ultimate consumer, and reducing not only labor costs, and losses on both the positive feeders and negative return, but, as has been demonstrated by the numerous existing installations, giving more satisfactory operating results than is possible with manual operation. Although the automatic railway substation has been used for a number of years and has passed the point of being merely experimental, it is yet susceptible of further development. The relative merits of the single unit and multiple-unit automatic substations are worthy of careful consideration, but frequently the practical problem of obtaining suitable property, especially where there are zoning laws and other limitations, may be the determining factor.

While there are as yet no automatic substations on our property, they have been a subject of intensive study and we expect before many months to have one or more in operation. One phase of our problem is limiting damage from underground cable failures. With manual operation of supply stations there have been occasions on various properties when the failure of a large-capacity cable has had disastrous results, damaging other cables and at times even burning up entire duct lines. Automatic substations in underground territory, therefore, require protective apparatus that will

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immediately disconnect a cable in case of failure, and not permit its reconnection until conditions are safe, and yet not interfere with operation under normal conditions even with typical railway load fluctuations.

SECTIONALIZING THE TROLLEY IS A FACTOR IN MAINTENANCE

In the second place, the distribution engineer is concerned with the sectionalizing of the trolley wires. Fig. 2 shows the various trolley sections on a portion of one large railway system, the details being described more completely later. In general, section insulators are placed near junction points, loops and turn-back points, and so located that in case of a wire down, or power off on one section, the interruption to service will affect

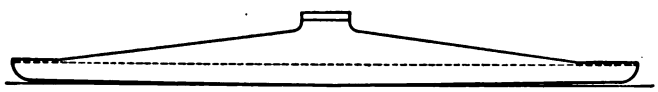

Fig. 1—Trolley Ear on Which Maintenance Is Low

only a restricted district. In case of long delays, cars can be turned back at crossovers and loops. Still further sectionalizing may be required if the service on a given section is too heavy for a single circuit. In the congested portion of the system above referred to some of the sections are less than 1,500 ft. long, while two important intersections have special feeders. Our experience has made us limit the size of sections in congested territory to an average of 1,500-2,000 amp., that is, to the capacity of two paper-and-lead cables of not more than 1,500,000 circ.mil area each, and usually 1,000,000 circ.mil each.

Car service and routing must be carefully checked in order to note changes in loading. While this may be done by watching the time-tables, there are times when trippers are used without being shown on the table, and there may be other factors, so that we have found it helpful to have "five-minute" readings taken once a month for the peak load from 5 p.m. to 7 p.m. for every railway feeder at every station. These are averaged for the highest thirteen consecutive readings and listed, with the maximum swing, in a book for ready reference. While this method is admittedly somewhat rough and ready it has been found by years of experience to give a very helpful check on individual section loads. A special check or study of a particular section may be made if the "load book" indicates that it is advisable. Such follow-up methods may require installation of reinforcing feeder or may permit removal of feeder or its transfer from one point to another.

THE FEEDER SYSTEM FROM THE MAINTENANCE STANDPOINT

The distribution of power from the supply station to the trolley section may be by either aerial feeders or underground cables. There are places where the placing of cables underground is proper, there are other places where only the aerial feeder would be considered. In those places where the question is at all debatable the placing of railway feeder cables underground should be avoided as long as possible for several reasons. For one thing, an underground cable is more subject to failure because it cannot be completely inspected; tests that can be made with present equipment have not proved entirely satisfactory; it is subject to mechanical injury, and being connected to the aerial trolley may at times be damaged by lightning. It also has a more limited current-carrying capacity and not only costs more of itself but requires the construction of a con-

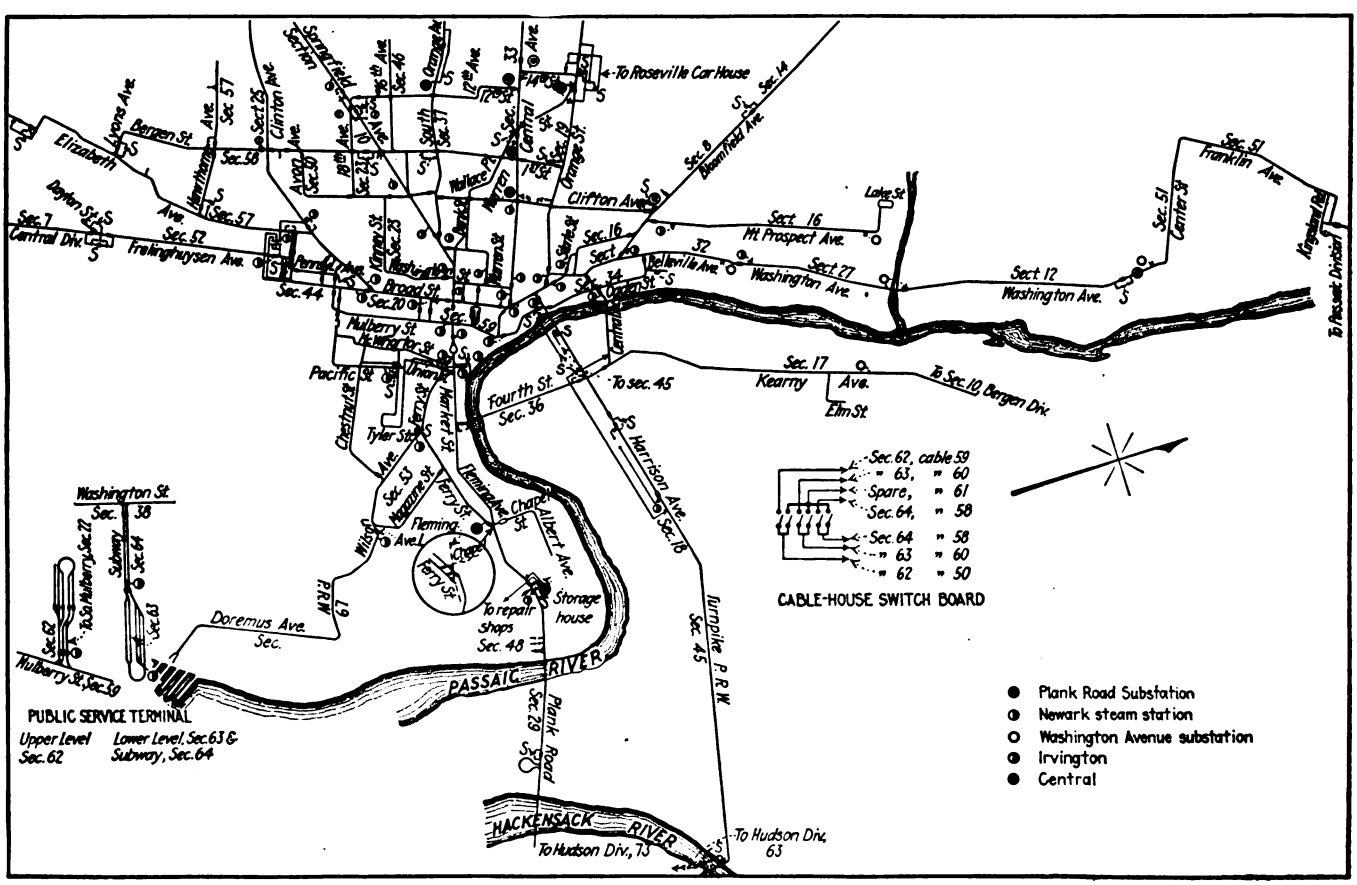

Fig. 2—Large Scale Map for Use in Maintenance of Distribution System

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duit line, or rental of duct space from another concern; both of these increase the cost, and the joint use of duct lines has the further disadvantage of increasing the hazard in case of cable failure.

Inasmuch as the electric railway must maintain its poles for the support of the trolley contact wire, there is no compensating saving for the extra hazard and expense of placing wires underground.

Where only 600-volt d.c. cables are concerned, periodic tests of insulation resistance may tend to reduce failures. These tests may be made with a megger or with a voltmeter of very high resistance, say 1,000,000 ohms on the 750-volt scale. We have found the voltmeter method preferable.

Where higher voltage cables are involved more elaborate tests are necessary, as was brought out at the recent convention of the American Institute of Electrical Engineers.

Securing a Substantial Supporting Structure

Probably wood poles have been most extensively used for the support of the overhead wires, but the increasing scarcity and cost, particularly of chestnut poles, which have been used extensively in the East, makes it advisable to substitute poles of a more permanent character. This may be done either by proper methods of preservative treatment for wood poles (a subject now under consideration by a special committee of the American Electric Railway Engineering Association) or by use of metal or reinforced concrete poles. Where metal poles are used, care needs to be exercised in the selection of a pole that can be readily reinforced at the ground line where it is most subject to corrosion. It is also important that metal poles be so designed that there are no shelves or pockets where moisture may collect and increase the corrosion. For illustration, the specifications of the A. E. R. E. A. Manual section Ds-5b, for tubular steel poles require "the top of the outer pipe to be chamfered to shed water" at joints.

Poles of structural shapes, whether made from one piece, as the Bates pole, or built up of several pieces, should be so designed that they can be easily inspected, cleaned and painted.

The reinforced concrete pole has given satisfactory service when properly designed and would probably be more generally used were it not for the greater weight involved. This objection has been overcome to some extent by centrifugally cast, hollow poles—the Massey pole for example—which give a denser structure and greater strength for a given weight than is found in the solid pole.

In city service the joint use of ornamental poles for both railway wires and street lighting is desirable. A photograph reproduced illustrates such a combination pole which has been used extensively and given satisfaction. This pole is 30 ft. long, and weighs about 800 lb. with the reinforcing sleeve at the ground line, the sections being 5-6-7 in. nominal diameter. A slot is cut in the pole below the ground, and the lateral cable for the lamp brought directly from the manhole and up inside the pole and bracket, through a second hole in the pole, to the lamp. It will be seen by looking at the line on the opposite side of the street that several railway aerial feeders can be mounted on a crossarm, the whole making a neat, attractive installation.

The maintenance cost is also somewhat less to the railway in the case of joint poles as the railway company construction, unless it has transmission lines, is always in the lowest position, and it therefore uses the shortest poles of any utility. Care must be exercised in agreeing to joint pole use not to increase maintenance costs, each company being entitled to show some benefit to itself as well as contributing to the general improvement in appearance.

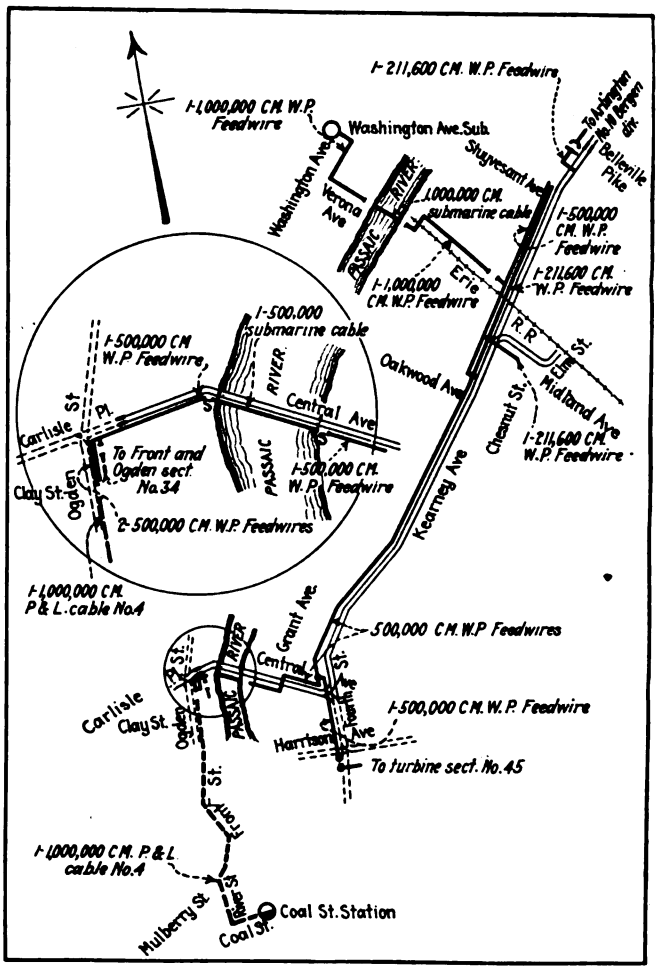

Fig. 3—Sample Individual Section Map as Used on One Large Property

Special Ear for Reducing Trolley Wire Wear

The cost of replacement of trolley wire is the largest single item of expense in the power distribution group of accounts. Therefore anything which serves to reduce the wear and increase the life of the wire is of direct financial value.

In general, the wear on trolley wire at the ear governs the length of time the wire can be kept in service. With this in mind a type of ear was developed for our use about five years ago which it was believed would reduce the wear. The principal feature of this ear (See Fig. 1) was a gradual taper from each end to the center directly under the boss where the ear fastens to the hanger. The ear is cast, of the clinch type. At each end it is merely deep enough to come slightly below the middle of the wire, after being clinched, while at the center it is deep enough almost to encircle the wire.

This ear was installed with new trolley on a test section on an upgrade, where for many years the average life of wire was about two years. In November, 1922, the wire was finally replaced after four years service, which means that the life of the wire was doubled merely by changing to the new style ear, the car service being if anything somewhat increased over

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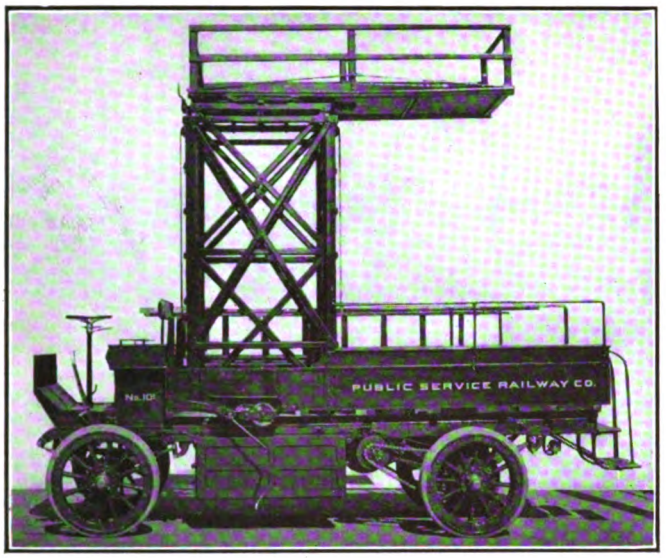

Electric Vehicle Which Has Served More Than a Decade in Overhead Maintenance Work

the earlier period. After renewal the old wire was found to have a cross section equal to 66 per cent of that of the original wire. It is of further interest to note that the new ears wore just as long as the older type, six sets of ears having been used during the four-year period. It was found that the wire at the point of support did not wear so as to require installation of any splicing ears prior to July, 1922. While we have no similar definite figures for the old type ears we know the record with the new type is much better in this respect.

It is also interesting to know that an ear of very similar design has been used on the Market Street Railway, San Francisco, for a long time, and that both companies developed the improved type independently.

Equipment for Use in Maintenance Work

To take care of the routine and emergency work of the department, there must be suitable and satisfactory tools and vehicular equipment. The vehicle is used both as a means of transportation for men and materials and as a tool during the performance of the day's work.

Local conditions have great weight in the determination of the type of vehicle used. For the small property the horse-drawn vehicle may even today be the most suitable for highway use, while the line car is, of course, required for work on private right-of-way. On the larger property, particularly if scattered over a wide territory, a motor-driven vehicle is indispensable, and may be operated either by an electric storage battery or by a gasoline motor, the choice of which again depends on local conditions. We have an electric vehicle, shown in one of the illustrations, which has been in service since 1912 and a second battery permits its use by both day and night crews. Where gasoline motor trucks are used experience has led to the adoption of two sizes of trucks.

For ordinary maintenance a 2-ton truck is needed, while a 3½-ton truck is necessary to carry reels of feed wire and trolley wire. Both sizes of trucks are equipped with adjustable Trenton towers and platforms. The three-section tower has lower center of gravity and reasonable height, making it possible to work on low bridges, of which we have many. It can also be raised high enough to permit work on the trolley at railroad crossings. Such an equipment is illustrated.

It will be seen that by placing boxes for tools and materials along the side of the truck over the wheels, space is provided for a reel stand.

The use of one large and one smaller truck permits the installation of trolley wire more quickly and efficiently than with horse-drawn or other older type vehicles, as both towers are used after the wire is run out and there is no idle equipment part of the day.

Records Are a Factor in Successful Maintenance Work

One essential requirement on any property is the preparation and continuance of adequate records, particularly those containing information for use in emergencies.

The first requirement is a large-scale map showing the physical layout of the property. On our system it is necessary to use several such maps, each division being shown on one or two maps, drawn to a scale of 1,000 ft. to the inch. Fig. 2 is typical, showing one-half of one large division.

It may be of interest to note the historical development of this map system. Originally these maps contained not only the line layout (using one line for a single track) but also showed the feeders from the power supply stations to and along each portion of the line. As the property increased in size and complexity, the feeders were omitted between the stations and the commencement of the trolley section, and a symbol was inserted at the feeding-in point denoting from which station the line received its power. The insertion of changes in feeders, etc., from time to time caused the tracing to become illegible or torn, and it had to be entirely retraced at frequent intervals. It was also difficult to show all the details clearly on a single map and it was too large for convenient reference. As a result we have for several years limited the information on the large maps to the following: (a) Physical layout of lines showing curves, connections, etc.; (b) loca-

Combination Pole Which Involves Low Maintenance Cost

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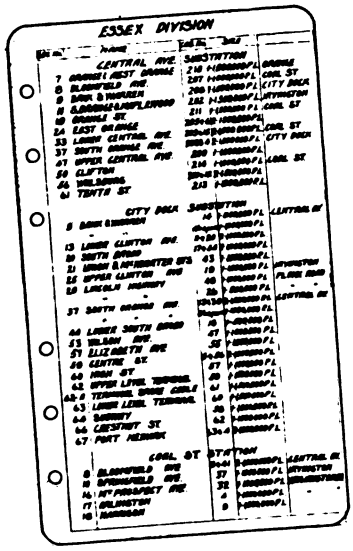

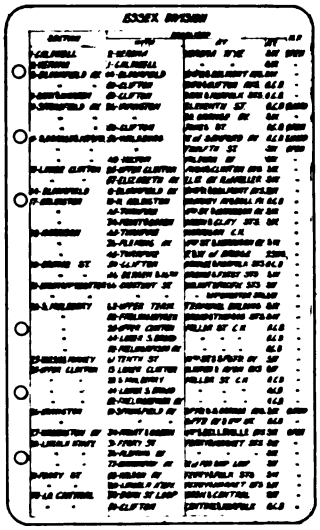

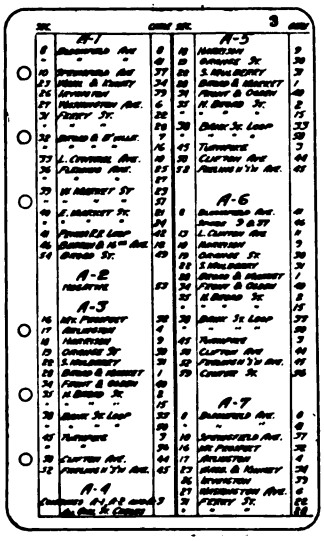

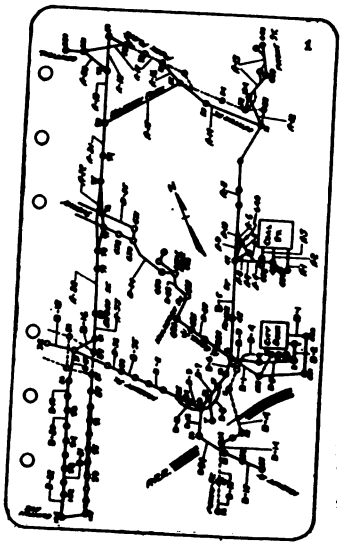

Fig. 4—Note-Book Leaf Containing Data as to Feeder Sections. Fig. 5—Data for Use in Equalizing Section. Fig. 6—Cables in Conduit Runs, with Corresponding Sections Fed by Them. Fig. 7—Underground Conduit and Manhole Data.

tion of section insulators; (c) number of each trolley section; (d) symbol denoting source of power—one or more—(e) automatic circuit breakers, and switches, for emergency feeds; (f) power supply for carhouses and shops.

Other detailed information as to feeder sections is shown on individual section maps, of which Fig. 3 is typical. It will be noted that aerial feeders, underground and submarine cables, switches, section insulators, etc., are shown by different conventions. These maps show the feeder in considerable detail from the power station to the end of the line. In addition to these individual section maps, brief written descriptions are used for further details.

Quite recently it was felt necessary to provide certain essential data in more concise form, therefore the pocket size data sheets shown in Figs. 4 to 7 inclusive were developed.

Fig. 4 is a list of sections fed by each power supply station and shows the number and name of the section, the cable number if in underground territory, the controlling or limiting size of feeder, as well as the name of any other power station which also feeds the section either regularly or in emergency.

Fig. 5 lists the sections that may be equalized with each other, giving the location and kind of equalizer and stating its normal position, whether open or closed.

Fig. 7 is a diagram of underground conduit and manholes, the latter numbered, whereas the reference notes A-4, B-8, etc., refer to Fig. 6, which lists the numbers of the cables in each conduit run, together with the name and number of the section which the cables feed.

These sheets in loose-leaf notebooks are invaluable aids in case of trouble and are furnished to the supervisory force, engineers and load dispatchers.

Changes of various kinds can be readily noted on all the records listed above; they rarely require retracing of maps, and even then the labor involved is relatively small when compared with that formerly necessary when we attempted to show everything on one large map.

In the preparation of this article on power distribution, the writer has endeavored to present certain general phases, rather than a technical discussion. It is hoped that it will be of interest not merely to those who have direct supervision over street railway power distribution systems, but also to the men who are directly engaged in the operation and maintenance of the lines, and possibly to persons in other departments who are concerned in the proper functioning of distribution systems, and their relation to car service.

High-Voltage Ring Connection

THE Detroit Edison Company, which supplies power to a number of electric railways in and around Detroit, is making a notable change in its power transmission system. The company proposes to establish a 120,000-volt transmission system around the territory in which it serves power. A large quantity of transforming and other apparatus has been ordered, the Westinghouse Electric & Manufacturing Company having been the recipient of a substantial order.

It is intended to tie the new 120,000-volt ring into the present 24,000-volt system at several points. The power at one of the existing power plants will be transformed from 12,000 to 120,000 volts in a bank of three single-phase transformers; it will be transmitted at the high voltage about 60 miles and then stepped down to 24,000 volts and tied in with the lower voltage system through a bank of three single-phase transformers. At an intermediate point the high-tension line will be tied to the 24,000-volt system through a third bank of transformers.

A Half Million a Year for Lighting

IT WILL cost $500,000 this year to light the subway and elevated trains, station platforms, track signals, and other facilities of the Interborough Rapid Transit Company, New York City. Of all the energy generated in its power plants 6.6 per cent will be required for electric light.

There are 320,000 outlets throughout the system, including those for 50,000 incandescent lamps in the subway cars, and 88,000 on the subway platforms and in the tunnels. Ninety per cent of the last-named burn continuously. The elevated trains require 45,000 lamps for lighting.

Track signals account for additional thousands of lamps. Every 400 ft. along the subway track is a blue lamp indicating the location of an emergency switch for shutting off power in the third rail.

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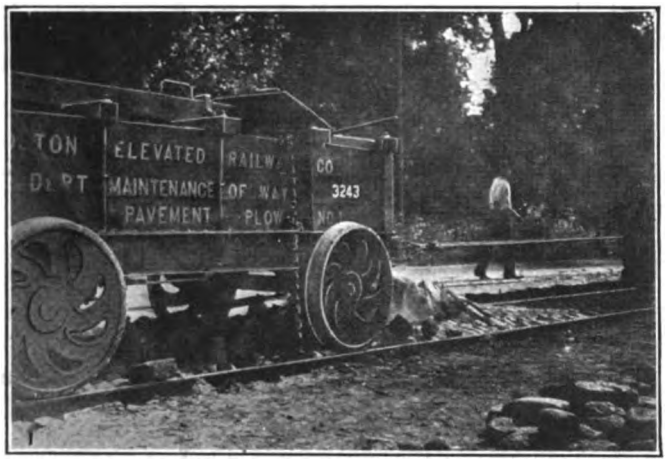
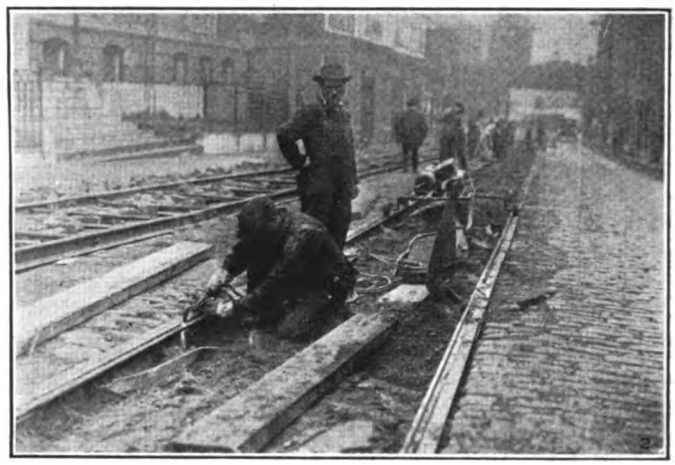
Track Machinery in Boston

From the Time that the Old Paving Is Taken Up Until the New Paving Is Laid, Machinery Plays a Most Important Part in the Work



Plow Tearing Up a Pavement



Acetylene Torch Cutting Old Rails for Removal

FOR ten years the maintenance department of the Boston Elevated Railway has gradually been increasing the use of machines in connection with the reconstruction of the surface tracks of that system until now machinery does nearly all of the heavy and repetitive work. The following is an account of the procedure in track building, told briefly, because the accompanying pictures tell the greater part of the story.

Procedure in Rebuilding Track

After portable crossovers or temporary tracks are installed the pavement plow (1) is brought into operation. The usual length of track under construction varies between 1,000 and 1,400 ft. of single track. After the pavement plow has passed over the track, the paving blocks are piled on the curb, where they are recut by paving cutters. The recutting of blocks is done by contract.

Next, the acetylene torch (2) comes into play and the rails are cut into the length proper for handling.

This operation is followed by the crane car (3), which lifts both rails so that the ties can be knocked off by a sledge. The rails are then thrown to one side where they are picked up by the rail car.

This operation is followed by the electric shovel (4), which excavates the track trench to the proper depth. One man operates the shovel and under good working conditions can excavate the trench for a distance of about 800 ft. in an eight-hour day and load the material upon auto trucks or cars. The shovel works very closely to grade so that after it has passed along there is very little work to be done by hand. If there is any, it consists merely of smoothing up the material which has been left behind.

The shovels are hauled to and from the track jobs by service cars. When the shovels are excavating the track trench, they operate over short sections of portable track of light tee-rail construction. Each section is 5 ft. long and is handled by means of a short chain hitched to the heel of the dipper and as the shovel progresses along the trench, the boom is swung back through 180 deg. and a section of the track is picked up and carried forward and laid in front of the shovel. This operation repeated many times during the day consumes a certain amount of time which slows up the operation of the shovel. To overcome this objection the company is now arranging to equip the shovels with caterpillar treads in addition to the car wheels already mentioned, so that the shovel will use the treads while working in the trench. These treads will be permanently attached to the shovel. Means will be provided for lowering and raising them into and out of contact with the ground, and the car wheels will be used while the shovel is moving to and from the track jobs, as at present.

When the shovel has progressed for a sufficient distance the steam roller (5) is brought on the job and rolls the trench as fast as it is excavated. The steam rollers are moved to and from the track jobs by use of a ramp car, as shown in the engraving.

After the trench has been rolled the ties, rails and other material are distributed by cars (6) to the job. The rails are then spiked, the joints made up, and the rail joint base plates attached and made ready for welding.

The crushed stone for ballasting the track is delivered on the job by Differential cars. As the company has two hopper cars formerly used for coal, which have not been in use for this purpose for about two years, these cars (having a capacity of 25 tons) have been used to a certain extent because with their use the ballast can be dumped through the hopper in the bottom of the car directly in the track, saving any rehandling.

The company has a track, with a 100-ton track scale, in a local quarry, so that crushed stone is purchased at a very favorable price and delivered directly onto the company's cars.

After the ballast has been delivered, the track is jacked up to grade and surfaced with pneumatic tie tampers (8). A tamping gang consists of from eight to

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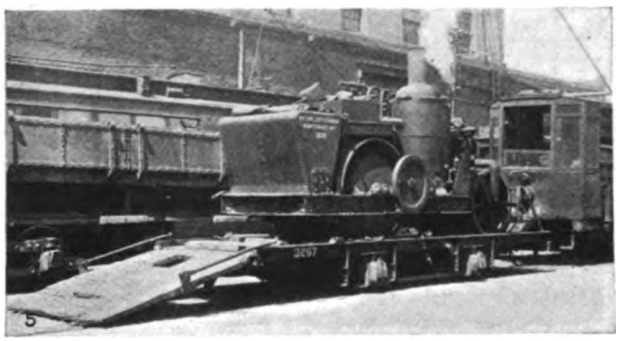
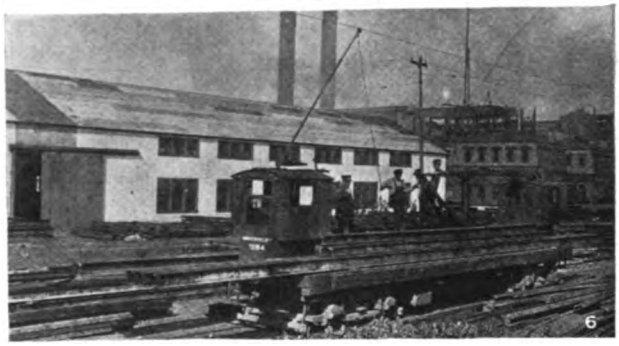
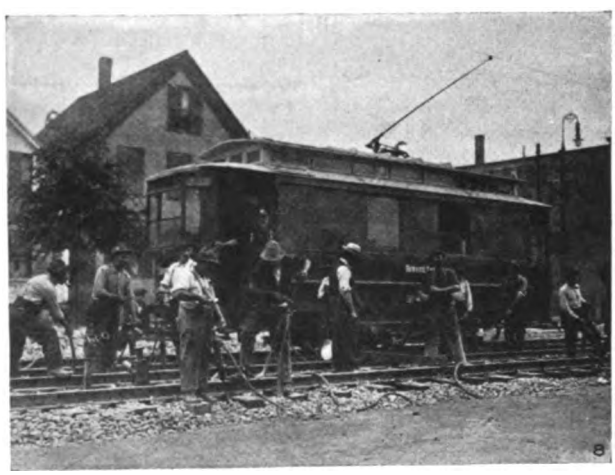
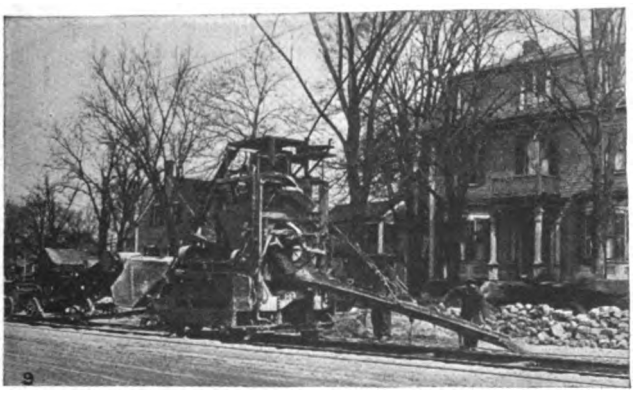
Some of the Machines Used by the Maintenance Department in Boston









No. 3 shows the crane car for lifting rails and ties. This is followed by the electric shovel (4) and this by the steam roller (5) to form the new sub-base. In this view the roller is shown on a flat car. Material for the new track is distributed by rail cars (6) and ballast hopper cars (7). The new ballast is then tamped by pneumatic tampers (8). The concrete is then put in place by means of the concrete mixer (9) which is used in connection with the concrete loader (10).

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twelve tampers, and air is supplied from a compressor mounted in an old passenger car. The compressor is of sufficient capacity to operate a maximum of twelve machines. Spare tamping machines are carried on each compressor car in order that the work might not be held up in the event of any machine breaking down or while machines are being overhauled. When tracks under elevated structures are being reconstructed or repaired, the tie tampers are connected up with the air main on the elevated structure.

It is planned to weld the rail joints between the time the track is surfaced and the concrete base installed, but joints can be welded at any time during the process of track building by the seam weld method.

During the operations of tamping and welding the concreting material for the paving base is delivered by Differential dump cars and is placed alongside the track in proper position.

The next operation is the laying of the concrete paving base. The concrete mixer (9) is accompanied by a machine called a mixer loader (10). This loader is, in effect, a continuous belt, 45 ft. from center to center of belt pulleys. The frame is mounted on car trucks and the machine is self-propelling. A separate motor drives the continuous belt. There are three measuring bins, each of 8 cu.ft. maximum capacity and adjustable for lower capacity. These bins are mounted on flanged wheels and may be rolled along the top of the belt frame for the accommodation of the shovellers. These machines were built in the maintenance department machine shop.

The concreting material is shoveled directly into the hoppers above the belt, where it is properly measured and is then dumped onto the belt and carried into the mixer. It is possible to have three batches of concrete in progress at one time, this is, one in the loader or distributor, one in the skip of the concrete mixer and the third being mixed in the drum of the concrete mixer.

These two machines require very few men to operate them and it is possible to install a large amount of concrete per day with this outfit. All the concrete mixers and loaders are mounted on car wheels and are self-propelling.

The track is then paved and the concrete mixer and loader are again used for grouting the pavement.

Additional equipment not shown by the engravings consists of four air compressor units mounted in passenger cars; one portable air compressor mounted on auto trailer, with capacity of 210 cu.ft. free air per minute and two portable air compressors with wagon mountings of smaller capacity; two Ransome concrete mixers of 1 bag capacity used occasionally for grouting pavement, and a Clark concrete breaker. The latter is used to break up the concrete base.

Altogether the company has of the equipment described: One pavement plow; seven acetylene cutting outfits; three crane cars; two type "O" Thew electric shovels; two 10-ton tandem steam rollers, each with a ramp car; three rail cars; seventeen Differential and Universal dump cars; three bottom dump hopper cars of 25-ton capacity; 105 Ingersoll-Rand tie tampers; three Austin self-propelling concrete mixers; three loaders for concrete mixers; one Clark concrete breaker, seven air-compressor units.

The company has two storage yards, both having steam railroad and water connections. At the South Boston yard is located the maintenance department's shop where all of the rails are curved, cut and drilled for special curves or in connection with special work. At this yard is also an up-to-date treating plant where treatment is given to all of the ties used by the company, as well as the lumber used on the elevated structure and in the subways and to some extent for building work. The treating plant was fully described in a special article in the report of the committee on way matters, read before the American Electric Railway Engineering convention in Chicago, October, 1922.

In addition to labor-saving tools and equipment, the efficiency of the maintenance department is largely made possible by proper ordering, delivering and handling of material. During the busy season from fourteen to sixteen large track building jobs may be under way at any one time, and the material, equipment and transportation, consisting of cars and trucks required for each day, is determined upon the previous day. The orders for these are placed by the man in charge of each job with the material and equipment dispatcher at the main office, and it is his business to see that each crew is supplied with the material or equipment that it has ordered or may require. The operator of each car or truck receives his orders directly from the dispatcher and at the end of each trip reports to him for further instructions.

The company uses in its busy season in track building work from eight to twenty cars and from five to twenty trucks daily. The maintenance department owns five 5-ton Mack dump trucks and six 2-ton trucks used for various purposes. Additional trucks which are required daily are secured from contractors, the number of hired trucks varying in accordance with the work in hand.

In its report dated January, 1923, the Massachusetts Department of Public Utilities presents several tables showing the rise in cost of labor and material, the cost for track rebuilding and the miles of track rebuilt for a period of several years. The department then makes the following statement in regard to the track maintenance work of the Boston Elevated Railway:

"From these figures it seems reasonably clear that during the last trustee year relatively little more was expended for maintenance of tracks, building and equipment than was expended by the former management in the period before the European war, and that if any increase in the amount of repairs and reconstruction work done has occurred it must have been due to increased efficiency in methods used, either through introduction of labor-saving machinery, improvements in the art or economy of management."

Public Utility Information for Students

FOLLOWING the examples of many other states, New Mexico and Wyoming are coming into line in furthering co-operation between the institutions of higher learning and the public utilities. In the State University of New Mexico public utilities are being systematically studied, and the State Agricultural College is preparing for similar instructions. Preliminary steps have been taken in Wyoming in the same direction. In Colorado students are learning the basic facts regarding electric railways and other utilities.

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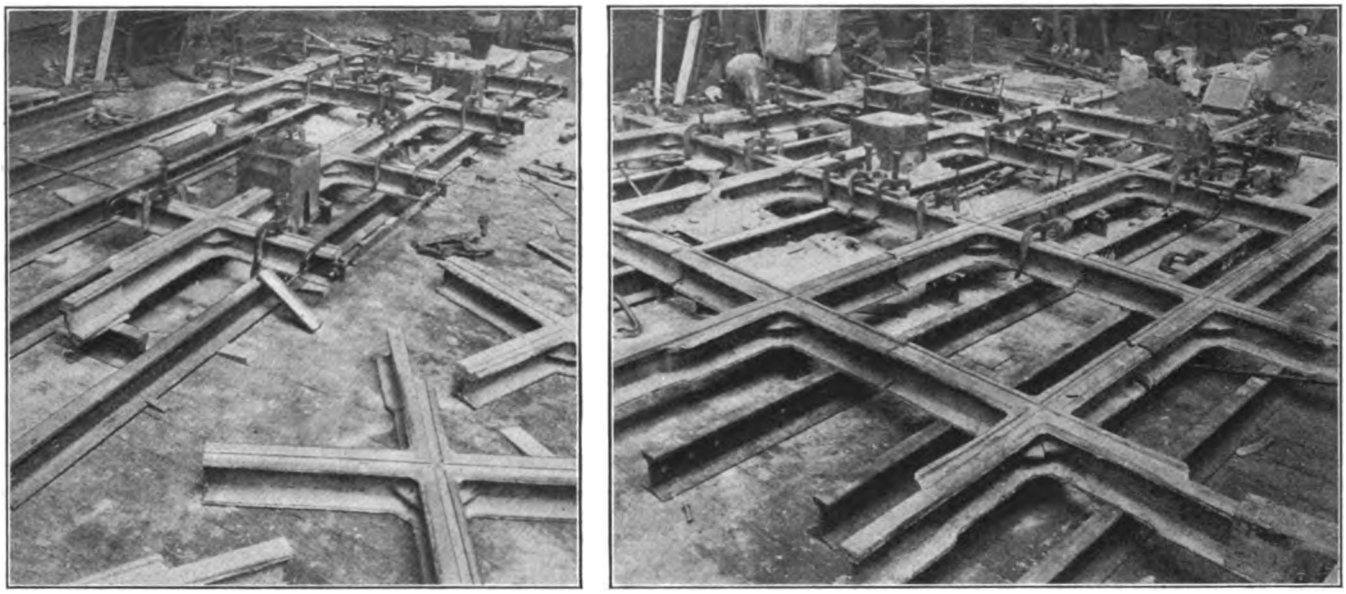
Chrome-Nickel Steel in Special Work*

A Scientific and Practical Discussion of the Characteristics of this New Steel Which Has Demonstrated Its Practicability in Milwaukee—Results of More than Three Years' Use Are Given—First Impetus to Develop the Steel Was Given by Prohibitive Wartime Prices of Ferro-Manganese

By F. G. Hibbard
Construction Engineer Way and Structures Department
Milwaukee Electric Railway & Light Company



Left—Thermit Welding of Joints in Crossing for East Water and Wisconsin Streets, Preparatory to Mounting on Bolted Foundation. Right—Thermit Welding of Joints in Crossing for East Water and Wisconsin Streets. Openings Shown Are for Inserts at Joints

DURING the last few years the Milwaukee Electric Railway & Light Company has installed in its tracks considerable special trackwork, in which the crossings, the frogs and some of the switch pieces were made of cast chrome-nickel steel. Much interest has been manifested both locally and throughout the country in these installations and their relative value compared to similar work constructed of cast manganese steel. It will be the object of this paper to set forth our experiences in the development of chrome-nickel steel as a material for special trackwork.

While the details of special trackwork construction have been greatly improved, in the writer's knowledge no new material has been offered the electric railways since the introduction of manganese steel in 1894, until we proposed the use of cast chrome-nickel steel in 1919.

Manganese steel was such a vast improvement over the other types that it seems to have been accepted by the manufacturers as the last word in materials for special work construction; and while no attempt will be made to discredit it, some of its disadvantages will be disclosed which are not apparent in our new alloy steel.

Considerations that Suggested Use of Chrome-Nickel Steel

During the World War prices for materials used in the construction and maintenance of track rapidly advanced and deliveries were uncertain. For several years the rising prices of materials were not compensated for by increases in the company's revenue and every possible expedient was adopted to conserve materials and make existing track and special trackwork serve until adjustments in rates could be secured to meet this inflated cost of materials. This condition brought into active play the electric welding machine, which served to extend the useful life of thousands of dollars worth of expensive trackwork.

In attempting to weld cast manganese steel, it was found that while many good welds were made, others did not prove successful and actually hastened the necessity for renewal of the pieces repaired. No welding concern was found that would guarantee a weld on manganese steel. Even in the face of these facts we were reluctant to substitute anything for manganese steel until the price of that material advanced to a point where it was practically prohibitive. This advance in price was due largely to the increase in the cost of ferro-manganese, which in 1911 could be purchased for an average price of $37.51 per ton, but in 1917 cost $327.21 and in June of that year sold for $443.75 per ton, an advance of over 1,000 per cent. As a comparison, standard steel rails showed a maximum advance of only a little over 100 per cent during the war period, the cost advancing from $28 per gross ton to a peak price of $57 in 1918.

The company had already made considerable progress in the development and manufacture of its own special trackwork, having installed a large number of frogs and crossings of the steel bound type. These pieces

*This article is condensed from a still more comprehensive paper read by the author before the Technical League of the Milwaukee Electric Railway & Light Company.

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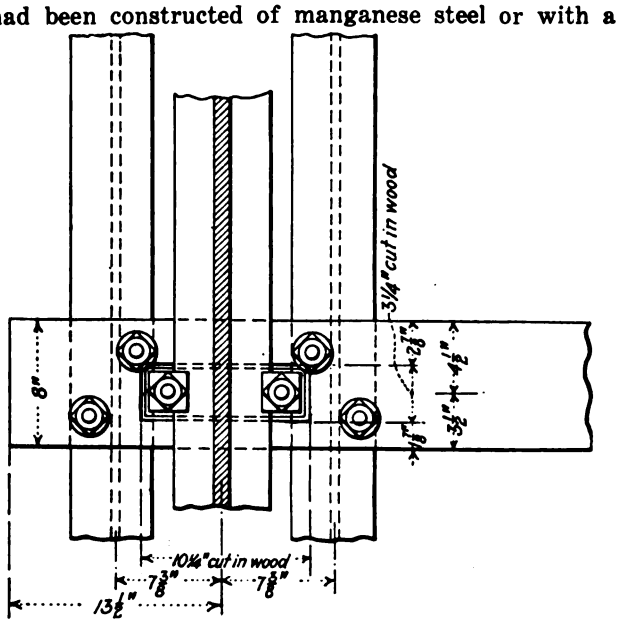
were constructed by first cutting and fitting the rails to the proper dimensions, and then casting open-hearth or electric steel around the intersection, binding the rails together and forming a guard and a support for the wheel flange. This type of construction was comparatively cheap and possessed the important advantage that when the flange bearing was cut out it could be successfully built up with the electric welder, whereas if it had been constructed of manganese steel or with a



Details Showing Construction of Crossing Foundation

manganese plate at the intersection welding would have been resorted to only as a temporary and uncertain expedient to prolong the useful life of the piece for a time.

The success experienced with the home-made steel bound frogs and the excessive price charged for manganese steel trackwork were the principal factors that induced the company to extend the manufacture of its special trackwork in its own shops and accordingly the writer was instructed to seek a substitute for manganese steel, which could be machined and finished at the company's Cold Spring shops and which could be cast at local foundries. At that time a new local electric steel foundry with large furnaces, known as the General Steel Company, was in operation and the company had transferred its steel bound frog business to that plant. As this plant was casting heavy alloy steel ingots and its facilities were available, the situation was particularly favorable for the plans being developed.

Satisfactory experience with some special trackwork layouts, consisting of open-hearth steel castings with a carbon content of from 0.40 to 0.50 per cent, which were given a single annealing treatment, suggested the possibility of improving castings of this nature by adding alloys other than manganese. These layouts were successful in part because they could be successfully welded, which together with the practicability of machining was the important consideration.

By the addition of nickel and chromium the physical properties of carbon steel can be materially improved. Testimony to this effect has been furnished in the publications of some of the nation's foremost metallurgical engineers.

Eighteen years of experience in the design and construction of special trackwork for electric railways pointed to only one installation of an alloy steel other than manganese. The Pennsylvania Steel Company (now the Bethlehem Steel Company) had built an electric crossing with center plates of forged Mayari steel, a natural nickel-chrome alloy. This was installed in Omaha, Neb. Diligent search failed to show any installations of cast chrome-nickel steel.

First Installation Made in 1919

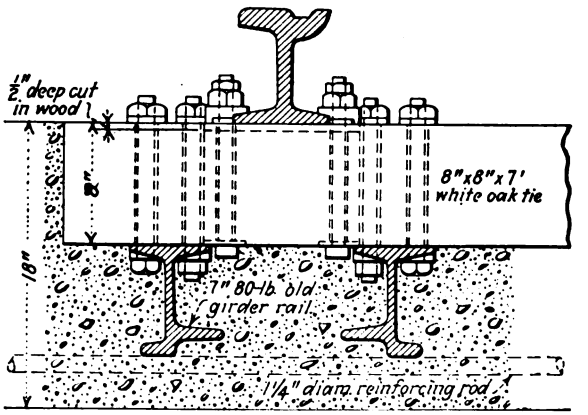
At last a trial installation of cast chrome-nickel steel was agreed upon and instructions were issued to place a crossing of this material at East Water and Wisconsin Streets. Details were prepared and patterns constructed but the question of analysis was yet undecided. Most of the existing specifications covered oil quenching and drawing of forgings, hence they were of little help because the unbalanced sections of track castings prohibited such treatment, as warping would surely result and in the treated condition straightening without cracking would be impossible. With this condition in mind and with a desire to produce a steel with good wearing qualities and high resistance to shock, it was decided to keep the nickel and chromium content somewhat higher than was specified in work that could be oil quenched. The following analysis was finally decided upon:

Element	Percentage	Element	Percentage
Carbon	0.30 to 0.40	Silicon	0.15 to 0.20
Manganese	0.90 to 1.10	Chromium	0.55 to 0.65
Phosphorus	not over 0.03	Nickel	2.20 to 2.40
Sulphur	not over 0.04		

After the castings were made, a check analysis showed the following close conformity for the analysis specified:

Element	Percentage	Element	Percentage
Carbon	0.33	Silicon	0.15
Manganese	1.00	Chromium	0.55
Phosphorus	0.025	Nickel	2.30
Sulphur	0.041		

The castings were given a single annealing treatment and no difficulty was experienced in machining them. When the castings were made proper shrink heads were not used, so that all castings contained large shrink holes located in the heavy part of the top of the section



Typical Section Through Chrome-Nickel Steel Crossing

approximately under the gage line, as well as several cracks in the base at or near the box section where the two rails intersect. Owing to the strict necessity for conserving materials at the time, the defective castings were used. The cracks were thermit welded, frogs were assembled and the joints thermit welded to form one-half of the double-track crossing. (See accompanying illustrations.) The crossing was through-bolted to a heavy timber foundation, consisting of 8-in. deep white oak ties bolted with heat-treated bolts to inverted old

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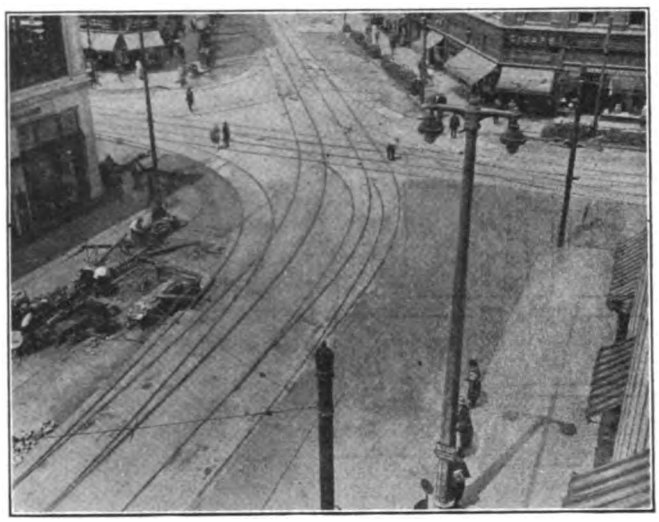
7-in. 80-lb. girder rail. This type of foundation was originated by this company and is now used as standard on all heavy crossing installations. The two units thus formed were easily installed in one night. Eight 1¼-in. round rods were placed at right angles and immediately under the old rails and an 18-in. concrete slab of 1:3:5 mix was cast around this foundation, extending up to the top of the ties. The four "dummy" joints and the sixteen exterior joints were then thermit welded. The thermit welding of the joints not only saved the cost of machining and drilling for splices and the cost of the joint plates, but gave an absolutely smooth unbroken floor for the continuous flange bearing construction which was adopted for this crossing.

Installation of Special Trackwork at Second and Sycamore Streets



Special Trackwork at West Water Street and Grand Avenue, a Good Example of Modern Special Trackwork Design

This crossing was installed in April, 1919, and similar ones properly cast, however, were placed at West Water and Sycamore Streets in May, 1919, and at Third and State Streets in October, 1919. A typical section through the crossing and a section through the foundations are shown herewith. The wide departure from previous practice and the novelty of these installations attracted considerable attention, and articles were published on this new type special work in the trade journals. From the resulting comment we realized that we had started something and made up our minds to see it through. We began to study what we had in the track and to make complete physical tests of the steel.

What the Studies Developed

Our first test bars showed a decided lack of ductility and the fracture indicated that the cast nickel structure was not completely broken up. A considerably longer period was required completely to anneal these castings than was required for carbon steel. Holding the castings in the oven at the proper temperature from four to five hours gave us the results, but still the tests showed a decided lack of uniformity. We then tried double annealing. This produced decidedly better results, and in purchasing the layout for East Water and Michigan Streets we incorporated this treatment in our specifications. At this time we began the study of air quenching and drawing, allowing the castings to cool down in the air from the annealing temperature, then heating them to the proper temperature below the critical range and allowing them to cool down with the oven. On Jan. 28, 1922, we made a physical test of six tensile specimens, two of which were double annealed, two were air quenched at 1,725 deg. F. and drawn at 1,350 deg. F. and two were air quenched at 1,725 deg. F. and drawn at 1,500 deg., which is slightly above the critical range. The results are shown in Table I.

Chemical analysis of these bars gave the following results:

Element	Percentage	Element	Percentage
Silicon	0.41	Carbon	0.40
Sulphur	0.046	Chromium	0.95
Phosphorus	0.014	Nickel	3.02
Manganese	0.76		

By comparing bars No. 11 and No. 12 with bars No. 1 and No. 2, the decided improvement in the elongation and reduction without loss of hardness is noted which indicate that the possibilities of the chromium and nickel are being better developed by this treatment. Bars Nos. 3 and 4 were made to check the critical point, which will be explained in the description of the photomicrographs of these specimens.

This treatment was continued and by lowering the drawing temperature the hardness was increased with a corresponding decrease in ductility.

The photomicrographs reproduced on page 466 were of specimens Nos. 11, 1 and 4 at 100 and 1,000 magnifications, showing as follows: No. 11 a pearlitic structure throughout; No. 1 a sorbitic structure throughout; No. 4 a structure partly sorbitic and partly pearlitic, indicating that the drawing temperature was slightly above the critical range, as stated, and that the structure obtained from quenching was breaking up and

TABLE I—RESULTS OF ANNEALING TESTS

Reference No.	11	12	1	2	3	4
Treatment	Double Annealed		Air Quenched at 1725 Deg. Drawn at 1350 Deg.		Air Quenched at 1725 Deg. Drawn at 1500 Deg.	
Elastic limit, lb. per sq.in.	69,100	67,800	77,500	76,250	74,200	72,700
Tensile strength, lb. per sq.in.	126,600	125,100	103,450	107,300	109,350	107,450
Per cent elongation in 2 in.	12.5	10.5	20	22.5	15.5	17.5
Per cent redution in area	15.0	14.5	41	49	23.5	37
Fracture	Square	Square	¼ cup	¼ cup	Angular	¼ cup
Brinell hardness	195	180	203	195	180	187

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drifting back to the pearlitic state, which is the structure of a steel cooled slowly from above the critical range. This checked our previous determinations of the lower critical point, which we found existed at a temperature of 1,492 deg. F.

In the special trackwork for East Water and Michigan Streets, which was manufactured by the Lorain Steel Company, we did not specify Brinell hardness, for our studies had not been carried to a point where

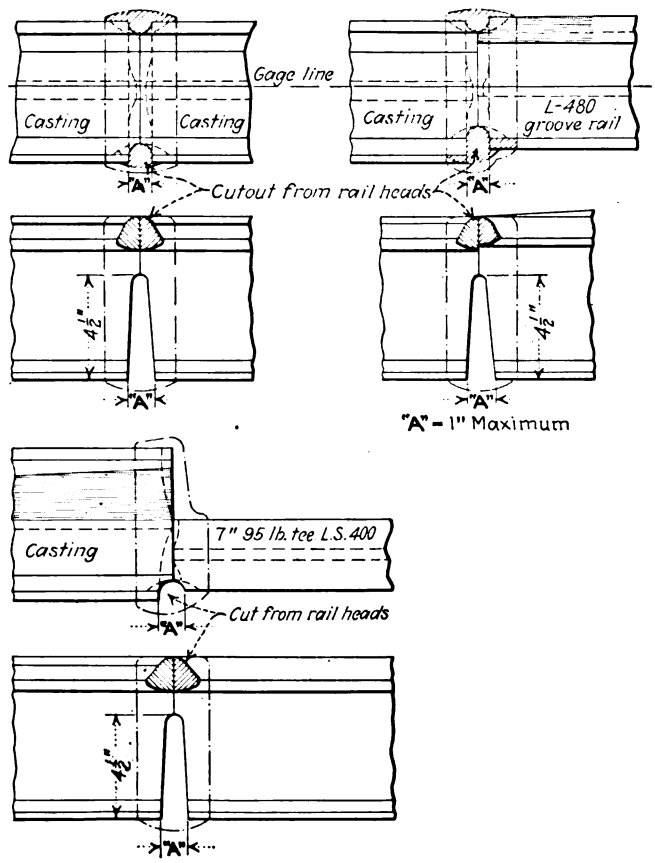

Diagram Showing How Rail Ends Are Prepared for Flange Bearing Crossings

we were certain of the low limit which could be specified. This we now know to be one of the most important factors in the life and wear of the special trackwork parts. Carefully conducted tests were made from test bars attached to the several frogs from the above layout, but as the coupons were cut off from the castings with the acetylene torch, some of the bars were so surface hardened that we were not able to turn them. From those which we were able to machine, the results shown in Tables II and III were obtained.

TABLE II—CHEMICAL ANALYSIS OF STEEL FOR EAST WATER AND MICHIGAN STREETS

	Specified Analysis	Piece No. 26 Arm No. 99	Piece No. 29 Arm No. 60	Piece No. 31 Arm No. 87
Silicon	0.25 to 0.35	0.27	0.24	0.15
Sulphur	0.05 max.	0.036	0.044	0.035
Phosphorus	0.05 max.	0.028	0.035	0.031
Manganese	0.60 to 0.80	0.78	0.78	0.61
Carbon	0.45 to 0.55	0.54	0.49	0.50
Chromium	0.60 to 0.80	0.50	0.45	0.59
Nickel	2.50 to 3.00	2.15	2.06	1.90

From Table II it will be noted that the chromium and nickel content falls below the specified analysis in all cases.

It will be noted from Table III that two of eight bars failed to meet the specifications as to elongation and reduction. This matter, together with the deficiency in chromium and nickel, was taken up with the manufacturer, who felt that the steel was of creditable quality considering that this was his "first attempt with steel annealing to these unusual requirements," and produced his own tests to verify these contentions.

Table IV contains a comparison of averages from test data furnished by the manufacturer with our own test data.

TABLE IV—COMPARISON OF DATA FROM TESTS

	Tensile	Elastic	Elongation	Reduction	Brinell
Manufacturer's tests	109,300	68,000	18.0	29.3	....
Our test on manufacturer's product	105,300	69,100	14.9	21.4	179.2
Our test on our own air-quenched and drawn specimens	105,375	76,875	21.2	45	199.0

These results seem to indicate that with our treatment we have not only obtained ultimate tensile strength equal to that of the manufacturer but have materially increased the elastic limit, elongation, reduction of area and Brinell hardness.

In the spring of 1922 it was decided to purchase the special trackwork parts for the track layouts at West Water and Grand Avenue, Second and Sycamore Streets, Reed and National Avenue and Broadway and Wisconsin Streets. Plans were prepared and specifications drawn for both solid manganese and chrome nickel steel construction. Quotations were received and when submitted to the management, instructions were issued to buy the entire lot in chrome-nickel steel, which was certainly a "vote of confidence." With these layouts installed, this new material will be given a real test. This material was inspected at the plant of the manufacturer by R. W. Hunt & Company. From their report on sixty-eight test bars from twenty-six heats the following averages were compiled:

Tensile 107,290	Elastic 66,950	Elongation 16.6	Reduction 26.4	Brinell 219
Carbon 0.49	Manganese 0.676	Silicon 0.30	Nickel 2.86	Chromium 0.837

While these results are very satisfactory, we believe still better physical qualities can be developed by suitable arrangement of air blasts to cool the castings down faster when first taken out of the annealing oven.

Wearing Qualities of Chrome-Nickel Steel

From time to time we have made depth-gage measurements of the throatways throughout the flange-bearing portions of the crossings made from various materials to determine how fast the metal was being cut down by the wheel flanges. As a fair example of our 1919 installations, it was found that it took approximately two years on the Third Street run of the Third and State Streets crossing to cut down the throatway to a point where the treads of the wheels were beginning to bear. As the original throatway depth was $\frac{9}{16}$ in. and as the

TABLE III—PHYSICAL TESTS OF STEEL FOR EAST WATER AND MICHIGAN STREETS

	Low Lim. Specif.								
Reference No.	.....	26-99	7-30	20-33	24-56	25-91	6-75	31-87	22-26
Elastic limit	60,000	67,550	70,050	70,800	73,050	68,100	68,850	69,150	69,350
Tensile strength	90,000	97,800	114,250	105,750	105,000	103,700	108,000	106,550	102,250
Elongation in 2 in	12	16.5	11.5	13.5	4.0	13.5	14.0	8.5	18.0
Per cent reduced in area	17	25.5	16.5	23.0	5.0	17.5	16.0	9.0	30.5
Brinell hardness in	.....	.....	.....	.....	.....	.....	183	183	170

Note:—First part of number indicates piece number and last part arm number. For example, 26-99 indicates piece No. 26, Arm No. 99.

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height of the car-wheel flange is ¾ in. it took approximately two years to cut down 7/16 in. into this steel. From traffic studies it was found that 834,993 cars passed over this crossing each way during that period, or 278,331 cars for each 7/16 in. of wear.

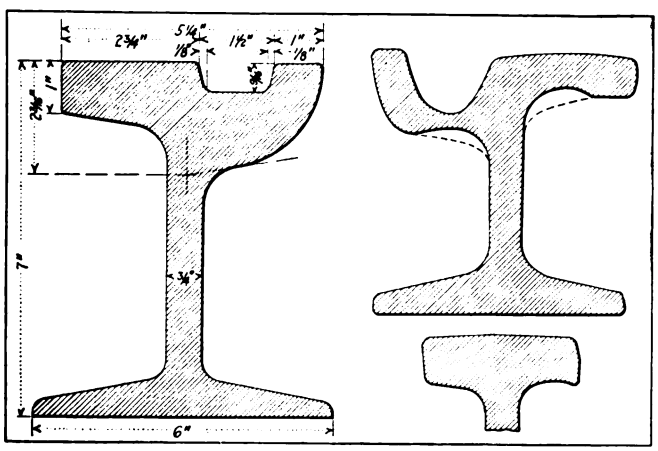
Data were obtained on the throatway wear on continuous flange bearing manganese steel crossings installed in the tracks of one of the large Middle West street railways. The throatways of the crossings were made ½ in. deep and the flanges are ⅞ in. in height. The best result obtained showed that 996,000 cars passed over the layout before simultaneous tread and flange bearing occurred, which represented a wear of ⅜ in. in the throatway, or 166,000 cars for each 7/16 in. of wear. Comparison of this figure with the 278,000 cars required for equal wear on the chrome-nickel steel crossings gives a good indication of the relative resistance to flange wear of these two types of construction.

On Oct. 10, 1921, traffic was restored to Third Street at Wells and at Grand Avenue after the installation of crossings at these locations. The crossings at Third and Wells Streets were constructed of manganese steel and the one at Third and Grand Avenue of chrome-nickel steel. These two crossings were placed on identically the same type of foundation and were subjected to the same traffic conditions on the Third Street run. Measurements taken on Oct. 3, 1922, indicate that the average depth of flangeway wear on the manganese crossing was 7/16 in. and on the chrome-nickel crossing 7/16 in. during the year. Approximately 192,000 cars passed over the Third Street run or 64,000 cars per 7/16-in. wear on the manganese and 192,000 cars per 7/16-in. wear on the chrome-nickel.

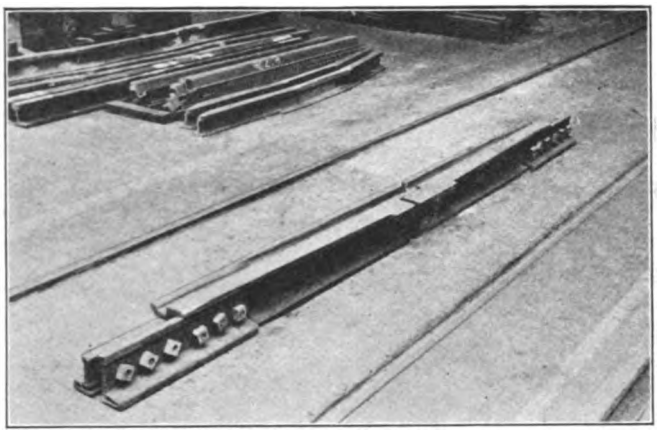
Our Experience in Welding Chrome-Nickel Steel

One of the first things we were told about our new venture was that the steel would be difficult to weld and if welded there would be doubt as to the welds being any good. However, we can now say with the utmost confidence that chrome-nickel steel of our analysis can be successfully welded. We have demonstrated beyond any doubt that this steel is not only relatively easy to weld, but when welded it can be depended upon.

As stated in the first part of this article, the crossing installed at East Water and Wisconsin Streets had large shrink holes located under the flange-bearing portion of the castings. The car wheels cut through into these shrink holes and in some instances sections were broken out. Two of these pieces over a foot in length were



At left—Typical Section Through Chrome-Nickel Steel Crossing. At right, Sections from Castings Showing How Splice Bars Wear Into Manganese Steel



Set of Bridge Shoes Cast in Chrome-Nickel Steel

completely built up with the electric welder and are still in service after about one and one-half years of heavy traffic has passed over them, with the wheel flanges riding directly on the welded portion—a severe test for any weld.

At Third and State Streets and at West Water and Sycamore Streets the flange-bearing portion has been restored by welding and no one is willing to hazard a guess as to the number of times this operation can be repeated.

The thermit welding of over 500 joints connecting together the frog ends in cast chrome-nickel steel layouts proves that this operation is also entirely successful. We have demonstrated that welds made on chrome-nickel steel by the electric and thermit processes can be depended upon when subjected to bending stresses.

As stated earlier, in 1919 we installed three double-track electric crossings of chrome-nickel steel and the following year another at Fifth and Sycamore Streets over the Chicago, North Shore & Milwaukee Railroad. In 1921 another of this type was installed at Third Street and Grand Avenue and we have just completed one more at Third and Center Streets. All of these crossings were cast in Milwaukee, machined at the Cold Spring shops and installed on the heavy bolted type of foundation which is original with this company. All joints were thermit welded.

We have installed on Second Street, at the east side of the Public Service Building, two switches and one mate of 50-ft. C. R., and, at several locations, frog center plates to replace failed manganese castings. We have made many renewal switch tongues and find that they stand up better than manganese, for the metal does not pean down nor flow under the action of the wheels. All tongues in our bolted type switches are now made of cast chrome-nickel steel.

Last winter we constructed three right-hand and three left-hand portable crossovers of 80-lb. A. S. C. E. rail in which the castings in the rail bound mates and frogs and the runoff points were made of chrome-nickel steel.

Last fall we ordered the layout for East Water and Michigan Streets and it was installed in March of this year. In February we contracted for the parts for four major layouts. One of these layouts was located at West Water and Grand Avenue, and a photograph of the completed installation is reproduced. The layout at Second and Sycamore Streets is being completed and its appearance before it was entirely paved in is shown in the illustration on page 463. The welding of all the joints in track special trackwork layouts is original

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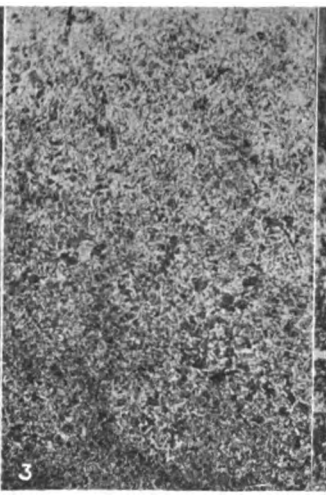
Photomicrographs of Chrome-Nickel Steel as Used in Special Trackwork by the Milwaukee Electric Railway & Light Company

No. 1. Specimen No. 11, 100 Diameters Magnification. For physical and chemical characteristics see page 463

No. 2. Same, 1,000 Diameters

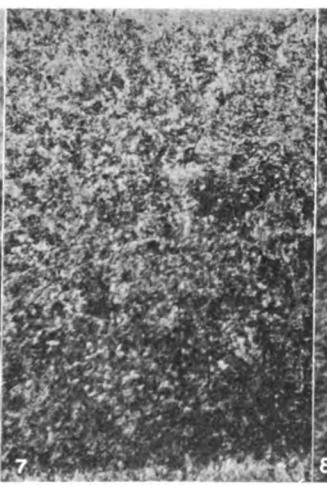


No. 3. Specimen No. 1, 100 Diameters. See page 463

No. 4. Same, 1,000 Diameters

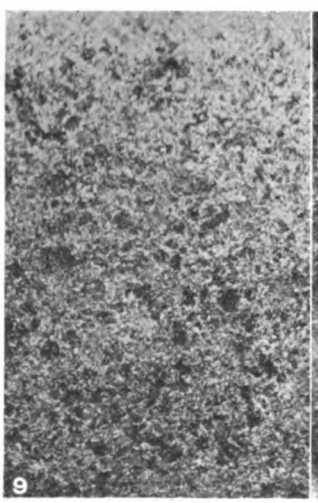
No. 5. Specimen No. 4, 100 Diameters. See page 463

No. 6. Same, 1,000 Diameters

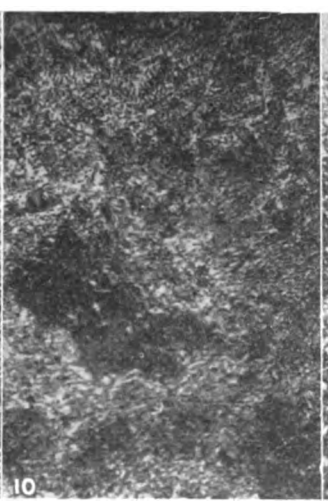


No. 7. Piece No. 31, Arm No. 87, 100 Diameters. See page 464

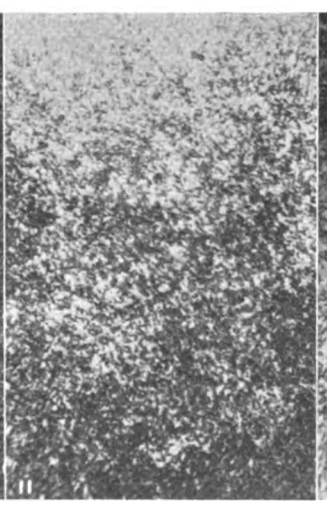
No. 8. Same, 1,000 Diameters



No. 9. Piece No. 26, Arm No. 99, 100 Diameters. See page 464



No. 10. Same, 1,000 Diameters



Nos. 11 and 12. Specimens from William Wharton, Jr., & Company, Inc., 1,000 Diameters.

NOTE: Specimens Nos. 11, 1 and 4 are from steel manufactured by the Milwaukee Steel Foundry Company, while Nos. 7 to 10 are for steel from the Lorain Steel Company.

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with this company. It is done by the thermit process. The placing of thermit welds on manganese frog castings would completely ruin them. This is a strong point in favor of the chrome-nickel steel, as the ends of the castings do not need to be machined for joint plates as temporary splices of bar steel roughly fitted to the castings will suffice for aligning and surfacing the layout and save the cost of the expensive and painstaking machine work necessary to make a proper fitting joint, another distinctive feature of our work.

We have also installed the following bridge frogs or shoes of chrome-nickel steel:

Main Street Bridge	Kenosha	24	castings
State Street Bridge	Racine	24	castings
West Water Street Bridge	Milwaukee	24	castings
Grand Avenue Bridge	Milwaukee	24	castings
Oneida Street Bridge	Milwaukee	16	castings

We are now making up twenty-four castings for the East Water Street bridge. The castings installed are proving very successful and in time we hope to have them on all bridges. A photograph is reproduced herewith showing a set of castings for the State Street Bridge, Racine.

The bridge and building department of the City of Milwaukee praised these bridge shoes highly.

CONCLUSIONS

In 1919 we installed crossings made of chrome-nickel steel on account of the excessive cost of manganese steel and in 1922 we are paying slightly more to get chrome-nickel steel than we would be obliged to pay for manganese steel because our experience has led us to believe it is better. In analyzing the cost of the special work for West Water Street and Grand Avenue, we find what is typical of most special work layouts, that the cost is divided about as follows:

Switches, mates and frogs	35 per cent
Rails, fastenings, joints, etc	15 per cent
Removing old work, excavation, installation, paving, etc	50 per cent

With the switches, mates and frogs representing but 35 per cent of the total cost and as they are in a great measure the deciding factor in the life of the special trackwork, it is a matter of good judgment to install the best that money can buy, for the best will be the cheapest in the long run.

We believe that our analysis with perhaps a slightly higher chromium content should be used in preference to the analysis as offered by the manufacturers, as any effort made to cheapen this steel will only detract from its wearing qualities.

To substantiate the above statement, I will quote from Bullen's "Steel and Its Heat Treatment":

HIGH CHROMIUM NICKEL STEELS:

Chromium nickel steels containing approximately 3.5 per cent nickel and 1.5 per cent chromium comprise a type of steel with distinctive physical characteristics, but which obviously are not shown by the results of ordinary pull test values when taken in comparison with the low chromium nickel steels. The following figures, giving the ordinary physical properties, illustrate the latter point. Dependent upon the section, treatment, and carbon content (0.2 to 0.5 per cent), they may be given as follows:

Composition	Tensile Strength	Elas. Limit	Elongation	Reduction of Area
3.5 nickel ... 1.5 chrome ..	85,000 to 275,000	55,000 to 265,000	26 to 10	65 to 25
1.5 nickel ... 0.5 chrome ..	80,000 to 264,000	56,000 to 240,000	30 to 8	70 to 27.5

It is evident, since the above results show but little difference, that the superiority of the high chromium nickel steel does not appear in the static properties. On the other hand, there is a tremendous difference between the two types (in favor of the higher alloy) in the dynamic and endurance strength, such as freedom from brittleness and resistance to shock.

Or, as it has been expressed in every-day terms, the effect of the large amounts of alloys in suitable combination is like a comparison between a trained athlete and the amateur. Each man may be able to lift a maximum weight of say 200 lb. But when it comes to repeating that same feat a number of times in succession, the trained man, with his developed powers of endurance, will win every time. And thus it is with the high alloy steel.

While the ordinary tensile tests can be met by the "low-chromium nickel steel" longer life and better wearing qualities may be expected by the use of a higher percentage of these alloys. We also believe that by a double treatment the effects of chromium and nickel are better developed.

With reference to the wearing qualities we have found that chrome-nickel steel does not flow under compressive stresses as does manganese steel; that the flange-bearing portions of the special trackwork do not cut out as fast and after they are cut out can be replaced by welding. This feature alone adds considerably to the life of the layout, for in manganese work after the flange bearing is cut out, pounding begins which loosens the special pieces and ultimately destroys the foundation. Joint plates do not wear into chrome-nickel steel castings as they do into manganese steel, also switch tongues stand up better at the heel because this metal does not flow under the action of the wheels.

Joints can be thermit welded and thus do away with this troublesome feature of special trackwork and save the cost of machining to exact dimensions necessary for proper fit of joint plates.

Repairs can be made either by electric welding or thermit welding.

Chrome-nickel steel can be machined with the ordinary machine shop equipment and no special grinding machine, etc., are necessary in producing special work of this material.

Sold 50,000 Maps in Two Months

LAST July the Philadelphia Rapid Transit Company put on public sale at 10 cents a copy a map of the car routes in Philadelphia. The map measured 14 in. x 24 in., and was in colors, with each route marked with its designating number. On the back of the map is a list of places of sightseeing interest in Philadelphia as well as of the prominent department stores, banks, churches, etc., and the route number or numbers of the routes serving that building. The map was inclosed in a convenient pocket envelope, and on the back of the envelope was a list of six "trolley hikes." The maps were all sold inside of two months, and the proceeds therefrom, $5,000, was donated by the company to the employees' "Helping Hand Fund."

The company is now preparing a new edition of the map which will be put on sale in the near future, and instead of the "trolley hikes" the back of the envelope will carry a list of the principal museums and other buildings of public interest in Philadelphia, with a list of the hours they are open, conditions of admission, a summary of what is shown, etc.

C. B. Fairchild, Jr., executive assistant Philadelphia Rapid Transit Company, who supervised the issue of this map, is convinced that it is not only a great convenience to many people who would use the lines in any event, but that it cultivates travel, particularly off-peak riding and from persons who would otherwise stay at home. The second edition will be 50,000, and the proceeds derived from the sale will be devoted to the "Helping Hand Fund."

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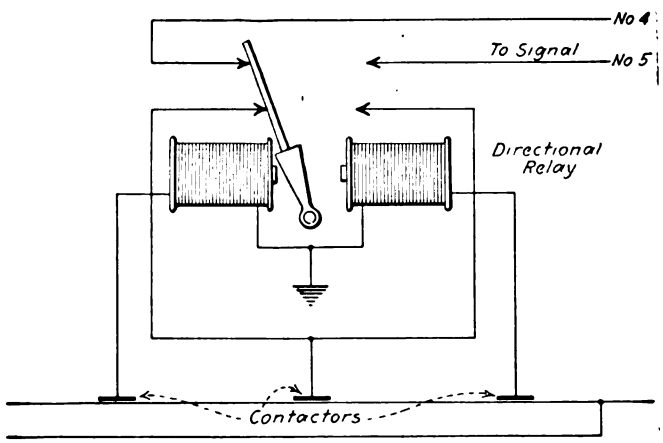
Signal Maintenance on an Oregon Railway

The Portland Railway, Light & Power Company Is Securing Excellent Results by Systematic Inspection and Repair Work—This Covers All Devices of a Warning Character Which Are Used to Protect Patrons and Expedite Operation

By H. J. Charters
Portland Railway, Light & Power Company, Portland, Ore.

THE signaling equipment on the lines of the Portland Railway, Light & Power Company, at Portland, Ore., consists of ninety-one United States Type G-1, non-car-counting block signals, 142 automatic signals for protecting spring switch points, fourteen terminal signals for stub-end city car lines, seven train-order boards, four crossing bells and two special light signals for indicating operation over bridges crossing the Willamette River.

In addition to maintaining and repairing these signals, the signal department maintains electric heaters and lights which are placed at nearly all stations on the interurban lines and at necessary points on the city lines, and in carhouses, shops, etc. There are several hundreds of these light clusters, illuminated



Circuit Diagram for Directional Relay

signs such as derail and stop signs, and special road crossing signs, which are 8 ft. long, displaying the words "Danger, Railroad Crossing" in red letters on a white background and illuminated by two series of 36-watt lamps.

It requires approximately 200 36-watt Mazda lamps per month to keep these lights in order, probably 25 per cent of these being broken or stolen by boys. General Electric tumbler snap switches, inclosed in a wooden box, with the switch handle extending through a slot in the box cover, are used at most of the stations, it being impossible to keep ordinary switches in repair due to vandals breaking them. Ten-ampere switches are used on account of their mechanical strength and an extension handle made of a discarded 600-volt 3-amp. fuse is fastened on in place of the molded one originally on the switch. In the two years that these switches have been used, not more than four or five have been broken and in these cases boxes and all were demolished.

No fixed policy of inspection is followed, but repairs are made as reports come in from various sources, as from passengers and trainmen. The trolley repair crews carry a stock of lamps and make renewals if this will not interfere with their other work.

Electric heater and light wiring in the railway buildings is inspected once a year and dangerous conditions remedied. The heaters used draw a current of 8 amp. from the trolley wire and are made in the company shops. They give very little trouble and occasion less fire risk than almost any other form of heating for the places in which they are used.

One Man Assigned to Maintenance of Signals and Lights

There is one man permanently assigned to repair and maintenance of signals and lights, but his time is so occupied with emergency repairs that any definite policy of inspection must suffer accordingly. There are two emergency trolley crews on duty, dividing the shifts from 8 a.m. to 12 p.m.; a night construction crew from 12 p.m. until 8 a.m. on the city lines, and an interurban crew of five men from 8 a.m. to 5 p.m. They make such repairs on the signals as cannot be attended to by a man operating from passenger cars and carrying the necessary material. There are telephones located at convenient points on the system from which the dispatcher can be called in case of trouble. The blocks being absolute, under the operating rules on the interurban lines, if a train finds a block signal red or yellow or fails to receive a proceed indication, the conductor must call the dispatcher and receive a verbal order to flag the block or meet an opposing train before proceeding. If the signal fails to clear when a car leaves a block, the dispatcher must be notified at the first telephone station.

Special Contactor Devised

Of the ninety-one block signals, forty-one are divided into twenty blocks, protecting 21 miles of single track on the interurban, and the remainder are on the city lines. Considerable difficulty had been experienced with the signals in operation in connection with interurban trains, which at certain locations attain a speed of around 50 m.p.h. Parts were continually being broken and movable parts bent. To obviate this, a system of contactors having no breakable parts was made, in connection with a directional relay for operating the block signals proper. The contactors consist of a timber 2 in. x 4 in. x 12 ft. in size, which is suspended in the center to the span wire and has a standard ear fastened rigidly to the trolley wire at each end. A third ear is clamped to the wire under the center of the contactor and suitable spacing provided by means of adjustable bolts, so that the tension of the trolley poles raises the wire and makes contact with a brass strip on the bottom of the timber above it. A wire leads from this strip to the directional relay. Three contacts were necessary, the first throwing the armature of the

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relay to the entering position and the center one providing the impulse of current to set the signals. The third one sets the relay for the release position. The contactors are placed one span apart and at observation distance from the signal. This apparatus has decreased the troubles materially and permits operation of the trains at any speed desired.

Simple Form of Signal Repeater Proves Effective

To enable an approaching train to ascertain the aspect of a signal located around a curve, a repeater signal was arranged, consisting of a small box with 60-watt, 120-volt Mazda lamp mounted 3 in. behind a 6⅜-in. lens. The lamp was wired in multiple with the red lamp in the signal, a 550-ohm resistance tube replacing the 175-ohm one normally in the original terminal resistance. This gives an indication which can be seen at any angle of the sun or headlights regardless of whether the lens is shaded or not.

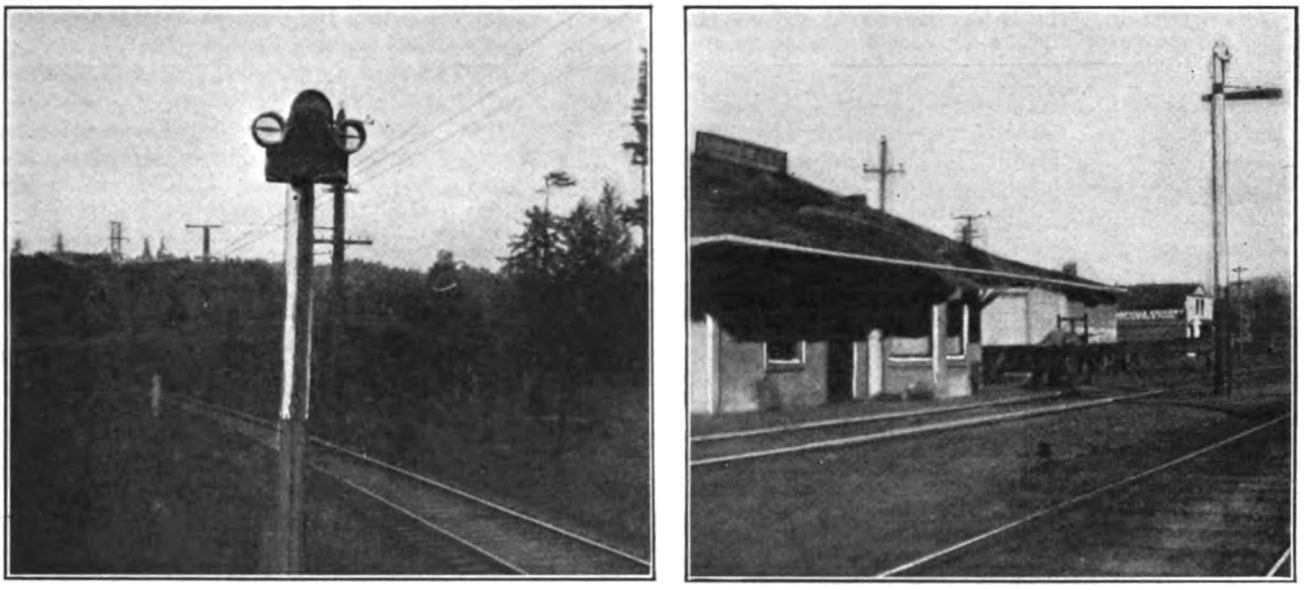
A modification of this arrangement has been used at various places, such as junction points, to indicate the approach of cars and at certain locations where it was dangerous for the motorman to look back to see if the signal cleared, as, for instance, at road crossings and station platforms. In this case the repeater was set ahead of the clearing contactor at observation distance, and faced toward the motorman. This latter arrangement is also used on all block signals on city lines where one-man cars are operated, the conductor watching the signals clear on two-man cars. These lamps last a long time usually, several having been in service since 1916 and burning twice an hour for several minutes.

An attempt is made to inspect the signals and directional relays once each month, to clean and oil moving parts, to make adjustments and to replace burned contacts, bad coils, etc. If any extended repairs are found necessary, a list is made up and the line crew assists in making them. The contactors are inspected as time permits, the line car being used for that purpose. On the city lines the original switches are in use and receive no regular inspection, being repaired or replaced when emergency repairs are made, this work being done by the trolley repair crews. Where possible these switches are being replaced by contactors of the brush type, similar to the ones used on the terminal signals.

Numerous Switch-Point Signals Are Used

The switch-point signals consist of a series of 20-watt carbon lamps located in a wooden box, behind a 6⅜-in. ruby lens, mounted approximately 15 ft. above the ground line, on a pole about 600 ft. in advance of the switch point which it protects. This gives a very clear indication and does not reflect in the rays of the headlights at night.

The line wire is brought in conduit from the nearest pole to the switch point, where it connects with a spring contact which is open when the switch is lined for the main line but closes when the switch is opened ⅜ in. or more, thus completing the circuit to the rail. The contact is of brass, mounted on a maple block which is impregnated with hot paraffin and the whole is suspended from an iron plate which rests on the ties on



At Left, Typical Signal with Pole Painted Black and White for Easy Identification. At Right, Train Order Signal

REPORT OF BLOCK SIGNALS, FROM JAN. 1, 1922, TO DEC. 31, 1922, AS COMPARED WITH TEN MONTHS OF 1921

PORTLAND RAILWAY, LIGHT & POWER COMPANY, INTERURBAN LINES

	1921 (Ten Months)	1922
Number of miles of track blocked		
Oregon City division	9 miles	9 miles
Springwater division	12 miles	12 miles
Total	21 miles	21 miles
Number of blocks		
Oregon City division	10	10
Springwater division	10	10
Total	20	20
Total number of signals	40	41

	1921	1922
Total movement of signals	843,464	991,062
Average movement per block	42,173	49,554
Average daily movement per block	138	141
Number of movements per failure	7,148	13,393

Analysis of failures

	1921		1922	
	No.	Per Cent	No.	Per Cent
Line wires	5	4	5	7
Switch and pole wiring	2	2	3	4
Blown fuses	7	6	3	4
Directional relay	29	25	22	30
Signal trouble	6	5	1	1
Contactors	44	38	26	35
No. 5 switch	7	6	2	3
Miscellaneous	6	5	1	1
No trouble found	11	9	11	15
Total	117	100	74	100

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PORTLAND RAILWAY, LIGHT AND POWER CO.

Report of Signal Failures

AUTOMATIC BLOCK
HIGHWAY CROSSING
ELECTRIC SWITCH POINT

No._____

Reported to Dispatcher by_____ Date_____ 192_____ A.M. P.M.

Reported by Dispatcher to_____ (Foreman) "_____ 192_____ A.M. P.M.

Trouble reported to Dispatcher:_____

By_____ DISPATCHER

Trouble found:_____

Repairs made (including any details of importance)_____

Repairs Completed Date_____ 192_____ A.M. P.M.

By_____ FOREMAN

Elapsed Time of Failure

_____ Hrs. _____ Min._____

Form Used in Reporting Signal Failures

either side. This, being flush with the top of the ties, offers no obstruction for trainmen to stumble over when throwing the switch.

There have been regular monthly inspections made of these signals. An extra man is detailed to this work for the four or five days necessary to complete the inspection. He uses a gasoline car to cover the territory, the signals being distributed over 70 miles of track. For the maintainer's use a testing apparatus was devised consisting of a bamboo pole 10 ft. long, provided with a hook on one end and having a porcelain receptable and 20-watt lamp mounted on it. The receptacle is connected to the hook on one side and to a spring clamp at the end of a flexible wire on the other. The switch point being normally closed, the tester is hooked over a bare spot left for the purpose on the wire leading into the conduit and the clamp is fastened to the conduit or rail. This connects the lamp on the tester in series with the lamps in the signal box and indicates whether or not the circuit is in order to that point. The switch is then opened, which closes the contact at the track, thus shutting out the lamp on the tester. This proves to be a very reliable method of testing, as the distance necessary for the switch to open before lighting the signal can be accurately observed. The operation of testing one signal consumes about one minute if the equipment is in order. If repairs are found necessary they are made at the time.

Considerable criticism has been directed at this signal due to its not giving an indication when lamps are burned out or the circuit open from other causes. Thus there is a possibility of a switch being open and no warning signal being given. However, it was felt that, as some degree of protection was necessary and as standard switch circuit controllers were out of the question on account of their high cost, these signals are satisfactory considering their cost.

The principal troubles have been due to lamps burning out, wires grounding in the conduit and contact blocks burning due to slight leakage across them during wet weather. The two latter troubles have been reduced by using double-braided wire in the conduit and by white-leading all joints in the conduit carefully and dipping the contact blocks in hot paraffin.

The trainmen have instructions to examine the switch point when they find a signal lighted to ascertain whether it is safe to proceed, and to report to the dispatcher at the first telephone reached. Section men make a visual inspection the first of every month, sending in reports of any signals found out of order.

OTHER SIGNALS

The terminal signals are composed of a wooden box, containing a series of 36-watt Mazda lamps behind a ruby lens, and a relay. They are mounted on poles 100 ft. beyond the end of the double track leading to the end of the city car lines. When a car passes under the setting contactor, the signal shows red and so remains until the car has returned from the end of the line and passes under the releasing contactor. The contactors are of the brush type and give very little trouble, being cheap enough to replace when they begin to show much wear. Signals of this type are also used at special locations to indicate approaching cars. They are included in the regular inspection trips covering other signals.

The train-order signals are located at interurban stations where an operator is maintained. They are provided with a semaphore arm for notifying trains to receive train orders. This arm actuates a movable ground connection on a series of lamps which show green or red at the top of the pole and in the operator's room according to the position of the semaphore. The end of the semaphore is counter-weighted and takes the stop position when a cable is released in the station. The cable and lighting wires are brought through conduit drained to a gravel sump hole to prevent accumulation of water and consequent freezing during cold weather. No special inspection is made of these signals except for overhauling and repainting as they are constantly under the attention of the operator on duty. Failure reports are made by telephone and relayed to the repair crews.

Three of the crossing bells are of United States manufacture and one is of the motor-driven wigwag type. These are inspected at the same time as the other signals.

This company inclines to the use of illuminated signs suspended over the road at heavily traveled points. A series of six lamps is used in each of these signs and maintenance is reduced to a minimum, it being only necessary to renew the lamps at infrequent intervals.

NEW REPORT FORM DEVISED

In 1921 the state public service commission required all railroads to furnish monthly reports covering all failures of automatic warning devices at highway crossings, the reports to show in each case the location, time and duration of each failure and also any pertinent details concerning it. In order to collect such information and also have a record of block and switch signal performance, which had been discontinued during the

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war, a report sheet was prepared having suitable spaces for the date, location, by whom reported, to whom referred, trouble reported, trouble found, repairs made, time "O.K." and elapsed time of the failure. Upon the dispatcher receiving a report of failure, he makes out one of these sheets, numbered serially for easy checking, and forwards one copy to the signal department for entry of repairs, time, etc., and the duplicate to the office for checking reports. Maintenance men are also instructed to fill out a report sheet for any failures they discover and repair without a report from the dispatcher. These reports are consolidated monthly and yearly, giving a good record of signal performance during the period. No reports are made out for the city lines, excepting those on crossing bells, with the exception of such reports as can be made up from the dispatchers' daily record of railway line trouble. This report merely shows the percentage of total trouble chargeable to the signals.

In the reports of signal operation for 1921 and 1922, a movement was counted every time a car passed under a contactor and, in computing the total movements, only the minimum number of trains was taken into consideration, there being several extra trains each day which were not included. It should be noted that the number of movements per failure during the ten months of 1921, for which the report was made, were only about 50 per cent of the movements during 1922. This would indicate direct results from resuming special repair and maintenance work which had been almost altogether dispensed with for several years. Under the head of line wires were included all the troubles emanating from that source, whether the circuits were open, crossed with themselves or crossed with other wires. Blown fuses resulted mostly from lightning storms and were not counted if they resulted from crossed or grounded wires or similar causes. Directional relay and contactor trouble caused a large part of the failures but were much less numerous than a number of years ago when the old style trolley switch was used. To signal trouble were charged all failures resulting from the signal mechanism; while never at any time very great, this trouble has decreased 20 per cent, there having been only one case during 1922. This speaks very well for the signals in view of the fact that they have been installed for over ten years.

Maintaining Dielectric Strength of Transformer Oil

Dehydration by Centrifugal Separator Is Proving Successful—The Advantages of This Practice Are Speed and Economy—Apparatus May Be Used for Purification of Lubricating Oil Also

THE danger resulting from even a very small proportion of water in transformer oil is well known to every electric railway power man. It is necessary constantly to be on the job, not only to prevent, if possible, the entrance of moisture, but also to effect its removal before a quantity sufficient to endanger the insulation has accumulated. Experiments conducted during the past three years by a large Eastern electric railway have demonstrated that the method of separation by centrifugal force can be successfully applied to the problem of removing water from transformer oil, as well as to the work of reclaiming oil used for lubrication purposes in the power house.

In railway service the load on a transformer varies widely and rapidly, with a consequent change of temperature of the apparatus and an accentuation of the "breathing" phenomenon. If the atmosphere is laden with moisture it is difficult to prevent the entrance of water when the machine cools and outside air is drawn in. Recent improvements have been helpful in reducing the amount of water in transformer oil. The chloride of lime breather, if carefully watched, operates satisfactorily to dry the air that is drawn into the case. Some new transformers of large size have a nitrogen breathing apparatus, which removes the oxygen of the entering air and leaves only the nitrogen within the transformer. Still other schemes have been tried with varying success. However, there are a very great number of transformers built before the development of these devices, but still perfectly capable of giving good service. The question of removing water from the oil therefore remains today, and will remain for a long time to come, an important problem for the electric railway industry.

A filter press is the method most widely used at the present time for removing water from transformer oil, but centrifugal dehydration has proved very successful where it has been tried. The earliest known application of this principle to such work is found in the ancient Chinese practice of separating fruit juices from a mixture by placing them in a gourd and whirling it rapidly around in a circle at the end of a rope. Our modern cream separator works on a similar theory, and some years ago the same method was first tried for the purpose of reclaiming used lubricating oil. The extensive use of centrifugal oil purifiers by the Navy during the war brought them widely into favor.

Soon after the successful adaptation of this principle to the problem of purification of lubricating oil, experiments were begun at the laboratory of this same Eastern electric railway company to determine whether or not the same method could be successfully followed for the reclamation of transformer and switch oils. It had already been established that the centrifugal purifier was highly efficient in the removal of the small particles of solid matter found in used lubricating oil, and that it removed also a large part of the water from the oil in the process. The problem of purification of transformer oil, however, is somewhat different. There is likely to be very little solid matter to be removed, but the elimination of moisture is of vastly greater importance. The reclamation of switch oil is largely a question of the removal of carbon.

It was found that the centrifugal separator then in

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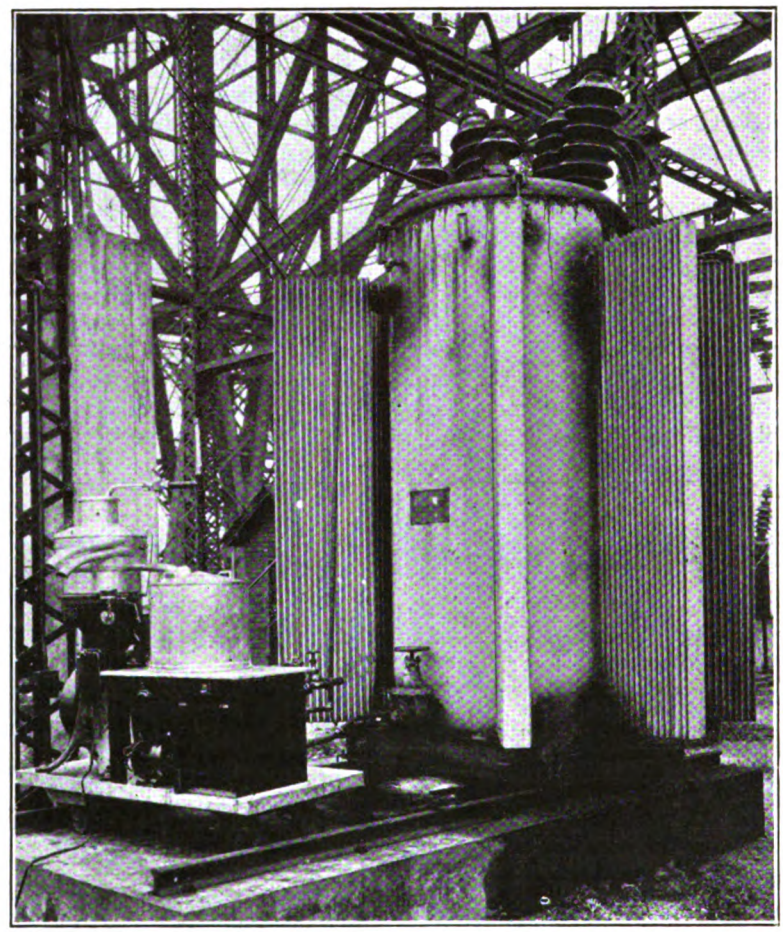
use for purifying turbine oil was not altogether satisfactory when used for dehydrating transformer oil. Too much water remained in the oil even after repeated treatments, and the dielectric strength was therefore not up to standard. A slight modification of the design of the bowl was accordingly made by the manufacturers, the De Laval Separator Company. After repeated trials and changes in the design, a model was developed which gave satisfactory results when used on even the worst transformer oils. With this machine it has been found possible to restore the original dielectric strength of the oil by putting it through the separator only once.

As an illustration of a typical experiment in dehydration of transformer oil, a test made by the electric railway company Oct. 17, 1922, may be cited. The transformer used was a 625-kva. unit, 2,300-4,400 volts, containing No. 12 transil oil. The temperature varied between 42 and 48 deg., Centigrade, during the test. Approximately 530 gal. of oil were run through the separator, at a rate of 50 to 150 gal. per hour. This speed could have been exceeded except for local conditions, a rate as high as 350 gal. an hour having been obtained in other of these tests. The dielectric strength of the oil was determined in each case by averaging the breakdown value obtained by testing five samples of oil in an oil test cup with ½-in. electrodes, 0.2 in. apart. The transformer was not in service at the time.



Transformer with Portable Oil Separator Connected

TRANSFORMER OIL TEST

Time	Dielectric Value of Oil at Intake	Dielectric Value of Oil at Outlet
8.15 a.m.	14,000 volts	21,000 volts*
8.30 a.m.	First oil repeated	40,000 volts
8.45 a.m.	29,000 volts	42,000 volts
9.30 a.m.	45,000 volts	48,000 volts
9.45 a.m.	46,000 volts	**
10.15 a.m.	49,000 volts	**
10.45 a.m.	50,000 volts	**
11.30 a.m.	49,000 volts	**
12.30 a.m.	51,000 volts	**

* This oil was not considered fit to be returned to transformer and was put through separator again.

** No breakdown values obtained—dielectric above 52,000 volts capacity of testing machine.

In similar tests using the "new" gap with 1-in. electrodes 0.1 in. apart, dielectric values as high as 32,000 volts have been obtained.

The apparatus now used for the dehydration of transformer oil is largely the outgrowth of experiments during the last three years. It consists of a motor-driven centrifugal separator, together with an electric driving motor, pumps, heater and oil tank, all mounted upon a movable platform. The separator itself differs only in the design of the bowl from the machine which was described in the ELECTRIC RAILWAY JOURNAL, issue of Nov. 18, 1922, and which is now quite widely known.

The action which takes place in the separator bowl is the same as that which occurs in the purifier bowl except that in the latter the water is forced upward along the outer edges of the disks and is discharged through an outlet at the top, while in the former, the comparatively small quantity of water is allowed to remain in the dirt pockets. The fact that the apparatus is portable makes it possible to move it easily from one location in the power house to another, or to roll it up a gangway onto a motor truck and carry it to various substations. At a large generating station it can remain permanently piped to all of the transformers and be used solely for their dehydration, but where there are not a sufficient number of units to keep one separator busy all the time, the portability feature is a great asset.

The frequency with which it may be necessary to dehydrate transformer oil of course depends upon many factors. An outdoor transformer in a damp climate may acquire a dangerous amount of moisture in the oil in four or five months, while another located indoors may safely go for years without being touched. The practice of the electric railway in question is to draw off a sample of oil from the bottom of each transformer once a month and send it to their laboratory for testing. In this testing the old gap is habitually used because it is thought to give more reliable results. When the dielectric value of the sample of oil falls below 26,000 volts, the transformer is dehydrated by the centrifugal separator.

The advantages which have been found to result from the use of the centrifugal separator for dehydrating transformer oil have been, primarily, increased speed and decreased cost. It was usually necessary with the blotter press to run the oil through the filter at least three times in order thoroughly to purify it. A big transformer may contain as much as 2,400 gal. of oil, which would mean a matter of forty-eight hours for dehydration by a medium-sized filter. Additional time would be required for changing blotters, taking apart

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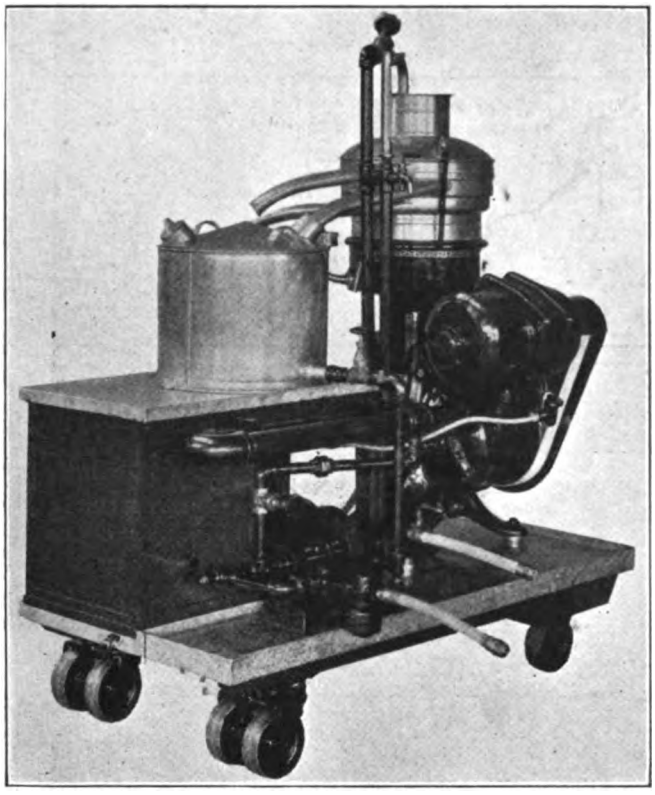
and putting together the apparatus. On the other hand, a centrifugal separator could probably purify that quantity of oil in about twelve hours.

Not only is it possible for fewer men and fewer machines to do the work by the new method, but there is also the additional advantage that it is frequently possible to take a transformer out of service for a short period for dehydration, when it might be quite impossible to keep it out for many hours. The centrifugal



Portable Separator for Reclaiming Transformer Oil

separator, therefore, makes it feasible at times completely to dehydrate the oil under circumstances such that it could not be done by the slower filter press. With the latter it would be necessary to do the job a little at a time whenever it was possible to take the unit out of service. Other advantages are that the separator is less influenced by atmospheric conditions, and that the messy process of changing blotters is eliminated.

An illustration of the usefulness of speedy dehydration is furnished by an experience which the electric railway had with a transformer at one of its substations. It was discovered that a small pinhole leak in the copper tubing was allowing a minute quantity of water to mingle with the oil. Although the rate of leakage was low, nevertheless the dielectric value of the oil was rapidly reduced. It was most important that the transformer remain in service, so a portable centrifugal separator was brought over and set to work while the transformer remained alive. After the oil had been dehydrated once the separator was left in place, and tests were taken of the oil every hour. Whenever the dielectric value fell below 30,000 volts, the purifier was set to work to restore it to the vicinity of 50,000 volts. In this way it was possible to keep the transformer in service for several days in spite of the leak, at a time of peak demand when the loss of any apparatus would have been a serious inconvenience.

It may be doubted, however, whether under ordinary circumstances it is desirable to treat transformer oil while the unit is in service. Sometimes when there is much moisture in the oil, it is not fit to be returned after one passage through the separator. The flow of oil in and out, and the disturbance of small particles of solid matter, to some extent increases the risk of a breakdown. Manufacturers of transformers disapprove the practice, and operating men are inclined to agree with them. In railway service it should be possible to take the unit off the line long enough to dehydrate the oil.

The existence of some solid matter in the transformer oil is clearly shown whenever the centrifugal separator is cleaned. A kind of sludge somewhat resembling vaseline is found to have gathered in the dirt pockets. This is probably composed of metallic particles from the terminals, ingredients of the insulating varnish and so forth. The sludge accumulates so slowly, however, that it is possible completely to treat a transformer without it being necessary to stop the separator for cleaning. In this respect the centrifugal separator possesses a distinct advantage over the press filter, whose blotters have to be frequently renewed. The time required for taking apart the machine, cleaning out the dirt pockets, and putting it together again is about forty-five minutes.

There are now several installations of this type of apparatus in use for dehydration of transformer oil. The blotter press method has not been entirely abandoned, because it is thought to be superior for removal of some foreign substances, such as the carbon in switch oils. Therefore apparatus for both methods is kept available, and its use is governed by the circumstances of a particular case. The same equipment has at times been used for purification of lubricating oil and dehydration of transformer oil, although this is not ordinarily done because the size of the plants justifies separate installations. On a smaller property, however, it would be possible to use one separator for both purposes by simply changing from a separator bowl to a purifier bowl, or vice versa. Carbon has been successfully removed from switch oil by washing with soap, allowing the mixture to settle, and then dehydrating the oil. By this process the dielectric value of the oil was brought back to standard and its clearness restored.

The utility of the centrifugal separator in electric railway work is perhaps greater than in most other work involving large transformers, because it is nearly always possible for a railway to take a transformer out of service for a few hours any day. Where the unit must remain alive during dehydration, there is a possibility that the first oil coming through the separator will not be fit to be returned, and if it should be poured back into the case, a breakdown might result. If, however, the oil in the transformer be of fairly high dielectric strength to begin with, or if the unit be dead during the dehydration, this danger will be avoided. It should then be possible to utilize the centrifugal separator readily, and to accomplish improved speed and reduced costs in the removal of moisture from transformer oils. The fact that the same machine can be used after a slight change, for the purpose of purifying lubricating oil, brings it within the reach of smaller companies as well as those which use power on a large scale.

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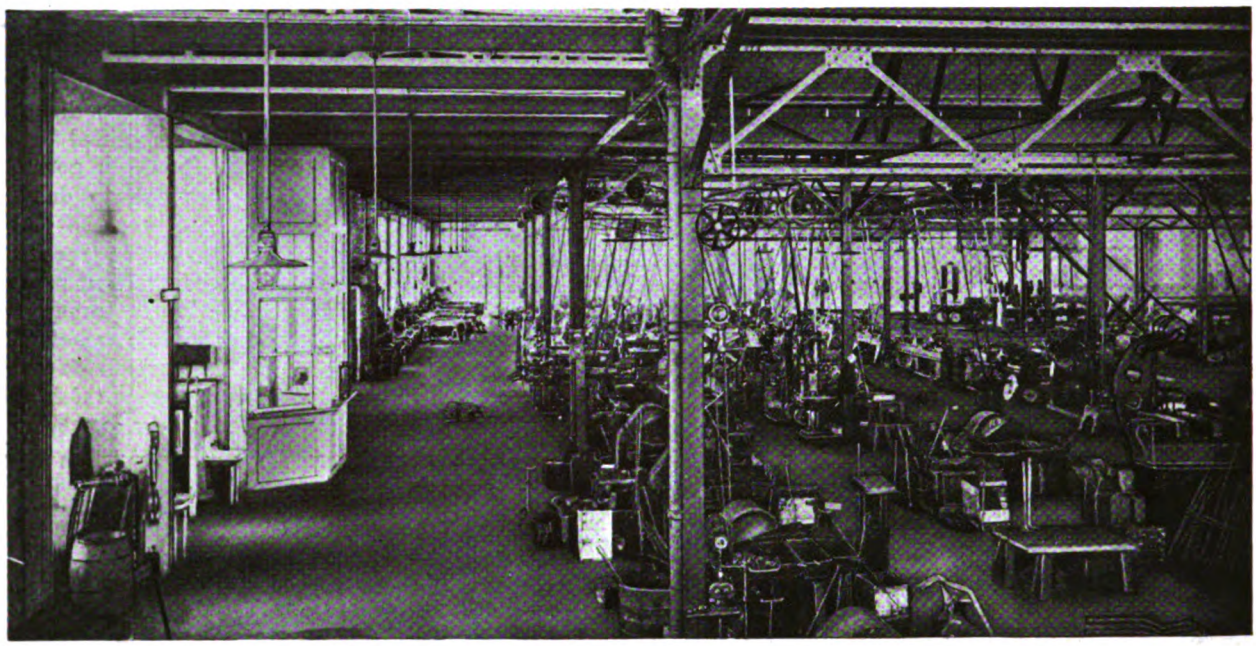
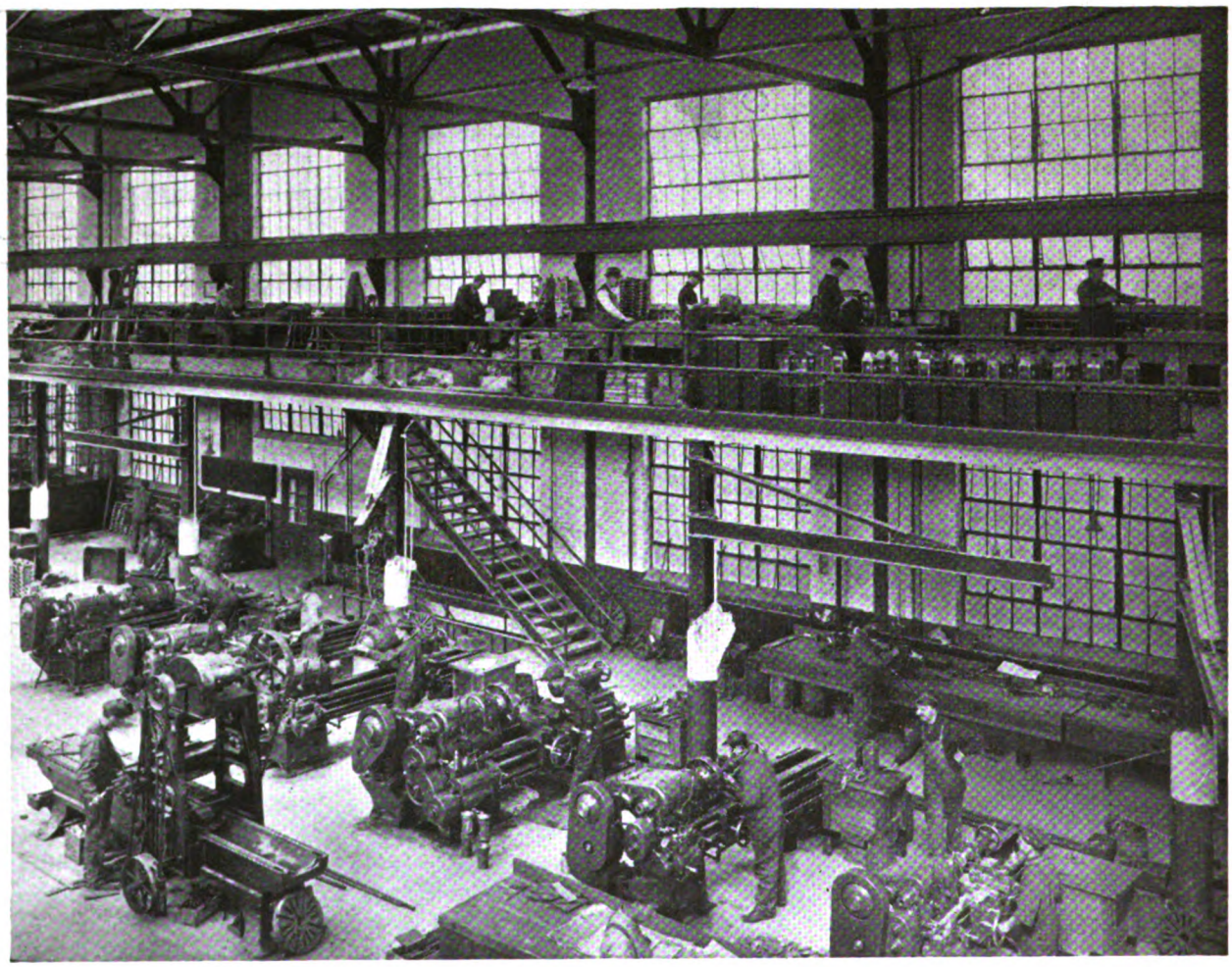
Two Comparatively New Electric Railway Machine Shops





A contrast in what individual motor drive or the lack of it (above) means in securing a clear overhead sweep for cranes, hoists and derricks, good appearance and better working conditions for the men. Belting not only clutters up the headroom, but incurs considerable expense in maintaining belts and shafting, and the machine work is not done as positively and economically.

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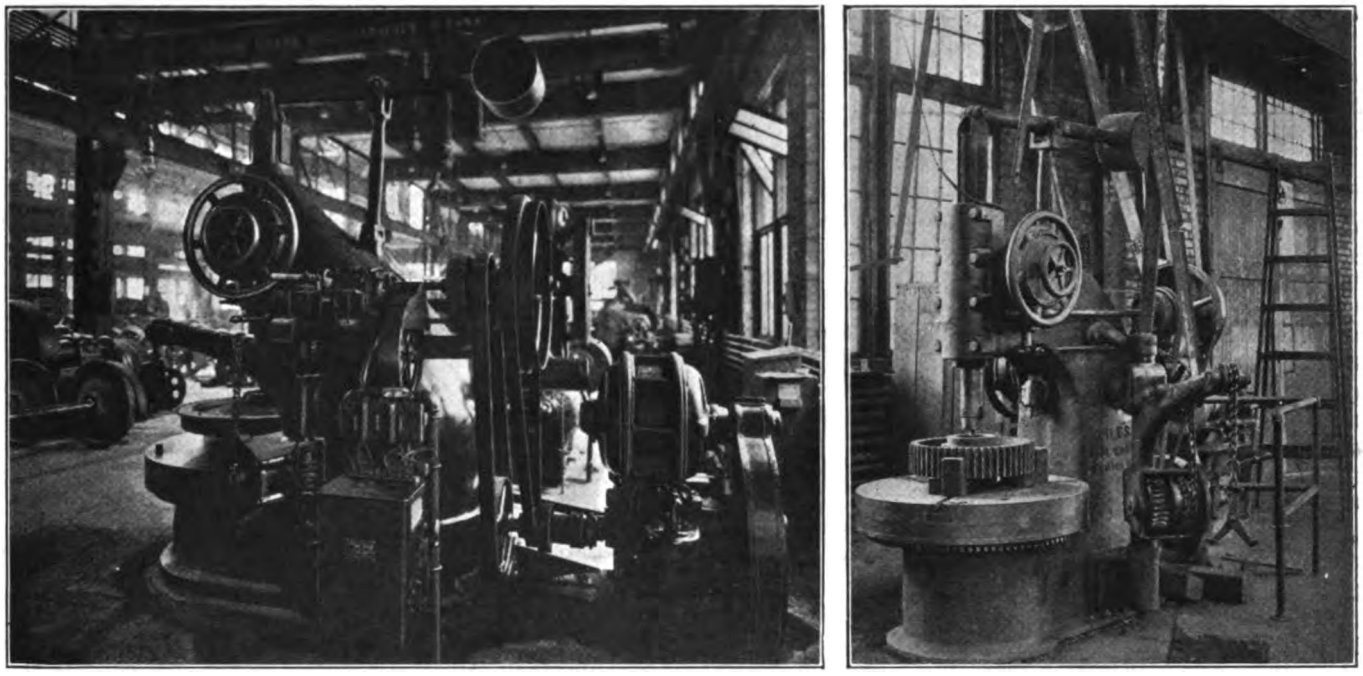
Individual Motor Drive Improves Shop Efficiency

The Intelligent Application of Electric Motors to Machine Tools May Be Used to Increase Shop Output, Save Power and Improve the Quality of the Work—Some Examples of Specific Application to Machines Are Given

By H. J. Rice
Machine Tool Specialist, New York, N. Y.



Two Boring Mills, One Equipped for Individual Drive and the Other for Group Drive

WHERE precision, efficiency and rapidity of production are of first importance small wonder that individual motor drive for machine tools is fast replacing the old system of transmitting power by line shafting. This is as true of the modern electric railway shop as in other lines of industry.

Briefly, individual motor drive involves the use of a motor with independent control equipment for each separate machine tool, as compared with the operation of several tools by the same motor. It is difficult to outline all the advantages of individual motor drive, but a few of the principal ones follow:

1. *Increased Production.*—This may come from various causes. Due to the variety of machine tools on the market today and the adaptability of some of them to certain types of motors and control equipments, an appreciable increase in capacity may be obtained. The use of adjustable or multi-speed motors may result in considerable saving of time in effecting speed changes, as compared with mechanical means, such as cone pulleys or gears. Simple controllers or push buttons can be placed convenient to the hand of the operator, who then can observe his work more closely.

2. *Power Saving.*—With line-shaft drive a considerable amount of shafting and belting must be turned over, and seldom indeed is it possible to avoid "idling" a large proportion of the driven machines. The friction loss in line shafting and counter shafting frequently takes a considerable share of the total power. In laying out such drives it is necessary to install a motor of ample capacity to take care of all the machines that may be run at once. The motor must operate much of the time at greatly reduced loads, with decreased efficiency. As an illustration a standard 75-hp. d.c. motor has a full-load efficiency of approximately 91 per cent; at half load the same motor has an efficiency of 87 per cent; and at one-quarter load it becomes about 79 per cent. With a.c. motors the drop in efficiency from full load to one-half or one-quarter load would be even greater, for we have then to consider the poorer power factor. Wherever such operating conditions obtain—and in the average electric railway shop half the machines may be idle momentarily—the installation of individual motors so that the power may be cut off the instant the machine becomes inoperative should result in a power saving of 10 to 50 per cent or more.

3. *Elimination of Belt Slippage.*—Often considerable trouble is experienced with slipping belts, and with deep cuts the allowable size of belt and pulley may not transmit the required power satisfactorily. Mounting the motor on or near the machine frame with positive gear drive will remove this trouble.

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4. *Shop Improvements.* — Elimination of shafting, belting and fixtures improves light and ventilation and reduces the amount of dirt, grease, noise, fire and accident risk. Clear overhead space often is a requisite for traveling cranes.

5. *Extensions and Alterations.*—These may be made at the least expense, each machine with its own motor being independent. Trouble at one machine does not necessitate shutting down others.

6. *Power Tests.*—Individual drive lends itself to accurate tests of power consumption. From a few readings faults in the machine tool itself easily may be detected and corrected. More accurate data may be furnished the accountant for fixing factory costs.

References have been made to the increased production capacity of labor, plant or machinery by individual drive. Output may be increased from 5 to 10 per cent by the introduction of electric drive in its simpler form, while with machine tools highly responsive to automatic control production may be increased 50 per cent or more.

The value of adjustable-speed motors in improving output is well illustrated by actual tests taken on a 72-in. lathe. The first test was made on a lathe having standard cone pulleys. Beginning on the first cone at a cutting speed of 66 ft. per minute the speed fell gradually for forty-one minutes, at the end of which time a speed of 33 ft. per minute was reached. The belt was then shifted to the second cone, giving an initial speed of 55 ft. per minute, which decreased in the next eleven minutes to 31 ft. per minute. The belt was again shifted to the third cone and the cut completed in seven minutes, the speed falling from an initial value of 48 ft. per minute to a final value of 15 ft. per minute.

The test on a similar lathe driven by an adjustable-speed d.c. motor with field control was carried out at a practically constant speed of 85 ft. per minute, the range being between 84 and 87 ft. per minute. The belt-driven lathe required fifty-nine minutes to complete the work, while the motor-driven one performed the same work in thirty-one minutes. With the electrically driven tool the cut began and ended at the maximum cutting speed that the work permits, a condition indispensable, as a rule, to rapid production. It should also be pointed out that with electric control the operator has only to watch the tool and increase the speed from time to time up to the permissible temperature of the tool and the safe working strength of tool carriage and lathe headstock.

Possibly one of the most interesting of all individual drives is that applied to the reversing planer. In the ordinary planer the work is clamped to the platen and moves back and forth under the cutting tool, the cut being taken in one direction of travel only. The speed maintained during the cutting stroke is comparatively slow, but is automatically increased on the return. Different materials, rough or finishing cuts, etc., impose various conditions. With motor drive, adjustments may be made within any desired limits of both cutting and return speeds. The motor speed while cutting may be set between, say, 250 and 500 r.p.m., and while returning a speed of 500 to 1,000 r.p.m. may be used. The motor is geared direct to the bull gear in the planer and its armature is reversed with each reversal of the planer platen. Dynamic braking is employed in effecting reversals tending to form a cushion effect in stopping the platen, thus reducing damage to the machine parts by these sudden impacts.

Similar reversing-duty equipments are now manufactured in standard sizes, and designed especially for boring mills, plate planers, slotters and wheel lathes. In the latter equipment frequent use is made of a "slow" push button which cuts in armature resistance to give approximately 50 per cent speed reduction, thus providing for cutting through hard spots on the tires of driving or car wheels.

Obviously these results could not be accomplished with the induction motor, for it is not satisfactory as a variable-speed machine. In many shops where a.c. power only is available, and where the automatic features of d.c. motors are desirable, necessary current is obtained from motor-generator sets. Induction motors will give fair satisfaction, however, and may be used where there is not enough use to justify the motor-generator installation.

The question may be asked whether individual drive has any place in the more or less isolated interurban shop where only 600-volt d.c. is available. Why not? Motors for 550 volts are now built in standard sizes from ½ hp. to 200 hp. and in the larger capacities are less expensive than the 230-volt machines. As previously pointed out, the d.c. machine possesses the inherent characteristics desirable for flexibility. The Harvard Shops of the Cleveland Railway, considered by many an ideal example of modern practice, employ 550 volts for power. Individual motor drive is used almost exclusively throughout the plant, whose average monthly consumption is 21,000 kw.-hr. Many other large shops also have abandoned line-shaft drive.

Great care should be used in selecting the proper type and size motor for each kind of machine tool. To give the characteristics of each machine here would be impracticable, but a summary of the different classes of work with the corresponding type motor follows:

D.c. shunt-wound or a.c. squirrel-cage motors are suitable where constant speed is desired and starting duty is not excessive, also when considerable speed range is desired. For the latter purpose the shunt-wound d.c. motor only is suitable. Machine tools in this classification include bolt cutters, boring machines, chucking machines, drilling machines and radial drills, grinders, gear cutters, lathes, pipe cutters, rotary planers, reversing motor planers, circular saws, shapers, slotters, and tappers.

D.c. compound-wound or a.c. squirrel-cage motors with high-resistance rotors are used for constant speed work but with heavy starting duty, or where there are sudden heavy loads of short duration. Machines in this class are bolt and rivet headers, bending machines, drop hammers, shears, and swagers. For these machines compounding of 20 to 40 per cent is used. Bending rolls and lathe carriages require 50 per cent compounding. Belt-reversing planers and friction saws use 20 per cent compounding.

D.c. series motors are useful to give excessive starting torque when speed regulation is unimportant, and then only if light-load speeds do not exceed the safe limit. This type is sometimes used for lathe carriages.

A.c. slip-ring motors are needed for heavy duty where some speed adjustment is called for. These motors do not have the characteristics of d.c. adjustable-speed motors, but are comparable with d.c. motors with armature control. Bending rolls use motors of this type.

A.c. multi-speed motors are used where d.c. is not available and when two or more definite speeds are desired.

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Automatic Substation Experience in Cleveland—III*

Remote Supervisory Control Gives Advantages of Manual Plus Automatic Operation — Experience with Existing Substations Has Made Possible Designs for Future Ones in Which Floor Space Will Be 30 per Cent, Cubic Contents 60 per Cent and Cost 40 per Cent Less than in Present Structure

By L. D. Bale
Superintendent of Substations the Cleveland Railway

IN PRECEDING articles the present three automatic substations operating in Cleveland were described and details of the sequence of operations in the automatic control were given. Mention was made of the remote control and load indication which are now being installed. The principles of this are given in the following article:

Remote Supervisory Control and Load Indication

Aside from the necessity of perfecting a system wherein absolute control of the individual faulty feeder section was obtained, it was realized that, with the adoption of comparatively small substation units, ability to shift or transfer load in the event of station or system zone trouble was imperative, especially where the demand for continuity of power supply was insistent. If means were not available for the control of transfer of load where the plants are in relatively close proximity and are connected through d.c. feeder network of low ohmic resistance, trouble occurring in one station or zone might readily be reflected to an adjacent plant, possibly producing sufficient overload in that plant to involve it in the trouble, and in this manner actually spreading the disruption to service over the system.

Taking advantage of the presence of the remote supervisory control system proposed for d.c. feeders, minor additions were made, making the control applicable to the converter. By utilizing this method, not only is indication had of the condition of the converter at all times, but also a much higher over-all plant efficiency may be obtained through the ability to start and stop equipment at will. This will simulate manually operated conditions, with the added advantage of much greater system flexibility.

The system of remote supervisory control and power indication, as being installed, will be centered in a dispatcher's office located approximately at the geographical center of the system. From this office will be extended two pairs of telephone conductors to each automatic substation. Each substation will be represented on the dispatcher's desk by a small panel, upon which will be located signal lamps for indicating the position of the various d.c. feeder contactors and certain master relays, or controlling devices, at the substation end. The remote control of equipment in the substation is accomplished by the manipulation of a keyset located on the dispatcher's table, consisting of about thirty-three keys or buttons similar in appearance to those used on adding machines. Through codes set up by the keyset, certain combinations are transmitted that cause control devices at the substation end to be operated. As these devices are operated, indication is had by the change of signals in the lamp monitor at the dispatcher's office. Further, the automatic functioning of any device at the substation end, that is, any operation independent of the action of the dispatcher, will also set up corresponding signals at the dispatcher's board. To aid in comprehensive load dispatching, provisions are made for duplicating, in the dispatching center, the loading of each station upon a graphic chart.

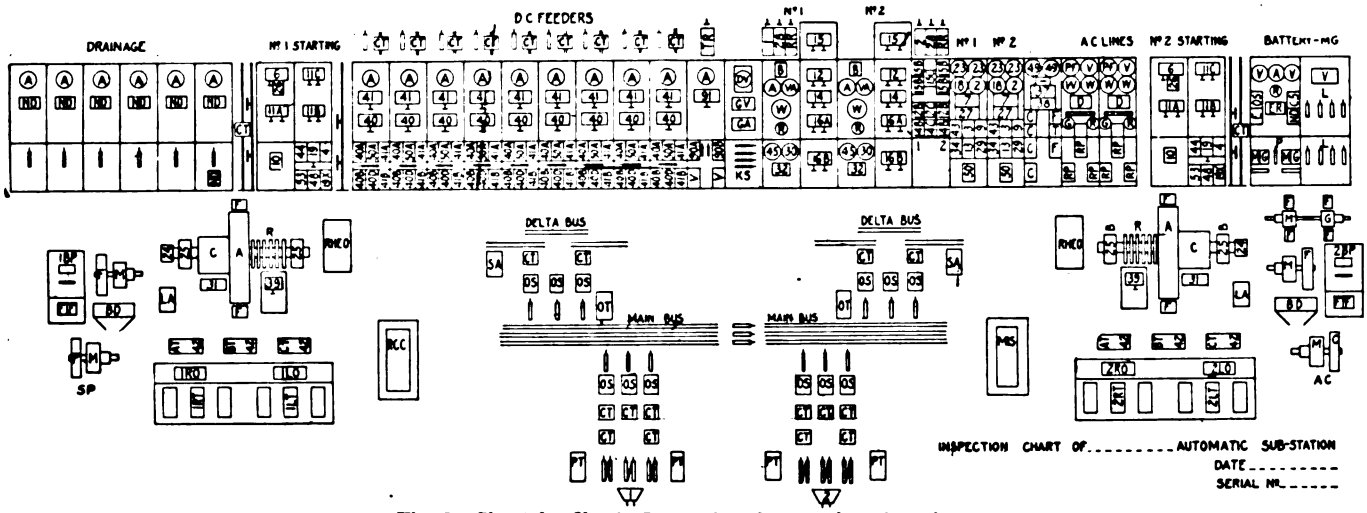

Fig. 8—Chart for Use in Inspecting Automatic Substations

*See issues of this paper for March 3, page 359, and March 10, page 405.

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The pairs of telephone conductors are also used for telephone communication between the dispatcher and the substation inspector. It must be understood that the remote control system does not supersede the automatic substation control in any sense, all the various benefits derived from full automatic control still remaining. In the event of the remote control system becoming inoperative for any reason whatsoever, it is automatically disconnected from the substation control, leaving the station under full automatic control.

The dispatcher's desk is at present arranged to accommodate fifteen automatic stations. In laying out the control system an ultimate capacity of thirty substations has been contemplated. With thirty automatic substations in operation, which would mean that the entire power facilities of the system would in all probability be automatized, through the use of thirty or forty buttons in the one keyset the dispatcher would have absolute control of every converter and d.c. feeder on the entire system.

Operating Experience With the Existing Three Substations

Prior to the starting of the first plant, there was doubt expressed in some quarters as to whether a converter automatically controlled could be successfully ap-

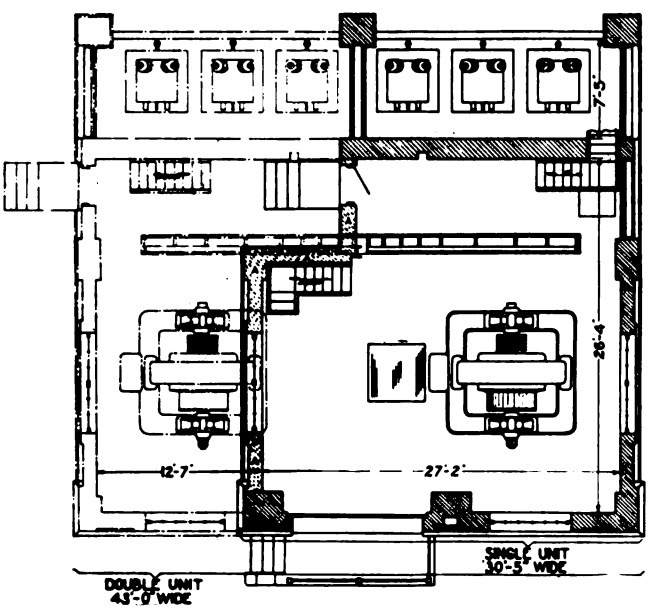

Fig. 9—Floor Plan of Proposed Automatic Substation. Single-Unit Type in Solid Lines, Extension to Accommodate Two Units in Broken Lines

plied to a system where the requirements were such as they are in Cleveland. This feeling probably was fostered by lack of precedent, in addition to the fact that many new phases of operation were presented in the adoption of this type of control that had not been encountered in automatic substation applications then in operation. Among the most important of these problems are: The matter of control of the larger capacity converters; complications arising affecting not only feeder control, but also involving the converters, due to the presence of tie copper and feeder network; reliability of operation under emergency conditions, etc.

After observation of the performance of the first automatic plant put into operation on this system, the question of the feasibility of automatically controlled substations for urban service was definitely answered. Regardless of difficulties encountered in the initial installation, there remained no doubt but that the principle was fundamentally correct. Such difficulties as were experienced were not inherent defects in this type of station, but rather a matter of control details.

The existence of the first installation in operation made it possible, by the process of elimination in some cases, to rectify defects in the scheme that were apparent, and, through special tests and experiments, to uncover other hidden deficiencies in the control. Thus, by intensive study of the problem, together with observation and verification of results obtained in actual service operation, the plants were finally brought to a point where the operating record was perfect. This refers, of course, to the converter control.

The d.c. feeder control, as previously pointed out, while being satisfactory in its operation when applied to most systems, it is not so in this instance, by reason of the rather unusual requirements on this property regarding power supply. With the completion of the installation of remote supervisory control and feeder transfer system, the complete control of the d.c. feeders in automatic plants will also be assured.

It has been found that automatized substations in urban work, as has been proved to be the case in interurban work, are conducive to a higher degree of reliability of service than manually operated plants. Not only are the mistakes in operation (generally resulting in interrupted service) eliminated, but service is restored with the greatest possible expedition in the event of a contingency involving possibly the entire system, such as a.c. power failure.

By check upon present manual plants on this system it has been found that it requires an average of one and one-half minutes for an operator to place a 1,500-kw. converter in operation from a standstill, under normal conditions. In the event of trouble, where switching is required on feeder sections, and where it is necessary, in preparing to restart, to clear buses, switch control, converters, etc., after an outage, an average of five and one-half minutes elapses from the time of origination of the trouble until the plant is again in full operation with all feeders on the converter bus. In automatic operation the same type of 1,500 kw. converter is started from a standstill and connected with the load in thirty-three seconds, provided there is no time consumed in field reversals. This takes approximately five seconds per reversal. With this speed of operation in mind, it may be assumed, provided a.c. power is available, that approximately thirty-five seconds will represent the limit of time of d.c. power interruption with this type of station in service. This point has been demonstrated on the property upon several occasions, in all of which the d.c. power supply was again established before the operators of the manual plants had the opportunity to clear their boards ready for restarting. With the automatic converter capacity at present installed, representing but 11.8 per cent of the total system capacity, it is realized, of course, that, in the event of a.c. power failure under peak-load conditions, the voltage from existing automatic plants will be so reduced by introduction of current-limiting resistance and feeder drop that the effect will not be felt appreciably over the entire system. However, during off-peak periods this is not the case.

With automatic control, the item of maintenance will be lower than that incident to manual operation, especially where the plants are subjected to an appreciable amount of trouble due to system disturbances. The possibility of an operator anticipating trouble is re-

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mote, for abnormal conditions develop so quickly and are frequently so obscure, that, before he has the opportunity to realize what is occurring, damage to equipment often results. Mistakes in operation are also conducive to further damage.

Because the method of control includes protective devices peculiar to automatic operation the equipment is protected as the trouble occurs. The effects of short circuits, of sufficient value to cause the converter to "flash over," are so minimized that no damage to the control results, and that to the converter is so slight as to be practically negligible. In the several cases of "flash-over" observed during the operation of the plants under discussion, there has been but one which interfered with service. In this instance the converter was removed from service due to operation of a.c. overload relays, and was back in operation again in forty seconds (the time required for automatic starting), no damage being done to any of the equipment. In other cases the converters were not disconnected from the d.c. bus.

In regard to the cost of maintenance, unsettled operating conditions due to the many tests and experiments conducted, and the work of making various changes necessary in the stations, have made it impossible to obtain dependable figures on maintenance cost. However, the amount of data so far collected indicates an approximate 25 per cent decrease as compared with manual cost, figured upon a unit, or converter, basis.

When the installation of automatic control was first contemplated it was realized that the success or failure of the installation would depend primarily upon proper inspection and maintenance. With this in mind, particular attention was given to the training of inspectors. A school was organized and to this were invited certain men in the organization who possessed the required qualifications for this training. They were engaged at that time in maintenance work and had had experience in operating substations. Intensive study was made, utilizing specially prepared wiring diagrams and charts; questions were asked; and all the possible contingencies that could be foreseen were discussed, until finally, everyone attending these classes became perfectly familiar with the scheme of operation.

Incidental to the training of inspectors, the discussions were, in a number of instances, responsible for the uncovering of weaknesses or deficiencies in the proposed control scheme. These were corrected in most cases before the control was assembled. The fact that the equipment for these automatic plants was installed by the railway company made it possible to have the trained men conduct all circuit check tests necessary during the construction periods. When the plants were ready for operation they assisted the company's engineers in all tests incidental to placing the equipment in full operation. The experience gained during this period was, without doubt, equivalent to at least three or four years of normal automatic inspection work. Since the plants have been in operation many valuable suggestions have been received from the inspectors regarding matters of control, etc.

In addition to a main wiring diagram of the entire plant, a loose-leaf book of individual devices is maintained at each substation. A separate page is devoted to each relay, contactor, etc., on which are indicated all of the circuits involved; the control of the operating coil, and circuits functioning through the contacts and interlocks of this device. This data book, which has helped wonderfully as a time saver in locating control troubles, and the sequence chart, shown in connection with the March 10 article, are most important in successful inspection work.

A casual inspection is made of each plant once a day at present, the time consumed in looking over graphic charts and condition of equipment requiring approximately twenty minutes. Every two weeks a thorough detail inspection is made, at which time all routine maintenance work is done and all equipment blown out and thoroughly cleaned. The cost of inspection alone, not including time consumed between plants, now averages $8 per unit per month.

Considerable thought has been given to the matter of inspection records or forms. At present a small blank for daily inspections is in successful use, but is not applicable for detail inspection. The usual form of record in which each device is tabulated, together with all component parts requiring inspection, would require a large, unwieldly report sheet, the use of which would not only slow up the process of inspection but would also be of questionable value. The value of inspection reports depends upon the ease of compiling operating data from them and of checking back in event of failures. The responsibility for the report and the thoroughness of the inspection must rest with the inspector. The form illustrated in Fig. 8 will, it is believed, prove not only conducive to good inspection, but it is simple also, yet contains sufficient information for compiling performance data, etc. The inspection chart, measuring 11 x 28 in., has every piece of equipment represented in outline or in block form, against which the inspector may check as inspected. On the reverse side detailed information is noted regarding any difficulty found and the condition of the building and general information.

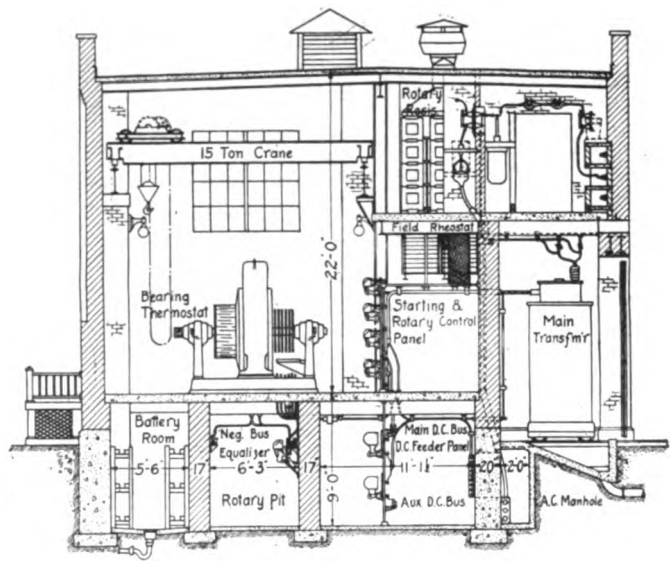

Fig. 10—Longitudinal Section of Proposed Automatic Substation

PROPOSED AUTOMATIC SUBSTATIONS

The period which has elapsed since the present stations were erected has afforded an opportunity to study the requirements of a structure suitable for automatic equipment on this system. Restrictions imposed by the city government, together with those frequently encountered in individual locations, have made it impossible appreciably to reduce the cost of the building by cheapening the exterior, because of resultant effect upon the appearance of the structure. Savings are possible, however, in numerous instances by reducing the size of the

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building. In designing these proposed stations, full advantage has been taken of the fact that automatic equipment was to be installed. This resulted in the utilization of areas within the structure to a much better advantage than had heretofore been possible. The locations of the various items of equipment, which in former plants were of necessity arranged with consideration to ease and expedition of operation, have been rearranged in order to simplify the connections and minimize the size of the housing structures. As a result of this redevelopment of substation buildings a reduction of approximately 30 per cent in floor area has been affected, and the cubical contents of the proposed building indicate approximately a 60 per cent reduction, when compared with the existing plants on a two-unit basis. Estimation of the cost of such a building upon the cubic foot unit basis, checked against a contractor's bid price, indicates that the buildings may be erected for less than 40 per cent of the cost of the present structures. The kilowatt installed capacity is identical in both instances, as is the case with the various items of control, except for the elimination of the d.c. feeder current limiting resistance.

Results of the development of a standard automatic substation building that can be erected either as a single or two-unit plant as illustrated in Figs. 9 and 10. The single-unit building is shown in full lines while the two-unit plant is illustrated as an extension in dotted lines. With conditions as they exist in urban centers regarding availability of real estate, values, restrictions, etc., it is possible that, due to increase of load in a given territory, it may become economically necessary to increase an existing single-unit plant to one of two units. The proposed layout was designed with that contingency in mind, only the wall section marked A in Fig. 9 having to be removed, and no equipment, circuits or barrier structures being disturbed. The resulting two-unit plant would be identical in all details with that of a plant originally built to contain two units.

Referring to the longitudinal section of the proposed plant, Fig. 10, it will be noted that a rather radical departure has been made from the present standard of substation layouts. By meeting the conditions imposed by fire underwriters' rules, oil-cooled transformers are permitted to be used. These transformers, while in the same building, are entirely sealed off from the rest of the substation equipment. The converter control, including starting panels and the a.c. incoming line control, are located on the main floor. The outgoing d.c. feeder panels are located directly beneath in the basement, from which the feeder cables leave the plant. Likewise, the negative drainage panels will be located in the basement.

The segregation of high-tension circuits from low tension is obtained by extending the structure covering the transformer vaults to comprise a balcony upon which is grouped all high-tension equipment. As a matter of insurance to service, all high-tension phases and equipment are separated by the customary barrier construction, this being deemed advisable for a station in this type of service. To provide against station shutdown, due to failure of the high-tension line normally supplying energy to the converter, the single-unit plants will be provided with a second source of energy, either from an a.c. ring system or from some emergency source of energy readily available, controlled either automatically or by remote control.

The Readers' Forum

Labor Costs in Boston and Philadelphia

BOSTON ELEVATED RAILWAY

BOSTON, MASS., March 9, 1923.

To the Editors:

In your issue of Feb. 24, 1923, on page 347, was printed the annual report of the Philadelphia Rapid Transit Company. Quoting from this report was printed the following:

Boston is operated by public trustees, with union working conditions enforced. Its labor cost is 3.61 cents per passenger carried.

Philadelphia is operated by men and management, cooperating for economic accomplishment. Its labor cost is 2.23 cents per passenger carried, which cost includes the co-operative wage dividend.

Philadelphia carried 848,883,512 passengers during 1922. Its labor cost of 2.23 cents per passenger, compared with Boston's labor cost of 3.61 cents shows P.R.T. savings from greater efficiency to be $11,714,592.

Subsequently, upon inquiry of the Philadelphia Rapid Transit Company, I received the following reply:

Answering your inquiry of the 1st inst., relative to labor cost per passenger carried in Philadelphia and Boston, I hand you herewith the basis from which the unit costs were derived, viz.:

	Philadelphia	Boston
Passengers (total)	848,883,512	409,039,586
Labor cost	$18,940,760	$14,772,340
Labor cost per (total) passenger carried	2.23 cents	3.61 cents

The Philadelphia Rapid Transit Company calculates its unit costs upon the basis of total passengers carried; i.e., revenue passengers and transfer passengers, on the grounds that car capacity and platform time, etc., have to be supplied in order to give the transfer passenger his second ride, and to all intents and purposes he, therefore, becomes another passenger. Calculating the labor cost on the basis of total passengers changes the cost per passenger from 4.143 cents, as shown in your published report, to 3.61 cents, the corresponding figure for Philadelphia being 2.23 cents.

On the basis explained in this letter the figures of 409,039,586, according to our official figures of total revenue and transfer passengers, should have been 663,529,529, which on the basis of comparison used by the Philadelphia Rapid Transit Company, makes the labor cost 2.226 cents per total passenger, or to all intents and purposes the same as Philadelphia.

The following tabulation gives the official figures of revenue passengers and total passengers (revenue and transfer), operating wages and wage cost per total passenger on the Boston Elevated Railway since 1917:

Year Ending Dec. 31	Revenue Passengers	Total Passengers Revenue and Transfer	Operating Wages	Wage Cost Per Total Passenger, Cents
1922	356,593,942	663,529,529	$14,772,340	2.226
1921	337,252,080	634,218,245	15,563,255	2.454
1920	335,526,561	640,010,337	17,216,445	2.690
1919	324,758,685	616,932,089	15,107,694	2.449
1918	348,664,700	660,537,597	11,007,362	1.666
1917	381,017,338	697,897,989	8,998,478	1.289

While I am sure that the Philadelphia Rapid Transit Company did not intend to make an unfair comparison, nevertheless in view of the widespread publicity both in the newspapers in Philadelphia and in your journal, this information has been broadcasted and it is regrettable that the figures used in the comparison were not similar and accurate.

I would thank you, therefore, if you will be so kind, in view of the letters which I have received because of this information, to publish this letter in order that in so far as possible the impression created thereby may be corrected. EDWARD DANA, General Manager.

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Maintenance Notes

Making a Noiseless Granite Block Paving

FOR a number of years the city of New Orleans, La., required the railway company to pave the track area with wood block and there now exists on the electric railway lines in the neighborhood of 60,000 sq.yd. of wood block paving in track area. A visual inspection of this yardage indicates that this type of paving in the track area of New Orleans has not been a success.

The New Orleans Public Service company, therefore, undertook in the early part of 1922 to break up this practice and to establish granite block as the standard paving for track area. After starting this campaign the railway found that the city authorities, the Chamber of Commerce and the public generally objected strenuously to another type of paving in track area on the basis that, regardless of how poorly wood block lasted or how expensive it proved, the company should stand all extra expense due to the great benefit the public obtained by the noiselessness and smoothness of wood block paving. The railway, therefore, found that it was impossible to obtain its desires in this matter if it insisted upon granite block paving in track area laid with sand and cement grout. The company then concluded that the best move to make was first to investigate thoroughly what methods the larger cities in the United States had used in the laying of granite block in track area and if any street railway or city had been able to lay granite block successfully with bituminous or mastic filler and, secondly, to commence experimenting with a mastic filler granite block paving construction at such points in the city as would not bring on great objections from the public and run into the possibility of injunction.

After a trip to Chicago, Detroit, Cleveland, Toronto, Buffalo, New York, Boston, Philadelphia and Portland, together with the experimental efforts of the railway, the conclusion was reached that an extremely satisfactory result could be obtained with granite block paving by the use of an asphalt mixed with hot sand in the proportions of about half and half. For the New Orleans climate it was found that a 40-45 penetration at 77 deg. F. asphalt met the condition best and that the real problem was to obtain a portable sand heater that would not only give the quantity of hot sand required but would heat this sand uniformly from a temperature of 350 deg. F. to 400 deg. F. or to about the same temperature to which it was necessary to heat the 40-45 penetration asphalt. It was found that asphalt would not thoroughly mix with sand unless the sand was uniformly heated to at least the temperature of the asphalt.

Upon this basis the company developed a portable sand heater based on the principle of a coffee roaster. The sand heater consisted of a rotating drum operated by a 550-volt motor which gets its power from the trolley wire, and by means of belting and gearing a speed on the drum of about twenty revolutions a minute was obtained. With a fire box surrounding the drum old ties and other scrap wood obtained from the general track maintenance were burned. This sand heater, with the exception of the motor, has an appearance very similar to a 500-gal. asphalt heater.

The granite block is laid in the usual manner with a hammer on a sand and cement cushion, and after the blocks are thoroughly tamped they are sprinkled with water to hydrate the cement in the sand cushion. It is found that all signs of water disappear in a few hours and then the hot asphalt and hot sand are mixed in proportions of about half and half in an iron wheelbarrow by the use of a hoe. When this is thoroughly mixed it is applied to the granite block paving and is spread over the blocks with an ordinary squegee.

When this type of paving is completed a layman is not able to tell that it is a granite block street because it looks exactly like a sheet asphalt paving, and it is just as noiseless and smooth as any wood

Applying Hot Asphalt and Sand to Granite Block Pavement. Sand Heater in the Foreground, Asphalt Heater in the Background

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block paving. As a result of this work the railway has been recently requested by the city authorities in the future to consider this type of paving as standard and use it throughout in the track area regardless of the amount of vehicular traffic on the street.

Rehabilitating Control Switches

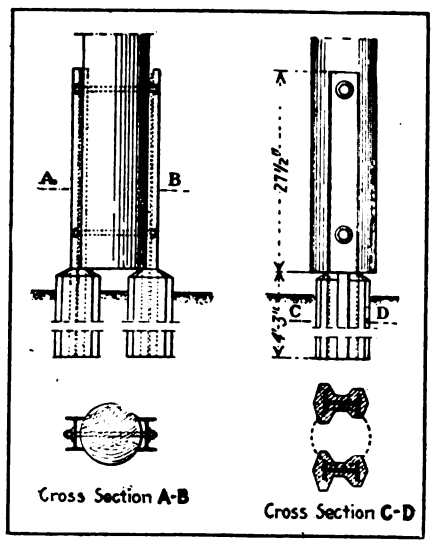
AFTER long continued use the bronze bearings of control switch arms become worn and because the shafts do not make a complete turn the wear enlarges the bearings to an elliptical shape. The San Francisco Municipal Railway makes a practice of overhauling these switches about every 75,000 miles, which is the equivalent of about 7,500 hours of operation. Worn shafts are renewed most economically by replacement, but the worn bearings which are integral parts of the switch mechanism itself must be restored if economical repair is to be made. This is accomplished effectively by filling the worn bearings with brass, using the oxyacetylene torch to melt and place the metal in the desired position, and then drilling the holes to the desired diameter. Not only the main shaft bearings but also worn sockets in all parts of the mechanism are treated in the same way.

Usually work of this sort is kept until enough has accumulated to keep the torch busy for a full day or two, then the entire collection is renewed at one time. Numerous small parts, such as ratchet wheels for brush-holder springs, etc., are reconstructed in this way in slack time and at small cost and are found to give very satisfactory service. Holes adjacent to the worn bearings are filled with putty to avoid the danger of the hot metal spilling into them.

Reclaiming Wood Poles

APROPOS of the discussion on reclamation of wood poles rotted at the ground line at the 1922 convention of the American Electric Railway Engineering Association, a description of the Forclum system, given in a recent issue of *Le Genie Civil*, is of interest. This is proposed for new poles so as to avoid destruction in the ground, but is applicable to old poles as well.

In the Forclum system the pole is supported above the ground surface by means of two steel I-sections, which are imbedded in concrete below and slightly above the ground line. This arrangement, of course,



Forclum System for Supporting Wood Poles Free of the Ground

gives a practically perfect aeration of the wood. The mechanical support can be made as substantial as desired by enlargement of the concrete foundations.

The process of setting a pole consists in placing the concrete foundations at the proper distance apart, the pole being supported by means of a bar and blocking at the proper distance above the ground. The pole is then bolted in place, two holes having been bored through it to register with the holes in the I-section. The earth is then tamped into place and the supporting bar and blocking are removed.

Lamp Filament Breakage Serious Factor

THE maintenance of car lighting consists chiefly of lamp replacement and inspection of switches and sockets. The greatest trouble experienced consists of the breakage of lamp filaments, which sometimes short-circuit and cause burning out of the lamps. In car service, where the lamps are subjected to severe vibrations, tests indicate that the life of the lamp is greatest when kept burning continuously. Tungsten metal which is used for the filament can be subjected to severe vibration when hot without breaking, but when the metal is cold it is very brittle. In this connection some results obtained from a test of two cars in service are interesting. One of these cars had the lights burning continuously while it was in service and the other had the lamps burning only when necessary, due to darkness. Each car was equipped with thirty-five new lamps and after twenty-four hours service the car that had the lamps burning continuously still had all filaments in perfect condition. The car with the lamps burning intermittently developed five cases of lamps with broken filaments, which resulted in two lamp circuits being inoperative. Three of the lamps with broken filaments had become welded, so that a portion of the remaining sections of the filaments were short-circuited. Lamps burning in this condition cause a higher current through the circuits, which decreases the life of the other lamps. The cost of the power used to burn the lamps continuously was 31 per cent less than the cost of replacing the five lamps with the broken filaments. The cost of the extra power used due to the short-circuiting of the welded filaments was not recorded.

Should Trolley Poles Be Raked?

BY G. H. MCKELWAY
Engineer of Distribution, Brooklyn (N. Y.) Rapid Transit Company

WHY are trolley poles set with a rake away from the track while the poles of lighting or telephone companies are set perpendicularly?

This question is often asked, but unsatisfactory answers are very often made. While most street railway men agree that the poles should be inclined away from the track, yet the opinion is by no means unanimous, and some of those who think that the poles should be raked can give no better reason for so doing than that it is the custom to do so, or that the practice is called for in the Engineering Manual of the American Electric Railway Engineering Association.

Some of the reasons advanced against the practice are that the appearance of a line of raked poles is not as good as that of a line of straight ones, and that the railway companies are the only public utilities to set their poles in that manner. Where railway poles are set raked back, in line with and between other poles of the same size set perpendicularly, the resulting appearance of the line of poles of both types is not good. Moreover, the

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lighting or telephone poles would appear to be falling over if they were set with the same rake that is given to the railway poles, and such a method of setting would not give as strong a line as if the poles were set straight.

In many cases the diameter of the railway poles is much smaller than that of the other poles and therefore they can be given at least a slight rake without their projecting so far behind the other poles as to be very noticeable. When the railway poles are the only ones on the street many people prefer the appearance of them when raked to that obtained by setting them perpendicularly.

Arguments in Favor of Raking

When it comes to utility the arguments are all in favor of raking the poles. The weight of the bracket arm or the pull of the span wire exerts quite a force upon the pole, which tends to draw its top in the direction of the trolley wire. While the tendency of the raked pole to fall away from the trolley helps in some slight manner to balance this pull of the span or arm, a still greater reason for raking is that this pull of the bracket or span tends to bend the pole, and that therefore while the pole may have been set with a rake before anything was attached to it, yet after such attachments were made the bending of the pole will be great enough to straighten it appreciably and make it look as if it had been set nearly straight up and down.

Another reason is that this pull toward the street is continuous as long as the pole is in use and, however well the pole may have been set in the first place, even if set in concrete or well keyed, in the long run the pull will have an effect and the pole will be drawn slowly toward the street. When the pole has been pulled so far over that it is leaning toward the track it will have to be reset, but if it has been given a rake in the first place, it will have to be pulled over much farther from its original position before this resetting is necessary, and the precaution will add several years to the length of time intervening between the time that the pole was first set and the time that it has to be reset.

Still another reason for raking the poles, and one that applies only in cities or towns, is that the poles have to be set close to the curb line and that therefore they are very close to vehicles drawn up against the curb.

The overhang of these vehicles is generally greatest at a point several feet above the surface of the street, so that a pole that is perpendicular or that leans toward the street is much more apt to be struck by a vehicle than is one that leans away from the curb.

It would seem therefore that, except where the railway poles are set in line with others, the better practice is that recommended by the Engineering Association—to set them with a slight but not too great rake.

A master mechanic has had neatly lettered and mounted for the benefit of his men the following definition of efficiency which he picked up somewhere: Efficiency is the power to do, in the safest, shortest and simplest way, the most and best.

Handling and Salvaging of Cement Bags

Loss of Bags on Montreal Tramways Property Reduced to Negligible Amount by Use of Systematic Follow-Up Plan

By R. B. Genest
Chief Clerk Engineering Department
Montreal Tramways

At the close of 1918 the stores department of the Montreal Tramways reported to the engineering department a shortage of 17 per cent in the return of empty cement bags. An investigation was made immediately to determine the causes of the shortage, and it was found that a number of these were outside engineering department control.

For example, return shipments were not made frequently enough to the cement company; bags were allowed to remain in storage for long periods without sorting and classification; there was no stated time arranged for the collection of empty bags, etc. The matter was considered important enough to have special attention and the following plan was worked out:

The special form reproduced herewith was devised and a special timekeeper was appointed to supervise the collection and return of empty bags twice weekly. He also follows return shipments through to the stores department and to the cement company, and checks quantities and classification in co-operation with their representatives.

The duties of the checker were further increased as shown by the instructions quoted below:

1. Supervise return of empty bags to the Canada Cement Company.
2. Make two trips each week with

MONTREAL TRAMWAYS COMPANY
ENGINEERING DEPARTMENT
CEMENT REPORT

No. 183 E47

Location 4169 Wellington St Date, Aug 31st 1922

DATE	NO. BAGS RECEIVED FROM STORES		NO. BAGS RECEIVED FROM TRANSFERS		TOTAL	NO. BAGS DELIVERED ON TRANSFERS		NO. BAGS RETURNED TO STORES		TOTAL	BALANCE ON HAND	Reference to Stores Report	REMARKS
	Req. No.	No. Bags	Credit No.	No. Bags		Credit No.	No. Bags	Credit No.	No. Bags				
Aug 14	54380	400				482	50	483	300				
18	54389	400				498	40	585	300				
24	54398	400				501	80	394	400		30		
29	54501	400											
TOTAL		1600					170		1400		30		

Enter in Remarks Column where Transfer is Received From, or Delivered to.
This Report to be made out monthly and sent to chief clerk, Engineering Department.

Foreman H Scott Checker P O'Neill

Cement Report Form Used by Montreal Tramways

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the construction car, covering all work orders and division headquarters to pick up empty bags.

3. Make monthly check of cement on hand to balance with timekeeper's record.

4. Supervise the movement of stone, sand and cement. Make daily trips to the stone quarries, sand company and storekeeper in following up orders.

5. Supervise the return of scrap copper cable to the storekeeper.

6. Supervise the distribution, transfer and handling of tools. Consult daily with tool clerk and storekeeper.

The results of this systematic work are shown in the following tabulation:

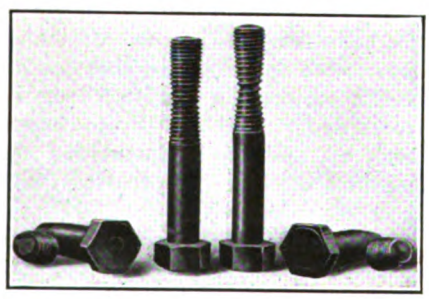
Year	Percentage of Shortage
1918	17.0
1919	0.0
1920	3.2
1921	1.7
1922	1.04

Heat-Treated Bolts

BY HARRY L. SIGNOR

Renewal Parts Engineering, Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa.

THERE are a number of bolt applications on electric railway car equipment where if the bolts fail for any reason or work loose the riding qualities of the car are affected, operation becomes dangerous and the cost of maintenance increases rapidly. A great deal of



Examples of Worn and Broken Bolts

trouble has resulted from motor frame, axle cap and housing bolts working loose in service, thus allowing these parts to wear badly before the trouble is found and corrected. Causes, such as bolts not drawn up tight, no lock washers and the presence of dirt under the bolt head and the nut, can be overcome by more care during the inspection and overhauling of the motors.

The stretching of the bolts due to an inferior grade of material, aggravated by shocks and blows received in service, seems to be one of the chief difficulties tending to cause bolts to work loose. This has been overcome by the use of special high-grade heat-treated bolts of axle steel, which are temper drawn to give toughness and strength. The heads of these bolts are machine forged, which insures uniform size and a good wrench fit, and they are also carefully machined and threaded. In order to distinguish these special heat-treated bolts from standard hardware bolts, it is considered good practice to have some distinguishing mark on the head of every special heat-treated bolt, as, for instance, the letter "O," as shown in the accompanying illustration. This is of great advantage to the workman, as it enables him at a glance to determine the grade of bolt being used.

Heat treatment will produce values of elastic limit considerably in excess of standard hardware bolts as shown in the table of comparative tests. This process, however, involves quenching and drawing operations, which requires great care in handling. When handled in bulk, special apparatus is required for these operations to maintain constant conditions, which is essential to produce a uniform product.

It is considered good practice and the best manufacturers require a test of one bolt representing each annealing charge where these contain small quantities. If the charge contains more than 500 bolts, tests are made of one bolt from each additional 500 or fraction thereof.

Relative costs, depending upon size, shape and quantities required, show that special heat-treated bolts cost approximately two to three times as much as standard hardware bolts; this, however, is offset by more than 100 per cent increase in elastic limit and ultimate strength of a heat-treated bolt over one of standard hardware.

COMPARATIVE TEST OF BOLTS

Kind	Tensile Strength	Characteristics
Standard hardware	25,000 lb. average yield point	Brittle and variable
Axle steel (heat treated)	60,000 lb. average yield point	Tough and strong

Shop-Constructed Hydraulic Press

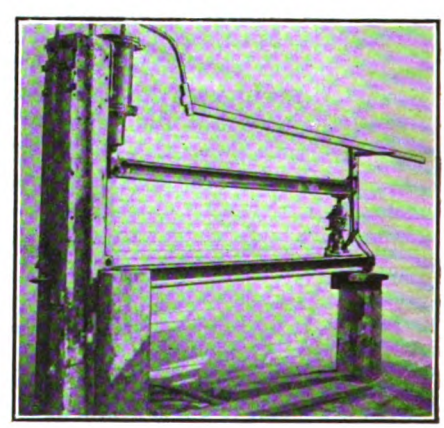
BY CLIFFORD A. ELLIOTT

Cost Engineer Pacific Electric Railway, Los Angeles, Calif.

THE accompanying illustration shows a shop-made hydraulic press which was recently built in the shops of the Pacific Electric Railway, Los Angeles, Calif. This is used for emergency signal repair work and takes care of the maintenance necessary for the engineering department's motor trucks, gasoline motor section and inspection cars, as well as the repairs to all track, bonding, bridges, paving and signal tools.

This press has been installed out in the open at a convenient location for its use. The machine as constructed consists of a top beam operated by a brake cylinder and having a fulcrum support at one end. The upper beam consists of a piece of 60-lb. scrap rail 8 ft. 3 in. long from bolt center to bolt center. An obsolete Westinghouse 8-in. x 8-in. brake cylinder is used for operating this lever and is installed at one end, as shown in the illustration. The base is made of two pieces of 60-lb. rail turned base side upward, each rail being 8 ft. 6 in. long. The fulcrum extends upward from the base so as to support the upper beam at one end. This fulcrum is 36 in. high and is constructed of scrap bar steel. It consists of two strips 2½ in. wide by ⅜ in. thick.

The post which supports the brake cylinder and end of the base is made from a scrap piece of 10-in. x 10-in. redwood. This post extends 7 ft. above the surface of the ground, this



Shop-Made Hydraulic Press

height being necessary in order to obtain the proper leverage. This main post is further supported by a section of 12-in. x 18-in. bridge timber placed beneath the surface of the ground and extending above to a sufficient height to support the end of the lower beam. This post is slotted to receive the rails which serve as a base. Another redwood post 10 in. x 10 in. forms the support at the fulcrum end.

The cylinder pressure is obtained from the water service which has two connections with a two-way valve. The pressure line is of ¾-in. iron pipe and the discharge line is 1-in. pipe. A wooden lever arm extends from the cylinder to the rear of the device for regulating the water pressure. The end of this lever rests on a lateral arm extending from the

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fulcrum. This lever permits the operator to work in any position about the press and still be able to regulate the water pressure.

In constructing the base each end of the rails used was sheared back 8 in. with an acetylene torch. The bulky portions of the tread and base of the rail were thus removed. The main web section of the rail was used for connecting up to the rear fulcrum. The die used with the machine was constructed of scrap material and the adjustable screw for the die was made from a screw removed from a scrap rail bender.

Copper vs. Phosphor Bronze for Brushholder Contact Tips

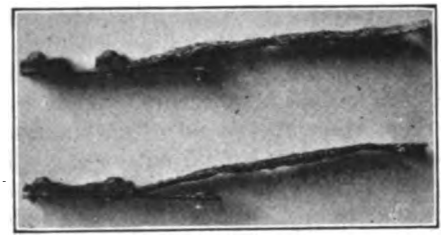
BY JOHN S. DEAN
Renewal Parts Engineering, Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa.

CONTACT tips on brushholder pressure fingers have been made of brass or copper and of various shapes. More recent practice in connection with the brushholders on modern motors is the use of a flat contact tip made from copper. In some cases these tips are riveted to the shunt and pressure finger spring, while in others they are brazed to these parts.

In some recent designs of the riveted type countersunk head rivets are used, while others are held by round-head rivets. With the use of the countersunk head rivets it becomes necessary to use a thicker tip to provide for the required countersinking, which makes the tip heavier and gives it a greater inertia.

With the use of the roundhead rivets the tip can be made lighter, but must be somewhat longer so that the round head of the rivets will clear the top of the carbon. However, with this type of construction a better mechanical job of riveting is obtained and the tips are less likely to become loose in service.

It has been intimated that better results might be obtained from these flat contact tips if they were made of a harder material, the idea being that by the use of this material it would tend to reduce or entirely eleminate the wear which has sometimes been noticed on tips operating under certain severe service conditions. To check this point a number of experimental flat tips of



Above, Phosphor Bronze Tip Worn Through by Arcing. Below, Copper Tip in Same Service

the riveted type were made up of copper and a similar number from phosphor bronze, and these were placed in brushholders that were mounted on motors operating under similar conditions.

After about 22,000 miles of service these special test tips were inspected and it was found, without any exceptions, that in all cases the phosphor bronze tips showed excessive wear, while the copper tips had worn relatively a small amount, as compared with the wear on the phosphor bronze, as can be seen in the attached photograph.

It has been suggested as a possible explanation for this excessive wear that the phosphor bronze tip with its relatively high specific resistance offers a greater contact resistance to the working current passing from the carbon to contact tip or vice versa. This, in turn, produces heating and arcing, setting up a burning action which rapidly reduces the section of the tip at its point of contact with the carbon brush, this action being more pronounced in the case of the phosphor bronze, as the latter metal is a copper base alloy containing varying percentages of tin and lead which volatilize at a comparatively low temperature and result in the burning action at the point of contact.

Stop the Leaks

THE employees of the Jinxville Electric Railway were meeting in one of their social rallies the other evening, story telling, songs, smokes and all that. The general manager, William Redfield, was called on as usual for some remarks, He responded something like this:

"I'm tickled to death the way you boys are co-operating with the heads of departments in helping me bring the property up to a condition of which we can all be proud. You're doing fine. Take, for example, the machine shop. Have you noticed how that's improved lately because the fellows are pulling together to keep the place looking neat? And a neat shop means good work."

"Now that I'm on my feet," continued the G. M., "there's a little matter I want to get off my chest, a matter in which you can all help. I notice as I go about the property a lot of little items of waste that in the aggregate represent a lot of money. A stray track bolt here, a dripping faucet there, a bit of line wire somewhere else; each rather insignificant in itself, but indicating a lack of appreciation of what waste means. If these items, summed up, could be visualized in cash, the amount would be great.

"Now you fellows know I hate to preach, but I was thinking maybe we could get up some kind of a scheme for cutting down these wastes. The only way I see to do it is for everybody to be on the watch to do two things—first, get the pick-up habit; and, second, send in suggestions as to how things can be done better with the idea of saving money. Put your comments in writing and hand them to your foremen. They'll take your suggestions up with me if necessary, and you'll be told what is done with them. Our property isn't large enough to need any elaborate machinery for handling these suggestions. Let's have a little discussion on this matter."

"Boss," said Jones, the machine shop foreman, "thanks for your compliments about the shop. It sure does look better since we began to get the men interested in keeping the machines neat. We're trying every known scheme to keep up this interest. Now, as to your idea about cutting out waste, we can all help out on that. We'll get right out after suggestions, and we'll get 'em all right. It strikes me that if everybody will think about this matter for a while, we'll get into the habit after a time."

"How about the line department, John?" said the G. M., turning to O'Neill, the overhead superintendent, "where do you come in on this?"

"We're with you, boss," O'Neill replied, "this idea of stopping the leaks appeals to me. We're pretty careful in our department, but there are many places, doubtless, where we lose things. I'll see what the boys have to say."

"I hope this discussion hasn't been too serious for a social evening," said the G. M., taking his seat. "You fellows know how anxious I am to keep up the service on this railway. With your help, even with the low fare we get, I believe we can have a crackerjack property, when we all pull together."

"Aye, aye, chief, we're with you!"

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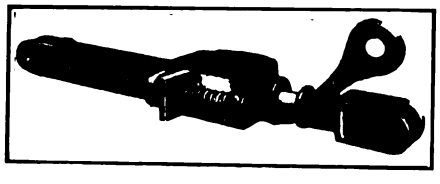
Maintenance of Automatic Slack Adjusters

BY W. H. SAUVAGE
Designing Engineer, Gould Coupler Company, New York, N. Y.

THE taking up of slack in the brake rigging of electric cars by the old method required either changing the pins in the upper end fulcrum of the truck dead lever or the disconnecting of the bottom rod truck lever. Accurate adjustment at these points was hard to obtain, since the distance between the holes was usually from 1½ in. to 2½ in. apart. This often resulted in either a too close or a too loose adjustment, so that the piston travel would vary from 2 to 3 in. of that desired.

Another and more familiar method consists of the use of a turnbuckle. This type requires almost daily adjustment, and effective lubrication on the turnbuckles is hard to maintain, as dust, dirt, water, snow and ice quickly destroy the best lubrication, and the location of turnbuckles underneath the truck subjects them to all sorts of dirt. This grit and dirt also cause rapid wear and short life of the turnbuckles.



Universal Brake Slack Adjuster, Type B

Automatic slack adjusters thus came into use to overcome the difficulties of manual adjustment. Among the various types brought out were the Gould types A, B and C automatic slack adjusters, and the following applies to desirable methods of maintaining these. The maintenance of the Gould type A adjuster requires that the friction and adjusting rod be kept clear of grease and the friction be kept constant. Grease does not affect the friction of the B and C types. Barrels and dogs should be washed out once a year at least, and oftener if found necessary. The life of the grip dogs varies according to the service and load placed upon them. After two or three years' service, the dogs should be turned over so as to give them an additional two or three years' life. The successful operation of these two types of adjusters depends largely on keeping the usual release springs furnished at the upper end of the live lever in proper condition. These in every case must bring the levers back into full release position. The function of the adjusters is automatically to take up all brake shoe and wheel wear as fast as it occurs. When the push rods of the adjusters become indented, they should not be filed off, but hammered smooth. Filing is liable to get the rods out of round and make them undersized, while the hammering will not do this. The type of adjusters using four dogs with spring steel untempered rods do not nick or roughen up the rods by severe usage.

The type C adjuster was originally brought out for the Birney lightweight car, and this adjuster is now more generally used where six grip dogs were previously employed. This type does not rely for its successful operation on the foundation brake rigging release springs, but provides for release within its own mechanism. There are no hidden parts to the Gould automatic slack adjusters, so inspection can be quickly made and knowledge of any injured or worn parts obtained readily.

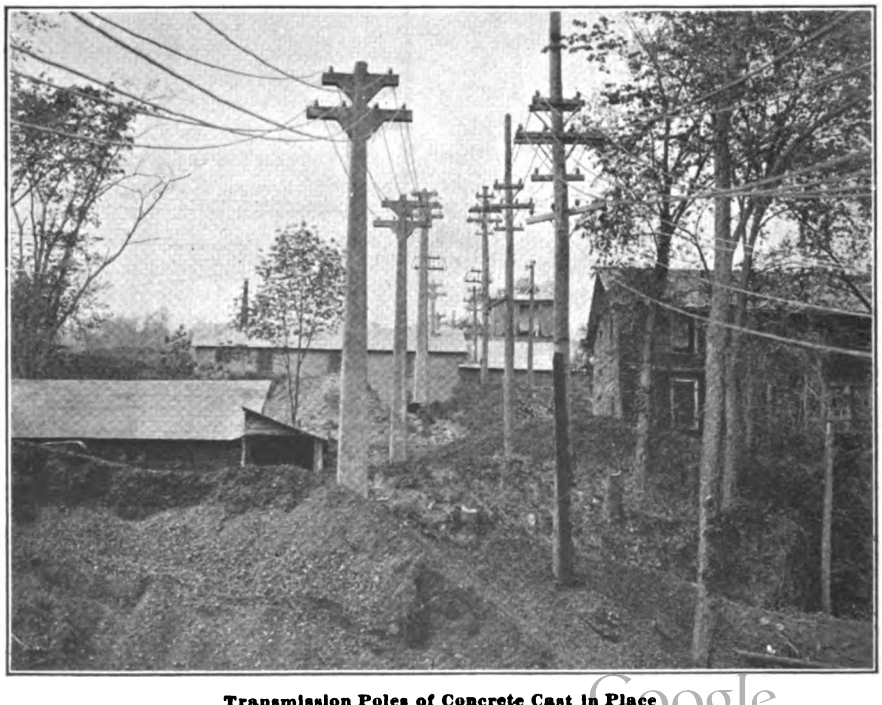
New Equipment Available

Casting Concrete Poles in Place

THE Helderberg Cement Company has just completed a new power transmission line at its Howes Cave works using concrete poles cast in place. W. J. Fullerton, superintendent of the company, who designed the poles and supervised the construction of the transmission line, claims three important advantages for this method: (1) Ease of erection, eliminating the necessity of handling heavy equipment. (2) The poles, being cast integral with their foundations, are more solidly bedded in the earth. (3) The cross-arms are cast monolithic with the pole, a feature which is not so easily accomplished where the poles are cast on the ground, and in handling the cross-arms are more apt to break.

The poles shown in the accompanying illustration vary in height from 27 ft. to 34 ft. from the ground line to the lower cross-arm, depending upon their location. The poles are square, 8 in. at the top, tapering at the rate of ½ in. to the foot.

After concreting the footings, forms for the poles were erected complete except for one side. After positioning reinforcing steel, concrete for the foundation of the pole was placed. Above the foundation the forms were fitted into the open side in short sections and followed with concrete. This permitted easy handling of the concrete and made it possible to spade it thoroughly against the forms. After removing the forms the poles were in perfect condition and of good appearance. The poles were erected at a cost of about $60 each.



Transmission Poles of Concrete Cast in Place

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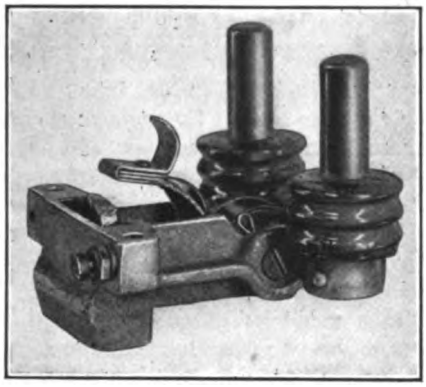
Closed-Front Type Brushholders for Motors

IN ORDER to increase the life of the carbon brushes used on ventilated railway motors and thus reduce the cost of maintenance of these parts the closed-front type of brushholder has been developed. One of the brushholders shown in the accompanying illustrations is for the Westinghouse No. 306 railway motor. It has a pressure finger of the harness type, fitted with a fifteen-tooth steel ratchet, and a pawl for adjusting the spring pressure. The other brushholder shown is of this type developed for the Westinghouse No. 508 railway motor, which does not use any harness in connection with the pressure finger. The adjustment of this type of mechanism is made by shifting the relative location of the holes drilled in the spindle or shaft and the holes drilled in the brushholder casting through which a cotter pin is forced to lock it.



Brushholder for Westinghouse No. 306 Railway Motor

Experimental tests conducted by the engineering department of the Westinghouse Company on this design of brushholder for various types of motors and on a number of different properties indicate that by thus closing up the front of the carbon box the life of the brushes is greatly increased, due to a reduction in the side wear on the carbons. These comparative tests were made with the standard holders and the closed-front type of holders operating under the same service conditions, using the same grades of carbon, and with brushholder spring tension, adjusted to the same pressure.

The advantages of this type of brushholder construction are as follows: (1) Dust and dirt are kept from working in between the carbon and the carbon box, thus reducing the side wear of the carbon; (2) the contact area between the carbon and the sides of the carbon box is increased; (3) the life of the carbon is increased.

Several suggested disadvantages that should be given some consideration are as follows:

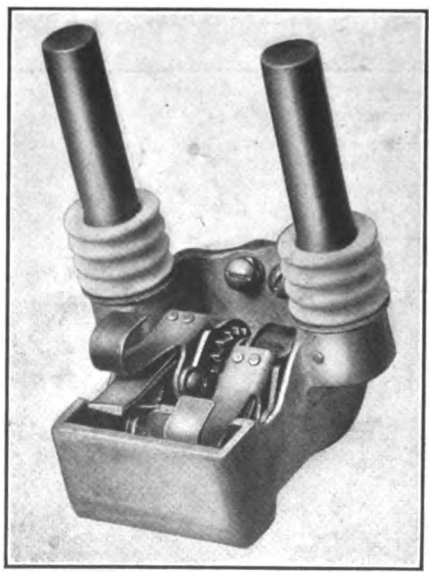
1. It is more difficult to remove the carbon from this type of box. This is, no doubt, true, especially after carbons wear down endwise. Experience to date has shown that operators over-rule this objection on account of the longer life obtained from the carbons.

2. The top of the carbons is more likely to be damaged by the use of the short, flat contact tip. So far this construction has not given any serious trouble in this way.

3. There is a possibility of the contact tip getting out of alignment and either striking the front sides of the carbon box or slipping off of the carbon, thus reducing or entirely releasing the pressure on the top of the carbon. This is a condition that may cause trouble if the adjustment is not properly maintained, but has not yet developed in service tests.

With due consideration to the above advantages and the suggested disadvantages, it is the general feeling among operators that the advantages more than offset the disadvantages.

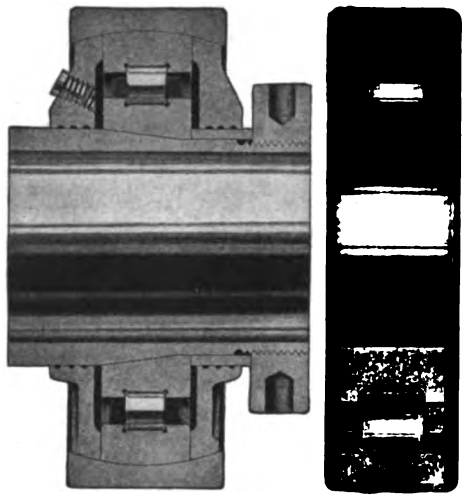
In developing improvements of this character, experience has shown that wholesale changes should not be made, but that it is better to try out a reasonable number in different parts of the country before adopting them as standard.



Harness Type Pressure Finger for Westinghouse No. 306 Railway Motor

New Roller Bearings to Be Marketed

THE Norma Company of America, Long Island City, N. Y., is placing the Hoffman roller bearings on the market in this country. The outer race or ring of the Hoffman roller bearing is of plain cylindrical form with rectangular cross-section and has a "flat-line" raceway on which the rollers run. The inner race or ring has a channel cross-section, with narrow rims on either side of the "flat-line" raceway to retain the rollers endwise. The rollers are cylindrical, with a length equal to their diameter, and they are held in exact parallelism with the shaft and with one another by these rims or shoulders, which are of hardened steel and allow only a very slight clearance for the rollers. The roller cage or retainer is of strong, balanced construction.



New Type of Roller Bearings

The Hoffman short roller and retainer is designed to eliminate the troubles experienced with other types of roller bearings using taper rollers or long rollers of small diameter. It is impossible, particularly at high speeds, to keep such long rollers rotating in parallelism with the shaft, with the result that the rollers wear concave and the retainer or cage is subject to undue and destructive wear, resulting in unsatisfactory bearing performance.

The Hoffman roller bearing has no end-thrust capacity. Where thrust is encountered it is necessary to hold the inner race and rollers in correct relation to the outer race by means of some locating device. Where the end thrust is small, it may be taken care of by thrust buttons at either

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At Left, Placing the Rail Filler in Position. At Right, Pouring the Concrete Foundation After the Rail Filler Is in Position

end of the shaft. Where the end thrust is large, it is carried either by auxiliary thrust bearings or by "location bearings" of standard ball type and slightly reduced outside diameter, mounted between two roller bearings.

In addition to the bearing just described (a rigidly mounted type), the same general construction is followed in the self-aligning roller bearing shown in section in the accompanying illustration. Here the periphery of the outer race and its two dust-and-dirt-excluding covers are ground to form one continuous spherical surface, fitting a similarly shaped inner surface on the shell or housing. The bearing is thus free to align itself with its opposite members, the dust covers following movement. This feature permits these covers to be bored with a very small running clearance on the clamping sleeve, so that lubricant cannot work out or dust get into the highly finished bearing surfaces. In the type illustrated the clamping sleeve extends clear through these dust covers so that the bearing may be properly mounted without exposing its working parts.

The following advantages are claimed for the Hoffman precision roller bearing: (a) A running friction about $\frac{1}{10}$ that of a well-fitted plain bearing and a starting friction about 1/800 that of a plain bearing; this latter feature is of special value in electric motors and with belt drives; (b) steady load capacity; (c) large temporary overload capacity; (d) ability to stand up under shocks and vibrations; (e) speed qualities equal to those of a ball bearing; (f) no heating and no risk of seizing; (g) no lubrication troubles, the bearing being grease-packed and needing replenishing of lubricant only at intervals of three to twelve months, depending upon the running conditions.

An Elastic Rail Filler

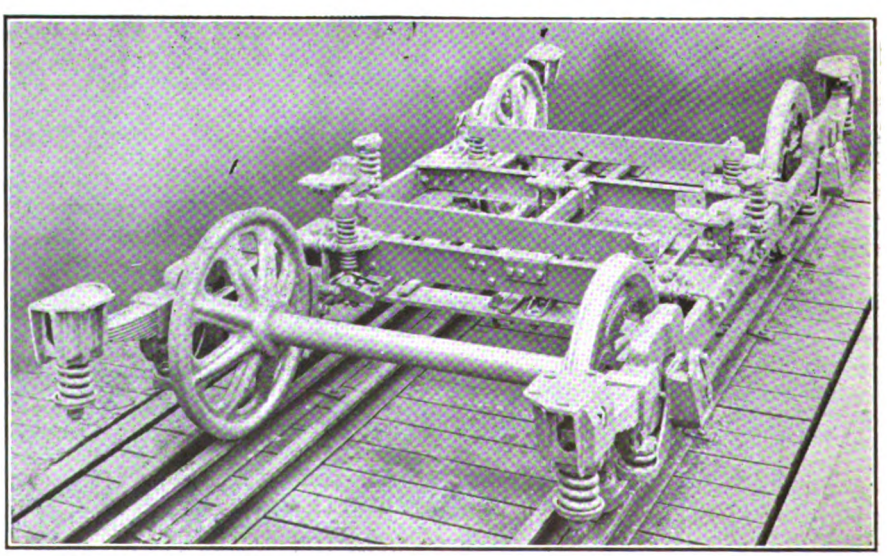
IN ORDER to provide a bituminous cushion between the rigid pavement and the vibrating rail of electric railway tracks, the Philip Carey Company, Cincinnati, Ohio, is marketing its "Elastite" rail filler. This asphaltic compound is furnished in strips of from 3 to 5 ft., and can be fitted against the web of the rail by light driving. In thickness the rail filler extends slightly beyond the head of the rail so as to serve as an expansion joint for the pavement. The material is factory made, of uniform dimensions, and is ready for use when delivered. When there are projections, such as at special work, tie rods or braces, the filler can be readily cut to provide for its installation.

New Type Truck

THE J. G. Brill Company, Philadelphia, Pa., has developed a new single truck designated as No. 79-EX for service under the heavier types of single-truck cars. The outstanding feature of this new truck is its long effective spring base, which insures a steady riding car and a flexible support under each car body corner. The Brill 79-EX truck supports 90 per cent of the weight of the car body on its four corners and only 10 per cent on its center coil springs. These latter therefore do not act as a fulcrum to the overhanging ends of the carbody, so as to cause an oscillating or galloping motion.

Each corner of the car body is supported on a flexible arrangement consisting of an easy-acting coil spring suspended by a swing link from the quarter-elliptic plate spring anchored to the end of the solid-forged side frame and extending into a notch in the truck pedestal. This combination of springs prevents any disturbing truck action set up by track irregularities from passing up into the car body.

Mounted on each side bar at one end of this truck is a trunnion device for connecting to the car body. This imparts firmness to the longitudinal direction of the car, eliminates lost motion, and enables the truck to take advantage of the rigid body construction and vice versa. This permits the elimination of unnecessary reinforcement.



The Long Effective Spring Base Insures Steadier Riding

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The News of the Industry

Detroit's Future Dips

$10,000,000 Proposed to Be Spent on 3.1 Mile Underground System Downtown—Immediate Relief from Congestion Necessary—Construction of Comprehensive High-Speed Lines Will Follow

THE tentative plans for a system of dips to carry street cars below the surface of the heart of Detroit, as submitted by the engineers of the Street Railway Commission, are being studied by Daniel L. Turner, advisory engineer for the Detroit Rapid Transit Commission. Chairman Sidney D. Waldon of the Rapid Transit Commission has announced that the commission will soon report on the feasibility of the project.

Under the plans submitted, four radial lines of underground railways would branch out on Woodward Avenue, Michigan Avenue, Fort Street and Gratiot Avenue, and sixteen to twenty of the car lines now entering the downtown district would utilize these subway tracks. Only a few of the present feeder line cars would run on the surface. The plans, according to an announcement by Ross Schram, assistant general manager of the Department of Street Railways, were submitted at this time with a view to their being developed during the summer months in detailed studies and made available for submission to the voters for decisive action at the November election.

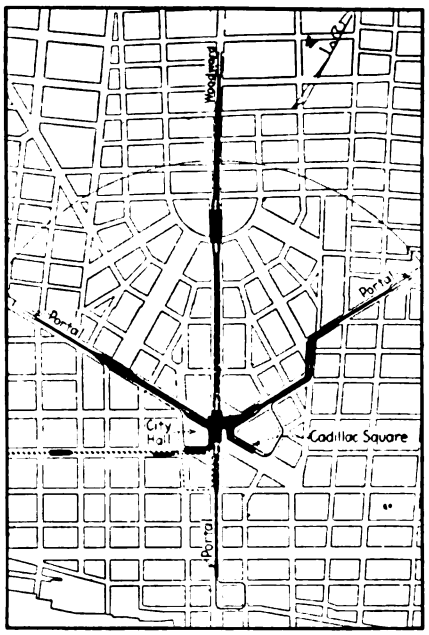
For nearly eight months the engineers of the Department of Street Railways have been studying ways and means for speeding up the handling of street car passengers. Twenty of the twenty-eight different routes comprising the street railway system enter the half-mile circle. Conditions have reached the stage where it is considered impracticable to reroute cars or loop back cars short of the downtown area.

The first step as outlined by the department provides for four sets of underground tracks on Michigan Avenue between First Street and Campus Martius swinging northeast through the central loading station to Monroe Avenue, Randolph and Gratiot Avenue, emerging on Gratiot Avenue near Mullett Street. The total length would be 1.4 miles with an estimated cost of $4,000,000.

The second step proposed is an underground tube beginning at Fort Street west of Fourth Avenue, running to Griswold Street with an underground loop south on Griswold Street to Congress Street again. The total length would be approximately 0.7 miles and the cost is estimated at $1.750,000.

The third step proposed is an underground tube beginning at Woodward Avenue in the vicinity of Winder Street, continuing south on Woodward Avenue, going under the Michigan-Gratiot subway at Campus Martius and coming to the surface on Woodward south of Jefferson to the surface loop on Woodbridge and Atwater Streets. This line would be about 1 mile long and cost about $4,250,000.

The total mileage in the three steps would be 3.1 miles. The estimated construction cost would be $10,000,000. These estimated costs include the grand central loading station on Cadillac Square and tentatively suggested loading stations on Michigan at Washington Boulevard, on Woodward Avenue, on Grand Circus Park and on Randolph at Broadway. Further development of the plan may indicate that these loading stations are not all most advantageously placed. It may also prove advisable to move the position of the portals slightly, but it is the opinion that in principal the plan is the best which can be developed at a minimum cost to take care of the situation in the central district.



Map of Central Area at Detroit Showing Subway Routes

With the addition of two-car and three-car train equipment to the system it is the belief of the Street Railway Department that the plan now advanced will do more than anything else to care for the traffic increases in Detroit pending the time the city is justified and willing to go ahead with a comprehensive rapid transit system.

With the portals as suggested it will be possible to bring into the underground terminals practically every car entering the half-mile circle. It is the tentative plan, however, not to operate the Fourteenth, Sherman, Brush, Harper, Jefferson, Fort East, Myrtle and Springwells lines into the tubes downtown. With the other cars removed from the surface in the central district it will be possible to speed up the operation of cars of the lines mentioned from the downtown section by a surface loop.

A plan for financing future rapid transit construction is now before the Michigan Legislature in the Wilcox-Culver bill. This measure, if passed, would permit bonding a municipality for rapid transit construction to the limit of 4 per cent of the assessed valuation. Under such arrangement the sum of $80.000,000 would be available under Detroit's present assessed valuation.

Samuel Insull Urges Chicago Subway

Transportation as the first essential prerequisite to a metropolitan district of Chicago was the keynote voiced by Samuel Insull at the City Club of Chicago on the occasion of a meeting for metropolitan planning. The meeting was called in order to "Plan our growth and grow to our Plan," as the slogan says. Mr. Insull said in part:

> No great plans for a metropolitan district of Chicago and its environs can be a success without adequate and sufficient transportation facilities in order to carry the workers from the working or manufacturing districts into the suburbs or home. A building program of transportation facilities must be launched with a view to the larger growth of the city which will provide for a population of 6,000,000 people in 1950.

Speaking as a director of two of the largest utilities in Chicago, he stated that the Commonwealth Edison Company will spend $25,000,000, the Peoples Gas Light & Coke Company $3,000,000 and the Illinois Bell Telephone Company $12,000,000 in the coming year in and around Chicago.

The transportation system in Chicago must spend a like amount in the coming years in order to relieve traffic congestion and provide adequate transportation. According to Mr. Insull, the first step in providing this transportation is an underground system starting from Eighteenth Street on the south and ending at North Avenue on the north. The latest figures indicated that on this plan a four-track subway would cost about $30,000,000 and would be the first step in the transportation solution. This amount of money could readily be made available for the project from the transportation funds of the city.

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Thompson Is Through

Mayor Thompson of Chicago apparently is through as a factor in public life in Chicago. At the election in Chicago last fall there was no direct issue affecting the public utilities, but the candidates having his backing were defeated at the polls. As if that were not enough, Arthur C. Leuder, the Brundage-Crowe-Deneen coalition candidate, won the nomination for Mayor easily in the primaries on Feb. 27. He defeated Edward R. Litsinger, who is described as leading the forlorn remnant of the Thompson forces. Leuder resigned as postmaster to give battle to Thompson. His victory was bigger than his managers expected. His two running mates had no opposition.

On the Democratic side there was only one ticket. The choice of the Democrats for Mayor was William E. Dever. The Republicans are loudly proclaiming unification of their party in Chicago, but the Democrats are more than ever confident of their ability to elect their candidate for Mayor. They may be counted upon to take full advantage of the schism that has prevailed in the Republican ranks, the scandals of the present City Hall administration and the crushing burden of taxation that has been placed upon the citizens since the election of Mayor Thompson eight years ago.

New Franchise Proposed

A. C. Blinn, general manager of the Northern Ohio Traction & Light Company, proposed to Akron city officials recently a new twenty-five-year railway franchise, effective Feb. 1, 1924, providing for a 6-cent fare with free transfers, elimination of competition along the company's lines, relief from the initial cost of street paving between the company's tracks and $1,000,000 in proposed additions, extensions and improvements to the company property in the first five years under the new grant.

By an agreement entered into with the City Council the Northern Ohio Traction & Light Company has been charging a flat 5-cent rate for several years. The existing franchise provides for the sale of twenty-five tickets for $1. The new offer includes nine tickets for 50 cents.

$4,500,000 Transit Plan Urged at Boston

At the conclusion of a public hearing held recently on the plan to run Dorchester tunnel trains over the tracks of the New England Railroad to Fields Corner and Mattapan, the consensus of opinion among the committeemen was in favor of putting the scheme into operation to Fields Corner as soon as possible. No formal vote of the joint committees was taken, but it is expected that the extension to Fields Corner will be recommended to the Legislature at the present session.

Appearing at the hearing and giving their hearty approval to the Fields Corner plan were representatives of the Boston Elevated, the New Haven Railroad and the city of Boston. No one appeared in opposition. The cost of the project is estimated at $4,500,000.

H. Ware Barnum, counsel for the Elevated trustees, said that congestion at Andrew Square has become so great that steps must be taken to distribute the traffic during rush hours.

Transit Hearings Begun

Committee Appointed Recently by Mayor Opens Sessions to Which Public Is Invited

The committee, consisting of Milo R. Maltbie, Morris Llewellyn Cooke and Francis Lee Stuart, appointed by Mayor Moore of Philadelphia to study the various rapid transit plans that have been proposed for the city of Philadelphia and report to him on routes, held its first session on March 9.

After the meeting had been turned over to him by Mayor Moore, Mr. Maltbie said that every one desiring to speak would be heard. Col. W. B. Barber, chairman of the public utilities committee of the Chamber of Commerce, read a typewritten statement embodying the views of the Chamber of Commerce. He took no sides as to any particular route, but indicated that the need for construction of high-speed lines was imperative and that the Chamber of Commerce would be behind whatever plan might finally be adopted.

Edward E. Ziegler, representing the United Business Men's Association, North Philadelphia Business Men's Association and the joint transit committee of the Central Labor Union, said that he favored the original Taylor plan with only "such modifications as you engineers decide are necessary." C. Oscar Beasley pleaded with the commissioners "to give Philadelphia a push up the transit hill." He said he favored construction of elevated lines where possible as opposed to the more costly subway construction.

Ralph T. Senter, operating vice-president of the Philadelphia Rapid Transit Company, promised that that company would enter negotiations looking to an operating agreement for the city-built lines when the commission submitted its report. He said that Mr. Mitten's letter of Jan. 8 had been misconstrued. It was at this point that Mr. Senter gave assurance that Mr. Mitten would study the plans and take up with the committee an operating agreement when the plans were completed.

It will be recalled that the commission is under instructions from the Mayor to proceed immediately to an examination and survey of the plans of the Broad Street subway, delivery loop and other authorized high-speed lines prepared by the Department of City Transit and to report back to the Mayor on or before April 15 if possible, so that the recommendations may be submitted to the Council and a report made to the people with respect to a comprehensive high-speed system adequate to the present and future needs of the city.

Fare and Valuation Matters Up in Denver

Henry A. Dubbs, Denver attorney, was appointed master in chancery on March 2 by Federal Judge Robert E. Lewis to take the testimony in the fare controversy of the Denver (Colo.) Tramway which is pending in the United States District Court. March 12 was fixed by the court for the commencement of the taking of evidence on the value of the property. Separate valuations will be filed by the city and the receiver of the company.

Upon petition made shortly after his appointment, E. Stenger, receiver of the company, secured an injunction from the Federal District Court restraining the city from enforcing a 6-cent maximum fare ordinance upon the ground that it was confiscatory. The contention of the city that the company was bound to carry passengers for 5 cents under a provision of its franchise, upon the theory that this constituted a contract, was over-ruled by the court and permission was granted Receiver Stenger to increase the fare to 8 cents cash or two tickets for 15 cents. The ruling of the lower court was sustained the Circuit Court of Appeals and application by the city for rehearing was denied.

The present proceedings are in the same case, but on an application by the receiver to make permanent the temporary injunction granted at the preliminary hearing in March, 1921.

The city of Denver has taken an appeal to the Circuit Court of Appeals from the decision of the lower court in its franchise tax case against the receiver of the Denver Tramway. The franchise granted the company in 1906 imposed a tax of $5,000 a month. This payment had not been made for some time prior to the appointment of the receiver on Dec. 24, 1920, and has not been paid since then.

Early in the year 1922 the city filed a petition with the Federal District Court asking that the city be given a preferred claim on the franchise tax debt in order that the city might be taken care of before other debts of the company were paid. Judge Lewis in a written opinion handed down April 25, 1922, ruled that the city was not entitled to a preferred claim, but the court did not rule on the question whether the city was entitled to the franchise tax money.

Employees Seek Wage Increase

Trainmen of the Municipal Railway, San Francisco, Calif., have presented demands to T. A Reardon, president of the Board of Works, through President Curry and Secretary Rowe of the carmen's union for a wage increase of $1 a day. At present conductors and motormen are receiving $5 a day.

Mr. Reardon said that the advance, if allowed, would mean an additional outlay of $400,000, which it would be impossible for the city to meet.

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Hearing on New York Transit Bill

Local New York City Measure Only One of Five Bills Considered at Session on March 14—Slight Chance Ahead for Passage of Bill, Which Provides for Municipal Ownership

A JOINT legislative committee hearing was held on March 14 before the public service committees of the Senate and Assembly. While it had originally been intended to consider five measures affecting the regulation of public utilities, only the Walker-Donohue bill was considered. This measure would grant to the city of New York the power to construct, acquire, own, operate and regulate its transit facilities. The other bills went over until March 20.

The hearing lacked much of the snap of similar hearings of previous years. Such shining legal lights as Job Hedges and William H. Guthrie were conspicuous by their absence while the opposition developed the unique idea of having their sentiments voiced almost entirely by so-called "reformers."

The opposition was heard first and was lead by William McCarroll, president of the New York State Chamber of Commerce and former public service commissioner. Mr. McCarroll attacked the delegation of power by the Legislature to an official body elected by the people of the city of New York for an entirely different purpose than transportation regulation, which in turn is given authority to delegate its power so conferred to other bodies of such city government.

Former Commissioner Opposes Measure

Mr. McCarroll also raised the question of the constitutionality of the measure in the delegation of powers of regulation to a body that is itself a party in interest to proceedings which it may be called upon to adjudicate. The speaker also drew attention to the statement of Governor Smith in 1920 that the state should not delegate the power of regulation of utilities to any body that is not directly responsible to the Legislature. Mr. McCarroll said the present measure meant a return to the old system of thirty years ago and declared that in thirty-six states state regulation has proved successful, that in each of these states the welfare of the people has been promoted and against none of these commissions has at any time a word of suspicion been had as to their operation. He attacked municipal ownership and operation as fundamentally wrong and stated it was inherent that such regulation should be or would become politically affected and voiced a protect against the state giving to any locality the right of local regulation.

Dr. William J. Sheflin, president of the Citizens' Union of the city of New York, stated the measure might properly be entitled "A bill to give more power to the Mayor in transit matters who has obstinately refused to use the power he already has." The administration of buses at the present time in the city of New York was cited as an example, that the Mayor seeks power to establish municipal bus lines, when under the present law such lines can now be established by the granting of certificates of authority and then obtaining of certificates of convenience and necessity from the public service commission. He charged that the Merchants Association had employed an expert committee to study and report upon the plans of the Transit Commission and those of the Mayor and that this report shows that the plan suggested by the Mayor would be not only expensive and extravagant but would result in worse crowding in the subways than is experienced at the present time. He attacked the Mayor for not cooperating with the present transit commission in putting into effect the plan it has prepared. He concluded his remarks with the statement that some people say: "Go ahead and give Mr. Hylan all the rope he wants and he will hang himself" This would be a very dangerous thing to do because that rope might cost the people $150,000,000 to $200,000,000.

Perhaps the star speaker of the opposition was Bernard M. Wallstein, of the Citizens Union, who agreed that a number of provisions of the bill are good ones, but attacked the measure from the standpoint of the city being called to regulate utilities of which it would itself be a party to the action.

Points Made by Opposition to New York City Bill

Opponents of the measure argued that:

1. It would be unconstitutional to delegate legislative power to the Board of Estimate, as the city would be a principal in all matters in dispute.
2. Legislative authority should not be delegated to a body not responsive or responsible to the Legislature.
3. The entire transit problem would be speedily solved if the Hylan administration would cooperate instead of playing politics.
4. It would create a commission of puppets or rubber stamps for the Hylan administration.
5. All other public improvements would be blocked because of the tremendous cost of municipal operation.

Claims Made for New York City Bill

Supporters contended that if enacted into law, the bill's results would be:

1. Partial solution of the New York transportation problem in sixty days.
2. An end to the agitation over transit and adequate transit facilities for New York.

He also attacked the probable personnel of the commission or body which might be appointed by the Mayor. He laid much emphasis on the fact that Governor Smith in 1920 vetoed a similar measure which would have given to the city of Buffalo regulation of certain of its own utilities because it delegated state sovereignty, which is inviolate and which should not be delegated by the Legislature to any municipality.

Alfred T. Davidson, representing the owners of the property of the Third Avenue Railroad System, attacked the bill as anarchistic and unrivalled by anything produced in Socialistic Russia. He brought out the point that the surface railways carry 43 per cent of all traffic in the city of New York; that it is the intent of the bill to confer authority upon the city of New York to scrap all of these lines.

Mr. Davidson brought out that there is a legal way to operate buses in New York city when they are really needed, but that the city has continued by illegal means to attempt to operate bus lines where such lines are not needed; that the Third Avenue system has applied and waited for two and one-half years for permission to operate buses on the Concourse in the Bronx without success. He also attacked the bill as confiscatory to the surface lines particularly the provision which allows the commission the power of removal and relocation of tracks and expressed the fear that the city would exercise its powers in such a way as to first ruin the property of the companies and then buy it in at the depreciated figure.

Mayor and Comptroller Speak

Raymond B. Ingersoll of the City Club went on record as being absolutely against city control of its public utilities as being unsafe and dangerous. He objected to the organization plan, the uncertainty of the personnel and of the powers and duties intended to be conferred under the bill and expressed hope that the present Transit Commission be continued. He criticised the drafters of the bill for failure to make any provision for public hearings and discussion before important steps involving the expenditure of millions of dollars might be taken under it and called attention to the apparent conflict between many of the provisions of the bill. He also brought out a joker in section 86 of the bill which states the rate of fare to be charged shall not exceed 5 cents per person for one continuous ride, "except by special authorization of the Board of Estimate and Apportionment," and charged that the latter wording would permit of a 10-cent fare if such body was disposed to exact it.

Mayor John F. Hylan was the first speaker for the bill. He said that if the Walker-Donohue bill is passed the city will give to the people a transit program that will serve the people and not the interests of those who want to get the profit out of the nickle. Mr. McCarroll is very much in fear of the bondholders and property owners not being properly treated, said the Mayor. The city has invested about $300,000,-

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000 in subways and the profit has all gone to the traction interests. "What we are desirous of getting," said the Mayor, "is a little of that profit and if possible manage some of the property which the city owns."

The Mayor said the present Transit Commission has cost the city of New York more than $4,000,000 and had done nothing. According to him the enactment of the Walker-Donohue bill would mean that the city of New York could start construction at once and new municipal buses operating over fifty routes at a 5-cent fare could be on the streets before next summer. The Mayor charged that the time of the Transit Commission had been devoted to the concoction of a scheme to unload millions of dollars of worthless traction lines on the city of New York.

The Mayor scouted the idea that the city is financially unable to proceed with the building of its own subways and transit facilities, stating that $40,000,000 a year of construction is all that it is physically possible to do. This amount is entirely within the financial ability of the city. The Mayor argued at length that if bridges, water supply and other public works could be administered by the city with economy, the city could operate its own transit facilities to advantage.

Charles L. Craig, Comptroller of the city of New York, went quite thoroughly into the history of interference by the Legislature with the street car interests of the city of New York, going back to the year 1860 when the Legislature took away from the city of New York the right to grant franchises for the use of its streets and issued by legislative enactment a number of perpetual franchises which it had the timerity to pass over the then Governor's veto. He stated that the legislation now asked was only a restoration of power formerly vested in the city.

Other speakers for the measure were: Murray Hulburt, President of the Board of Aldermen; Edward Riegelman, Borough President of Brooklyn; F. L. La Guardia, former President of the Board of Alderman; Maurice Connolly, Borough President of Queens; George Nicholson, Corporation Counsel of the city of New York, and Edward Flynn, Sheriff of Bronx County.

It is expected the bill will be passed in the Senate some time next week. Its fate in the Assembly will depend upon how many up-State Republican votes can be mustered in its favor. It would appear to have much more of a chance of passage than any other of the so-called administration measures.

Bond Issue for Improvements Fails for Second Time

The proposed bond issue of $5,000,000 for making extensions to the Detroit municipal street railways and buying new equipment failed for the second time to receive the necessary 60 per cent of the votes when placed on the March 7 primary election ballot. According to a count of the ballots, the number of favorable votes was 49,877, with 36,230 negative votes, giving a majority of approximately 58 per cent in favor of the project. The City Council has voted unanimously to put the bonding proposition on the ballot again for the April 2 election. The placing on the ballot of the proposition to bond for $12,000,000 for the city's new municipal lighting plant has also been voted by the Council. These steps have been taken in spite of the action by the State Legislature delaying the Culver bill providing for raising Detroit's bonding limit. It is pointed out that if the bill fails to pass the Legislature, the city's increased valuation this year will provide for additional bonds to the amount of $3,000,000 to $4,000,000. The municipal lighting plant would be used as a source of additional power for the street cars.

Bill to Abolish Commission Fails.— The bill proposed in the Utah Legislature abolishing the State Utilities Commission and others proposing various changes in the commission failed of enactment. The Legislature adjoined on March 8.

Trackless Trolley Requested

The Philadelphia (Pa.) Rapid Transit Company on March 8 asked the city for authority to operate a trackless trolley line on Oregon Avenue, between Eighteenth Street and Delaware Avenue. Councilman Gaffney introduced the ordinance in Council at the request of the company. It was referred to the Councilmanic committee on transportation and public utilities.

The present fare would prevail on the proposed route, with free transfers to intersecting lines. Recently Thomas E. Mitten said the company planned such a line. As explained previously in the ELECTRIC RAILWAY JOURNAL, the Pennsylvania Rapid Transit Company has been organized as an underlying company to operate the new line.

The ordinance also gives the company the right to build on Sixteenth, Seventeenth, Wolf and Jackson Streets, in order to reach the carhouse at Sixteenth and Jackson Streets. It provides the lines shall be in operation within a year after the issuance of a certificate of public convenience from the Public Service Commission.

Foreign News

$500,000 for Power Improvement

In anticipation of the opening of the extensions of the London Underground Railways now under construction, a contract has been placed for a 15,000-kw. turbo-alternator for the power station at Chelsea. The turbine will be constructed by C. Parsons & Company and the alternator by the Metropolitan-Vickers Electrical Company. The cost will be £53,000, exclusive of condensing plant, the contract for which has yet to be placed. Other improvements at Chelsea will cost £47,600, so that more than £100,000 is about to be spent on the Chelsea equipment. The total capacity of the station will then be 93,000 kw.

To accelerate the speed at which tickets are issued at London Underground Railway booking offices, the company has been experimenting with "Roltio" ticket-issuing machines for some time at a number of busy stations. These machines are prepared to a design of the underground railways and they almost instantaneously space, date and issue the ticket to the passenger. In tests as to the speed of booking passengers, the best result obtained so far was 1,174 tickets issued in an hour. In that hour, change had to be given to 492 passengers. Roll tickets are used at a cost of only half the price of card tickets. Further, when 1,000 tickets have been issued, the roll is replaced, whereas card ticket cases have to be refilled after the issue of 250 tickets. Another successful experiment has been a 1½ d. slot ticket machine electrically connected to the passimeter. When a passenger inserts his money in this machine he obtains as usual a dated and canceled ticket and the passimeter unlocks automatically so that he may pass through.

Lord Ashfield, chairman of the London Underground Electric Railways and the London General Omnibus Company, has been holding forth to representatives of the London daily press on the iniquity of allowing small companies to run buses in competition with the general company's services. He professes not to object to genuine competition, but to the fact that these small concerns run only on the most congested and remunerative routes, while his company, in the public interest, provides services on unremunerative routes. The sponsor of one of the small companies has replied hotly. Among other things he points out that a few days after he instituted a service on a crosstown route where there were practically no facilities the London General swamped the business by putting on a great number of buses in competition.

It has also been pointed out by the tramway interests that the London General carries on absolutely unregulated competition with the various metropolitan tramway undertakings. On some routes during the rush hours the tramways can carry all the traffic so that the buses are quite unnecessary. The latter would probably not be run on tramway routes were it not for the gold mine which the buses find in the city and the West End where no tramways are allowed.

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Financial and Corporate

Traffic and Earning Figures Compared

Loss in New York City Only $2,043,760 in Year 1922 Compared with $16,914,256 in 1921

The gross traffic of the street railroad companies under the jurisdiction, of the New York Transit Commission as presented in the report of that body to the Legislature for 1922 shows an increase for the year of 98,404,521, to which there may be added the increase upon the routes operated by the Fifth Avenue Coach Company, making a total increase of more than 100,000,000. This does not include any traffic upon steam railroad lines, nor upon the electrically-operated divisions of such roads.

Numerically the greatest increase shown was upon the surface lines of Brooklyn, the figures of the Brooklyn City Railroad and of two small and relatively unimportant lines, being combined with those of the B. R. T. system. This Brooklyn increase was 54,431,425. While indicating very great traffic increments, this high figure is in part accounted for by the fact that on the Brooklyn lines, during the preceding fiscal year there was a disastrous strike, resulting in the continued cessation of operation of several lines and a reduction of the totals upon practically all below the normal figure which might have been expected. For the same reason, as they were also affected by the strike, the B. R. T. rapid transit lines showed a traffic gain for 1922 of 39,776,589.

A marked change was reported in respect to the figures of the Interborough Rapid Transit Company. In recent years, with each annual report, the subway and elevated lines of this system have shown substantial and in some instances, remarkable gains in traffic. The past fiscal year, however, revealed a remarkable reduction in the rate of increase upon the subway lines of this company, with a total traffic of 644,975,474, which was an increase of only 5,589,694 over the previous year, in which year the increase over 1920 was more than 53,000,000. Some subway routes of the Interborough showed an actual traffic loss. Still more remarkable was the decrease upon the Interborough elevated lines, where the traffic fell 25,775,835 below the 1921 figure. The year previous had shown a slight gain. The Interborough's elevated loss is difficult to explain, save in one instance, where the Sixth Avenue line, closely paralleled by the Broadway subway of the B. R. T., lost nearly 11,000,000, while the Brooklyn company's subway line gained more than 15,000,000 passengers. It is also believed that a part of the loss is represented by a diversion, through preference for travel by subway, of many former elevated passengers to the Interborough's underground lines.

The Hudson and Manhattan tubes, with a gain of 3,497,244, maintained the approximate rate of growth which has prevailed upon its lines for several years.

Surface line traffic in all boroughs showed gains, that in Manhattan being the least, with 1.10 per cent, while the Borough of Richmond, semi-suburban community, had the highest, with 17.53 per cent. This is to be explained by the fact that the Staten Island Midland trolley lines were in operation only a portion of the year during 1921. The gain upon all rapid transit lines, a little more than 23,000,000 passengers, was at the rate of 1.52 per cent. Upon surface lines the gain was 7.70 per cent. The combined gain, for all lines, was 3.95 per cent.

Financial Resuls of Operation

The accompanying tables show (1) the number of revenue passengers reported by the several systems, the estimated population of the city of New York and the average number of rides per capita for the fiscal years 1920, 1921 and 1922; (2) the street railway traffic for 1860, 1870, 1880, 1890, 1900, and for every year from 1910 to 1921, inclusive; (3) the results of operation, from the financial standpoint, from the year 1908 to the year 1922, inclusive.

STREET RAILWAY TRAFFIC IN NEW YORK CITY, 1920-1922
Number of Revenue Passengers (Cash Fares)

	Fiscal Year Ending June 30			Increase* of 1922 over 1921	
	1920	1921	1922	Number	Per Cent
Subway and elevated lines:					
Interborough—					
Subway	586,098,633	639,385,780	644,975,474	5,589,694	0.87
Elevated	369,034,477	374,293,051	348,517,216	D25,775,835	D6.89
B. R. T. elevated and subway	376,782,635	404,970,640	444,747,229	39,776,589	9.82
Hudson and Manhattan tubes	92,250,836	95,607,645	99,104,889	3,497,244	3.66
Total	1,424,166,581	1,514,257,116	1,537,344,808	23,087,692	1.52
Street surface lines in:					
Borough of Manhattan	349,772,761	384,128,024	388,357,767	4,229,743	1.10
Borough of the Bronx	94,141,991	107,675,507	114,679,520	7,004,013	6.50
Borough of Brooklyn	432,936,227	418,106,603	472,538,028	54,431,425	13.02
Borough of Queens (a)	49,562,574	51,944,034	58,826,451	6,882,417	13.25
Borough of Richmond	15,007,235	15,797,894	18,567,125	2,769,231	17.53
Total	941,420,788	977,652,062	1,052,968,891	75,316,829	7.70
Grand total	2,365,587,369	2,491,909,178	2,590,313,699	98,404,521	3.95
Population (b)	5,620,048	5,705,364	5,790,680	.....	.....
Fares per capita	421	437	447	.....	.....

* The prefix D indicates decrease. (a) Exclusive of Brooklyn Rapid Transit. (b) Estimated for 1921 and 1922 on basis of one-tenth of decennial increase, 853,165.

As the commission views it, the combined financial situation of the street railroad companies showed a healthy improvement, leading to the hope that the current fiscal year, unless unforeseen conditions arise, will end with a balance on the right side of the traction ledger. While net corporate income for the fiscal year 1922 shows a deficit of $2,043,760, the measure of improvement is indicated by the deficit of 1921 which was $16,914,256. In the year previous the deficit was about $10,700,000, and 1919, more than $8,500,000, a combined deficit for the three previous

RESULTS OF OPERATION OF STREET RAILWAY COMPANIES NEW YORK CITY
Years ended June 30, 1908-1922

Fiscal Year	Street Railway Operating Revenue	Expenses of Maintenance and Operation	Taxes, Tolls, etc.	Operating Income (a)	Net Corporate Income (b)
1908	$69,026,613	$41,305,058	$4,330,228	$23,391,327	$2,665,765
1909	72,432,714	41,461,172	5,007,159	25,813,683	6,385,998
1910	79,593,910	43,586,932	5,148,324	30,858,654	9,559,816
1911	83,751,415	45,993,964	5,495,881	32,261,570	10,171,074
1912	88,242,144	47,667,562	5,803,790	34,770,792	11,893,641
1913	92,141,605	48,675,647	6,095,520	37,370,438	11,797,771
1914	94,155,521	50,117,712	5,895,935	38,141,874	11,849,985
1915	93,644,428	50,324,095	5,811,290	37,509,043	11,501,157
1916	98,628,185	52,038,312	6,238,461	40,351,412	12,352,438
1917	100,185,796	55,960,722	7,185,113	37,039,961	9,457,886
1918	103,499,463	60,699,402	8,232,851	34,567,210	5,266,496
1919	110,198,575	75,985,007	7,907,358	26,306,210	Loss 8,556,408
1920	127,880,161	96,059,603	7,353,757	24,466,801	Loss 10,725,522
1921	136,805,038	107,232,966	7,505,676	22,066,396	Loss 16,914,256
1922 (c)	141,236,944	96,320,951	8,544,895	36,371,098	Loss 2,043,760

STREET RAILWAY TRAFFIC (INDICATED BY NUMBER OF CASH FARES) IN NEW YORK CITY, 1860-1922

Year	Surface Railways	Rapid Transit	Grand Total	Per Capita
1860	50,830,173	.....	50,830,173	43
1870	152,463,920	.....	152,463,920	103
1880	229,585,272	60,831,757	290,417,029	152
1890	331,243,531	237,906,029	569,149,560	218
1900	603,788,366	242,564,692	846,353,058	246
1910	763,140,739	768,122,175	1,531,262,914	321
1911	805,619,547	798,281,850	1,603,901,397	331
1912	843,539,783	837,374,152	1,680,913,935	340
1913	901,443,411	868,433,097	1,769,876,508	352
1914	916,205,060	896,999,296	1,813,204,356	355
1915	918,752,149	888,880,577	1,807,632,726	348
1916	944,591,698	954,143,917	1,898,735,615	360
1917	860,165,633	1,058,646,596	1,918,812,229	358
1918	869,997,143	1,105,514,646	1,975,511,789	362
1919	875,678,033	1,204,266,264	2,079,944,297	376
1920	941,420,788	1,424,166,581	2,365,587,369	421
1921	977,652,062	1,514,257,116	2,491,909,178	437
1922	1,052,968,891	1,537,344,808	2,590,313,699	447

(a) Excess of revenue over expenses and taxes. (b) Balance after interest, rents and other fixed charges (c) Provisional.

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years of more than $36,000,000. These deficits, preceded by several years of decreasing income, serve to indicate the serious financial situation under which the operating companies have been laboring and the difficulty which has faced them in the attempt to justify new capital issues, from which to obtain funds for greatly needed expenditures for new rolling stock and other equipment to meet the demands of a growing traffic.

They have also served to make more difficult a favorable response to the commission's persistent demands for improved service, as more cars and more trains generally indicate increased operating expenses. Strict economy, however, has enabled the companies to reduce their operating expenses during the year, in which effort they have had the assistance and co-operation of the commission as far as was consistent with the just demands of the traveling public for adequate service. Operating revenue increased during the year about $4,431,000, operating expenses decreased $10,912,000, and thus, while taxes increased about $1,000,000, street railway operating income increased approximately $14,307,000.

Ohio Road Abandons Service

The Newark & Granville Electric Railroad, a branch of the Columbus, Newark & Zanesville Traction Company, ceased giving service at midnight on March 10 on authority of the Ohio Public Utilities Commission after the company had presented evidence showing the branch to be operating at a loss, due mainly to motor bus and automobile competition.

On Dec. 21, 1889, the first car was run over the line but only as far as the city limits in Newark. A year later service was carried through to Granville.

Improvement in 1922 Earnings

The report of the Rochester & Syracuse Railroad, Inc., Syracuse, N. Y., showed a substantial gain in earnings last year. The company earned twice its bond interest and, after the payment of 4 per cent on preferred shares, had a surplus of $28,300, compared with $3,619 for the previous year.

The gross earnings of the company were $1,055,272 and operating expenses $747,163. Taxes amounted to $68,096. Non-operating revenue was $11,782 and the gross income $251,796. Bond interest amounted to $125,555, with $126,241 to be applied to dividends. Preferred stock dividends took $97,940, leaving a surplus of $28,301.

Revenue Passengers on City Lines in Fort Wayne Increase

Fare-paying passengers on the Fort Wayne, Ind., car lines increased more than a million and a half during 1922 from the figure for 1921, according to a report released by General Manager S. W. Greenland of the Indiana Service Corporation. The number of passengers carried on the interurban lines of the company decreased more than 63,000, it was shown. During 1922 the total number of fare-paying passengers carried on the Fort Wayne city lines amounted to 18,747,084. In 1921 the total number was 17,199,663. The total number of revenue passengers carried on the interurban lines in 1922 was 1,140,888, while in 1921 the total was 1,204,143.

The car mileage in Fort Wayne was considerably greater in 1922 than in 1921. The car mileage covered in 1922 was 3,504,248, while the car mileage covered in 1921 was 3,288,691. The interurban mileage also showed an increase, the mileage for 1922 being 1,164,979, while for the previous year it was 1,127,286.

$481,688 Net Earned Since Receiver Was Appointed

The net income of the Denver (Colo.) Tramway from Dec. 24, 1920, the date of the appointment of the receiver, to Jan. 31, 1923, was $481,688. No annual or monthly reports covering the operation of the property have been prepared or printed for distribution since the receiver was appointed. The figures covering the period mentioned, shown in detail in the accompanying table, were transcribed from the records filed by the company in the office of the Federal District Court.

Preferred Shares Participate

At a meeting of the board of directors of United Light & Railways Company, Grand Rapids, Mich., held on March 8, the following dividends were declared:

A regular quarterly dividend of 1½ per cent on the 6 per cent first preferred stock of the company, payable April 2.

A regular quarterly dividend of 1½ per cent on the participating preferred stock of the company, payable April 2.

An extra dividend of 1 per cent on the participating preferred stock, payable in quarterly installments on April 2, July 2, Oct. 1, 1923, and Jan. 2, 1924.

A special dividend of 5 per cent on the common stock of the company, payable in common stock, on April 2, 1923.

A regular quarterly dividend of 1½ per cent and an extra dividend of one-half of 1 per cent on the common stock of the company, payable in cash May 1.

The board announces that it is its intention from time to time to make disbursements of special dividends on the common stock of the company in the form of stock whenever the surplus of the company warrants it.

The board further announces that all stockholders of the company will be offered an opportunity in the near future to acquire additional holdings of common stock and participating preferred stock at attractive prices, as it will be the policy of the company to raise a portion of its financial requirements for development purposes by the sale of its capital stock to its stockholders and to its employees.

CONDENSED STATEMENT OF NET INCOME OF THE DENVER TRAMWAY COMPANY FOR THE PERIOD FROM DEC. 24, 1920, TO JAN. 31, 1923

Classification	Accumulative 12-24-20 to 12-31-22	January 1923	Accumulative 12-24-20 to 1-31-23
Passenger	$9,483,992	$400,683	$9,884,676
Parlor, chair and special car	5,441	168	5,609
Mail	3,324	144	3,466
Express	4,724	148	4,873
Switching	18,449	880	19,329
Total revenue from transportation	$9,515,930	$402,023	$9,917,953
Revenue from operations other than transportation			
Station and car privileges	$41,903	$1,791	$43,697
Rents of tracks and terminals	70,653	2,500	73,152
Rents of equipment	45,489	1,947	47,437
Rents of buildings and other property	83,584	3,571	87,155
Power	70,317	2,898	73,215
Miscellaneous	490	33	521
Total revenue from operations other than transportation	$312,436	12,740	325,177
Total operating revenue	$9,828,367	$414,763	$10,243,131
Operating expenses:			
Way and structures	$1,362,032	$45,798	$1,407,831
Equipment	920,855	37,923	958,779
Power	724,400	35,365	759,768
Conducting transportation	2,863,784	118,463	2,982,248
Traffic	4,547	89	4,630
General and miscellaneous	689,818	27,770	717,589
Total operating expenses	$6,565,436	$265,408	$6,830,845
Net operating revenue	$3,262,931	$149,355	$3,412,286
Miscellaneous income:			
From securities and accounts	$23,679	$1,095	$24,774
Total miscellaneous income	$23,679	$1,095	$24,774
Gross income less operating expense	$3,286,609	$150,450	$3,437,060
Deductions from income:			
Taxes	$757,166	$32,117	$789,283
Franchise payments	121,210	5,000	126,210
Interest on funded debt	1,942,743	79,674	2,022,418
Interest on floating debt	17,461	.....	17,461
Total deductions from income	$2,838,580	$116,791	$2,955,372
Net income	$448,029	$33,658	$481,688

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Net Up 41.51 per Cent

Milwaukee Company Another Utility that Made Excellent Showing in Year 1922

The net income of the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., for the year 1922 was $1,418,671. This is an increase of 41.51 per cent over that for the year 1921. Operating revenues of the railway department amounted to $9,721,909, an increase of 1.55 per cent over 1921. Operating revenues of the electric and heating departments amounted to $9,648,515, an increase of 11.28 per cent over 1921.

Capital expenditures during the year amounted to $5,459,081. The principal items were as follows:

Railway	$3,457,491
Electric	859,763
Heating	11,024
Street lighting	11,902
Power	659,179
Miscellaneous	483,525

More than $93,000 of property was withdraw from service during the year.

Expenditures in the railway utility include the acquisition by purchase of ninety-nine city cars and forty one-man safety cars heretofore leased from the Wisconsin General Railway under agreement dated Oct. 1, 1920, the purchase of a small railway line from the Milwaukee Northern Railway and the purchase and acquisition of a fleet of buses operated in interurban service.

INCOME ACCOUNT OF MILWAUKEE ELECTRIC RAILWAY & LIGHT COMPANY FOR 1922

Operating revenues		$19,370,424
Operating expenses:		
Ordinary operating expenses	$12,478,062	
Depreciation (Reserve credit)	1,558,918	
Taxes	1,326,869	
Total operating expenses		$15,363,849
Net operating revenues		$4,006,575
Non-operating revenues		122,587
Gross income		$4,129,162
Interest charges:		
Interest on funded and unfunded debt	$2,330,159	
Interest on depreciation reserve balances	334,095	
Interest on other reserve balances	46,237	
Total interest charges		$2,710,491
Net income		$1,418,671

John I. Beggs, president, explains that in view of the lower interest rates prevailing, the company called for redemption $4,950,000 refunding and first mortgage 7½ per cent bonds, series A, dated June 1, 1921, due June 1, 1941; $2,000,000 three-year 7 per cent secured gold notes, dated May 1, 1920, due May 1, 1923, and $872,000 ten-year 8 per cent sinking fund equipment trust gold certificates, dated Oct. 1, 1920, due Oct. 1, 1930. In order to refund these securities and provide funds for the retirement of floating debt incurred for construction expenditures and for further construction requirements, the directors authorized an issue of $12,500,000 refunding and first mortgage 5 per cent bonds, series B, which bonds were sold under favorable market conditions. This will result in a substantial interest saving. On July 1, 1922, $150,000 of 5 per cent serial notes matured and were paid.

During the early part of the year the company sold the balance of $1,338,100 preferred capital stock, issue of 1921, 8 per cent series, which brings the total amount of this series up to $3,000,000, the authorized amount.

On April 17, 1922, the directors authorized the issue and sale of an additional $3,000,000 par value of the new preferred capital stock, issue of 1921, 7 per cent series. The stock is offered for sale at par by the company direct to its customers and the residents of the territory served by it. Up to Dec. 31, 1922, $1,267,500 of this stock had been sold at par, for cash, and $642,600 on installment payment plan, on which payments had not been completed.

Common capital stock in the amount of $1,400,000 was issued at par in payment of balance due Milwaukee Light, Heat & Traction Company on account of the acquisition of the operating property of that company.

In submitting the printed report to its preferred stockholders the company inclosed with it a copy of an advertisement published in answer to an intended legislative inquiry. The documents give ample proof that the business of the company is growing rapidly and that it is keeping pace with a constant increase of demand for its services. For the benefit of the stockholder it is explained that the company obtains its new capital, so far as possible, from investors at home by selling, with the State's approval, its preferred shares. On Dec. 31, 1922, the company had 7,000 paid-up preferred shareholders, with several thousand more who are buying shares on monthly payments. The company then says to the shareholder:

> When you bought our 8 per cent or our 7 per cent preferred shares you made sure of permanent income from your money at a rate well above the interest average now and for many years to come. If you have surplus funds for investment, we advise you to increase your holdings of 7 per cent preferred shares, while the opportunity is still available. We shall be glad to have you, as a shareholder, recommend these shares, now on sale, to any of your friends who may be looking for a safe investment paying a good income rate.

Facts for the Legislature and for Milwaukee Electric Railway & Light Co. Shareholders

The state assembly a few days ago asked the Railroad Commission to supply the speaker with the following information: Total outstanding bond and stock issues of Wisconsin public utilities, and approximate annual interest and dividends paid on such issues.

Speaking for itself only, Milwaukee Electric Railway & Light Co., Wisconsin's largest public utility, gives below the answers to these questions, for the information of the legislature, and of our customers and our investors throughout the state.

VALUE OF THE COMPANY'S PUBLIC SERVICE PROPERTY

Physical property (State appraisal of 1914), with additions to Dec. 31, 1922	[illegible]
Working capital, materials and supplies, same date	[illegible]
Total	[illegible]

SECURITIES OUTSTANDING (As of Dec. 31, 1922)

Bonds:		
First consolidated	$6,500,000	
Refunding and extension	6,728,000	
General and refunding	5,819,000	
Refunding and first	12,500,000	
M. L., H. & T. Co. first	5,000,000	
*Total bonds	$36,547,000	$36,547,000
Notes:		
Serial gold notes	$ 550,000	
Secured gold notes	[illegible]	
Total notes	$ 4,150,000	$ 4,150,000
Preferred stock:		
6% shares	$ 4,500,000	
7% shares	1,267,500	
8% shares	2,737,300	
Total preferred stock	$ 8,504,800	$ 8,504,800
Common stock		$11,250,000
Total outstanding capitalization, Dec. 31, 1922		$60,451,800
Excess of property over capitalization		$ 3,324,611

*(Cash has been set aside to pay off [illegible] of car trust certificates coming due April 15, [illegible], cancelling that item of bonded debt.)

INTEREST AND DIVIDENDS, 1922.

Average rate required for interest and discount on the $40,697,000 of bonds and notes was a shade over five and one-half per cent—the exact figure being 5.523 per cent.

Dividends on preferred shares were paid at rates indicated above.

Dividend on common stock amounted to $921,500—at the rate of 8.19% on $11,250,000 outstanding.

Actual net income earned during 1922 for interest and dividends was a trifle over six and one-half per cent—the exact figure being 6.569%. This was much less than the 7½ to 8% "reasonable return" sanctioned by state policy.

RELATION OF CAPITALIZATION TO ELECTRIC SERVICE RATES

The gentlemen who offered the assembly resolution stated their belief that the large yearly increase in public utility capitalization lays a steadily increasing burden upon public utility customers in city and country. As regards the customers of Milwaukee Electric Railway & Light Co., the gentlemen were in error. Increase of investment, serving each year thousands of additional customers, has resulted in a steady decline in the cost of electric energy during the seventeen years of Railroad Commission regulation of the public utility business. Here are the figures:

Year	Capitalization at end of year	Average Charge per kilowatt hour for all energy sold
1905	$21,361,405	6.00 cents per kwh
1910	37,791,900	4.39 cents per kwh
1915	43,[illegible]000	3.44 cents per kwh
1920	45,937,000	3.29 cents per kwh
1922	60,451,800	2.91 cents per kwh

The company's growth during the past two years was swift and large. A large part of the $14,500,000 of new capital needed to finance that growth was supplied by Wisconsin investors, who are now drawing regular interest and dividends on their investment. During 1922 the company gained over 14,000 new electric service customers, and over 11,000 new Wisconsin shareholders.

A SAFE 7% INVESTMENT

The company is now selling, with the state's approval, the last $500,000 of a $3,000,000 issue of 7% cumulative preferred shares. The price is $100 per share. You can buy them either for cash or on monthly payments of $5 or more per share. Either way, you get 7% on every dollar invested, from the start. Mail orders for these shares are filled promptly by registered letter.

Securities Department

THE MILWAUKEE ELECTRIC RAILWAY & LIGHT CO.
Public Service Bldg., Milwaukee, Wis.

Reproduction of Advertisement Sent to Stockholders

Net Income of Pittsburgh Railways Increased in 1922

An accounting of the assets and liabilities of the Pittsburgh (Pa.) Railways asked by the United States District Court on Feb. 15 as the first step toward the reorganization of the company was filed on March 6 in the court by the receivers, C. A. Fagan, W. D. George and S. L. Tone.

The report shows a falling off in total receipts for the year 1922 as against 1921 of $199,965, but the net income for 1922 is shown to be $166,339 more than the net income of 1921, an increase which is attributed to economies introduced in the service. The coal strike and business depression in 1922 are given as causes for the decrease in total revenues, which is also indicated in the fact that 627,967 more passengers were hauled over the lines the year before.

Out of $21,169,750 received in operating revenues last year, $16,669,846 was expended for operating expenses, a decrease of $188,570 from 1921. Much of the decreased cost of operation is in the maintenance bill which the receivers account for in the betterment of track and equipment. The continued appro-

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priation of portions of the revenues for modern equipment and better roadbeds is recommended by the receivers as a means to further economies.

In 1922 the company paid out $3,482,437 in fixed charges, interest on bonds, mortgages and rentals as against $3,720,463 the year previous, a decrease of $238,025.

The net liabilities of the company on Dec. 31, 1922, were $8,087,000, according to the report. Current and accrued liabilities totaled $12,159,000, but from this total was subtracted $4,072,000 included in current and working assets to give the net figure. The outstanding unpaid liabilities are largely injury and damage claims, taxes and municipal charges.

The comments of the receivers contained in the detailed report were republished as a full-page paid advertisement in the Pittsburgh *Gazette* and other papers. From a typographical standpoint, the ad, considering the extent of the text, was admirably displayed.

Makes Report on Railway Properties

The Dominion Power & Transmission Company, which controls and operates the electric railways in Hamilton and Dundas, Ont., has submitted its annual report for 1922. The company sees a tendency toward improvement out of the adverse war conditions, but its railway properties have experienced little relief from their problems. The report states that the Hamilton & Dundas Street Railway is planning on a change in fare with a view toward keeping in business. It had contemplated the necessity of going out of business.

The statement refers to an issuance of bonds amounting to $100,000 and bond redemption equaling $224,000. The total of the company's reserve and profit and loss account has been increased by the sum of $276,381, bringing that total to the sum of $3,616,462.

Reorganization Plan Being Prepared

Plans are under way to release the New York (N. Y.) Railways from receivership instituted March 20, 1919. The Chase Securities Company and two large insurance companies are said to be back of the plan.

The proposed reorganization would continue the consolidation of the lines now controlled by the receiver, Job E. Hedges, but would leave out of consideration the three lines which have already been restored to independent operation viz.: The Eight Avenue Company, the Ninth Avenue Company, and the Fourth & Madison Avenue Line.

One of the burdens carried by the New York Railways has been in the form of rents to its subsidiary companies. Under the reorganization plan the rentals probably will be scaled down and the lines put into condition to insure efficient operation.

Railway Securities at Auction

Electric railway securities sold by Adrian H. Muller & Son on March 14 at the Public Auction Room, 14 Vesey Street, New York, were as follows:

$5,000 Columbus, Buckeye Lake & Newark Traction Company 5 per cent bonds, certificate of deposit, 2 per cent.

800 shares Denver & Northwestern Railway $5.75 a share.

$157.14 reorganization committee certificate, Series "A," Chicago Electric Traction Co., representing an undivided beneficial interest in first mortgage 5 per cent gold bonds of Chicago & Interurban Traction Co., interest paid to Jan. 1, 1922. $26 lot.

Will Pay Another Dividend. — The Brazilian Traction, Light & Power Company has declared a 1 per cent dividend payable on the common stock for the first quarter of 1923. This is the third declaration since the resumption of dividends. The company's monthly statements have shown steady increases in earnings.

Sale Authorized.—Authority to sell the transmission line of the Ohio Power Company, now owned by the Fort Wayne, Van Wert & Lima Traction Company and extending from Lima to Wapakoneta, Ohio, for $14,000, was given by Federal Judge Killits, Toledo, to Henry C. Paul, receiver of the traction company, on Feb. 26.

Gold Bonds Offered.—Drexel & Company, Philadelphia, Pa., are offering at 97½ and interest, to yield nearly 6.25 per cent, $3,000,000 of the Georgia Railway & Power Company, Atlanta, Ga., twenty-five year general mortgage gold bonds. The bonds, known as the 6 per cent series of 1923, are dated March 1, 1923, and are due March 1, 1948.

Mr. Mitchell Chairman of the Board.—S. Z. Mitchell, president of the Electric Bond & Share Company, New York, N. Y., has been elected chairman of the board to fill the vacancy caused by the resignation of Marsden J. Perry. Mr. Mitchell will continue to serve also as president. F. B. Odlum and Frank Silliman, Jr., have been elected vice-presidents of the company.

St. Louis & Jennings Railroad Sold.—The St. Louis & Jennings Railroad, an electric line operating between St. Louis and Jennings, Mo., was sold on March 7 to W. J. Stedelin, St. Louis. The road was built in 1911 to aid in opening up several subdivisions in the district through which it travels and has been in continuous operation ever since. In August, 1922, it was placed in the hands of a receiver due to its failure to meet certain interest payments. Mr. Stedelin says that the road will be continued in service.

Recommends Change in Fixing Allowances. — Street Railway Commissioner Engle of Youngstown, Ohio, at the first meeting of the street railway committee of the Council, advocated a change in the method of fixing operating and maintenance allowances for the Youngstown Municipal Railway, saying they should be regarded merely as budgets and changed from time to time to conform with new conditions. He said no large surplus or deficit should be permitted to accumulate in any item of allowance.

Preferred Stock Offered.—A syndicate headed by the Southern Trust Company, Houston, Tex., is offering at 100 and interest $500,000 of the 7 per cent cumulative participating preferred stock of the Seaboard Electric Railway of Texas. The stock is callable all or in part as the directors may determine at 105 and dividends. After the payment of 7 per cent on the common stock the preferred stock will participate equally with the common stock in all further dividend payments. The purpose of the issue is to advance money for the construction of the interurban railway to Pasadena.

Prior Preference Stock Offered.—Stone & Webster. Boston, Mass., are offering $2,000,000 of the 7 per cent cumulative prior preference stock of the Puget Sound Power & Light Company, Seattle, Wash. The price is 103 and accrued dividend to yield 6.80 per cent. The stock will be redeemable at 110. Dividends will be payable Jan. 15 and quarterly. The proceeds from the sale of this issue will be applied against the recent purchase of the Washington Coast Utilities and North Coast Power Company and for the construction of transmission lines connecting with these properties.

Prior Preference Stock Offered.—A syndicate headed by the National City Company, New York, N. Y., is offering $1,000,000 of 7 per cent cumulative prior preference stock of the Portland Railway, Light & Power Company, Portland, Ore. The price is 98 and accrued dividends yielding more than 7⅛ per cent. The proceeds from the sale of the stock, together with the recent bond financing, will reimburse the company for construction expenditures. A block of the stock was offered by the company to residents of Portland. In offering this the company called attention to the fact that "the stock is an investment in a $60,000,000 Home Industry, supplying 330,000 people with necessary public service." The shares are offered to local investors direct on the partial payment plan.

Customers Take Preferred Issue.—The entire 50.000 shares of new 7 per cent cumulative preferred stock of the Public Service Corporation of New Jersey offered to stockholders on March 1 at par and accrued dividends has been taken. The offering was oversubscribed 50 per cent. Subscriptions were received from 18,974 customers for 75,179 shares. This is the first of the $25,000,000 of 7 per cent cumulative preferred to be offered. On Dec. 18 last shareholders approved a change in the charter to divide the $50,000,000 authorized preferred stock into two classes, half to remain 8 per cent preferred and half to be 7 per cent preferred. The company now has $18,414,500 in 8 per cent preferred stock outstanding, together with the $5,000,000 of 7 per cent preferred just sold and $30,000,000 in common of $100 par value.

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Traffic and Transportation

One-Man Two-Man Cars

The Connecticut Company, New Haven, Conn., has in mind the installation of a lighter type of double-truck car in cases where the present one-man vehicles are carrying an excessive burden. This statement was made by Lucius S. Storrs, president of the company, during a hearing at Hartford recently before the legislative committee on railroads on a bill to abolish one-man cars. He said that the company recognized the fact that there was excessive crowding on these smaller cars at rush hours and it planned to meet the situation by bringing into use a car which could be operated by one man during a part of the day and by a motorman and conductor during the rush periods. This, it is hoped, will solve the problem.

Charges Discrimination in Fare Issue

Piedmont commuters recently protested before the California State Railroad Commission charging discrimination by the San Francisco-Oakland Terminal Railways in the matter of fares.

The investigation of the rates of the Key Route for Piedmont passengers was demanded by the city of Piedmont and the Civic Association, which alleged that the extra 6 cents charged on the Piedmont street cars after the commuter had paid 18 cents ferry and Key Route electric train fare, constituted an unjust discrimination, a disadvantage to the development of Piedmont and a prejudice on the part of the traction company in refusing transfers.

W. R. Alberger, vice-president and general manager of the San Francisco-Oakland Terminal Railways Company, in answer to the argument that transfers were free in Berkeley, testified that the free transfers in Berkeley were made necessary by the competition of the Southern Pacific. The commission will make a decision later.

Woman Secures Business for Railway

Through the quick thinking and good salesmanship of Emma Teague, agent of the Union Traction Company at Pendleton, considerable more shipping business is now being undertaken by the Indiana company. The Hardy Manufacturing Company, which manufactures metal stampings, parts used in automobiles, has shipped its output for years via steam road to Flint and Detroit and practically two weeks' time was consumed in transit. The resulting dissatisfaction caused Mrs. Teague to ask Mr. Hardy, owner of the factory, for a trial shipment. The service given by the electric railway was so pleasing to the purchasing agent for the automobile company that he ordered all future shipments should be sent via the Union Traction. This has resulted in a daily shipment from Pendleton of about 3,000 lb., half of it going to Detroit and half to Flint.

Bus "Feeder" Established by Pacific Electric in Alhambra

The Pacific Electric Railway on Feb. 19 commenced operation of bus service in Alhambra, Calif., a city of 12,000. The bus routes form a loop around the city. Thirty-minute service is operated. The fare charged is 6 cents with transfer privilege between cars and buses within the present 6-cent fare limits of Alhambra. The railway does not operate local lines in Alhambra, but its interurban trains run between Los Angeles and Alhambra and carry passengers within the city limits of Alhambra. Three buses are required to render service over the routes operated, of which one is available for emergency.

With the three new buses in service in Alhambra the Pacific Electric now has three buses in use in San Bernardino, five in Santa Ana, three in Glendale and one at Redlands.

Fares Reduced in Spartanburg

Fares in Spartanburg were reduced on March 12 from 7 cents on some lines and 10 cents on others to 5 cents on all lines by the State Railroad Commission, which is operating the South Carolina Gas & Electric Company.

The commission decided to cut the fare to a nickel as an experiment to see if the plan will work. The commissioners say that the arrangement, like the improved schedules established some weeks ago, is temporary.

State Commission Sanctions Use of Bus by Railway

One of the most sweeping orders ever issued in Massachusetts has been promulgated by the Department of Public Utilities. It authorizes the Eastern Massachusetts Street Railway to acquire, own and operate motor vehicles for the transportation of passengers in seventy-one cities and towns.

This order covers practically the whole territory which this company serves, but it should be explained that the company must also obtain a license from the city or town in which it is to operate. The company does not now intend to run motor buses in all these places, but desires to supplement its railway service with motor vehicle service, feeding into the latter, wherever it can be done to advantage, without competing with some other railway. A measure is in the Legislature on jitney and one-man car operation.

Pacific Electric Plans Completed for Installing Bus Feeder in Pasadena

Plans have been announced for railway and motor bus service in Pasadena, Calif., by the Pacific Electric Railway. The details were agreed upon by the Pasadena Board of City Directors and officials of the railway after six months of negotiations.

The new motor bus "feeder" service will probably go into effect in April. At that time the first buses of the company's order placed on Feb. 16 for eighty-one Model 50 White cars are subject to delivery.

The buses to be operated in Pasadena will run under permits only, no long term franchises being granted by the city. The present bus lines in Pasadena are to be purchased and the equipment removed by the Pacific Electric. Pasadena has a population of 50,000 and the plan announced will give the city a transportation service unsurpassed by any city of its size in the United States, according to the railway directors.

The fare within the city will be 5 cents by purchase of a block of ten tickets, with privilege of transfer. The cash fare will be 6 cents. These fares will become effective at the start of the new bus service. Fares for school children will be reduced to 3 cents by book. The schedules of the buses and street cars will be co-ordinated.

Schedules to be put into effect call for the use of thirty-eight buses in active service, with seven held in reserve for emergency use. The buses have a seating capacity of twenty-five passengers and cost approximately $8,000 each.

The plans call for the continuance of local railway service on some of the most important lines in the city, while in other cases all other local railway service will be withdrawn and motor bus service substituted. None of the railway lines to be discontinued will be abandoned physically until the proposed combination bus and railway service is thoroughly tried out.

The railway now has approximately 40 miles of single track serving as local lines in the city of Pasadena.

Owl service will be given on the buses to all sections of the city.

Scientists to Have Benefit of Buses

The Capital Traction Company, Washington, D. C., began in February of this year the operation of a bus owl service to and from Rock Creek Bridge loop, Twentieth and Calvert Streets to Chevy Chase Circle. The bus owl service will be continued for two or three months until the experiments, in the laboratories of the Carnegie Institution, which are of great importance, have been completed. The change was made from electric owl cars to buses, because the current from the Chevy Chase line, leaking ever so slightly, interfered with the delicate instruments a half mile away.

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Protest Launched Against Fare Charge

Resident of the Rainier Valley district, served by the Seattle & Rainier Valley Railway, are indignant because they are still forced to pay 8½ cent fare on the railway lines, while Seattle Municipal riders now pay only 5 cents. As a protest against the higher fare, the residents are endeavoring to organize a system of transporting people to the city by privately owned automobiles, but the railway company threatens to ask immediately for a temporary injunction restraining jitney drivers from operating on streets where the company maintains its lines. In the meantime, the railway officials report a slight dropping off in receipts, and only occasional refusal of patrons to pay the fare charged. The Department of Public Works is conducting an investigation of the investment, expenses and revenues of the Seattle & Rainier Valley Railway, to obtain evidence for a public hearing on the question of transportation rates to be charged by the road. The investigation was ordered following the filing of a petition signed by residents of the Rainier Valley.

While Baby Sleeps Ride the Street Car on Your Unlimited Pass

The weekly pass plan has still another advantage which up to now has not been emphasized. Here's what the editor of a San Diego paper thinks of the pass:

A $1 city line unlimited pass and a smooth riding street car a few days ago accomplished for a little 2-year-old urchin what a fond mother's soothing lullaby failed in the night previous. In the throes of cutting first teeth, the baby had been unable to get sufficient sleep, and the mother was taking young "Bill" down to the dentist in search of relief.

Boarding a car shortly after noon in the arms of his parent, "Bill" calmly took it into his head to enjoy a much needed nap. Delighted over the idea and the excellent judgment of her offspring, the mother, armed with her city line pass, rode back and forth from one end of the line to the other for about three hours, until "Bill" decided to open his sleepy eyes and take notice of the surroundings.

Conductor Buchanan, realizing that any one could ride as long as he desired while holding one of the weekly passes, was puzzled over only one feature of the experience and sent in the following report to headquarters: "How many times should one pass be rung up when a passenger rides all afternoon, boarding car at 12:42 and riding until 3:40? Making three round trips, this lady had a little baby about 2 years old and said as long as it was asleep and her pass good, she would ride until it woke up, and she did. When we would get to the turning point she would turn her seat and be all set for the return trip. The little kid had not slept much the night before, because of trouble with his teeth."

Report Safety Record.—The Spokane & Eastern Railway & Power Company and the Inland Empire Railroad Company, Spokane, Wash., report that they transported 930,000 passengers in 1922 without a single fatal accident.

Fare Hearings Concluded. — The Louisiana Public Service Commission has concluded hearings on the application of the Shreveport (La.) Traction Company for permission to increase fares in Shreveport from 5 cents to 7 cents. The commission has reserved its decision.

Reach Fare Agreement.—As the result of a conference at which were present city officials of Warren, Ohio, County Commissioners and Pennsylvania-Ohio Traction Company representatives the present fare of 10 cents will be continued for three years between Warren and Leavittsburg.

Cheaper Fare Wanted.—A campaign has been started in the Tonawandas looking toward cheaper fares between Buffalo and the twin cities. Although the Public Service Commission some months ago ordered a discontinuance of the zone system and that one fare be charged in the two cities, four different fares at the present time are being charged between Buffalo and points in the Tonawandas.

Pass in Peekskill. — The Peekskill Light & Railroad Company, Peekskill, N Y., has joined the ranks of the pass-sellers. The company on March 12, put into effect the $1 unlimited transferable weekly pass good in the central zone of the village. Without a pass a ride in this zone costs 10 cents. Another form of weekly pass sells for $1.90, is good in the village limits and also to the neighboring village of Verplanck. The cash fare between the two villages is 20 cents.

Fare Increased.—The El Paso (Tex.) Electric Railway announces that it will increase the fare charged between Juarez and El Paso from 5 cents to 6 cents, effective on March 15. The fare from El Paso to Juarez has been 6 cents for several years, but the fare from Juarez to El Paso has remained 5 cents pending sanction of the increase to 6 cents by the government of the State of Chihuahua, Mex. The government of Chihuahua has now approved the increase.

Hearing Date Announced.—A hearing will be held on March 19 by the Public Utilities Commission of the District of Columbia on the application of the Washington Interurban Railroad to abandon service on Bladensburg Road. The company wants to substitute bus service. The commission stated that the company's request was made as the result of its stated inability to meet certain improvement costs incident to the paving of the roadway.

May Try Flat Ten-Cent Rate.—At a special meeting of the Pittsfield Board of Aldermen on March 2 the members discussed a proposal to join with the Berkshire (Mass.) Street Railway in petitioning the Public Utilities Commission for a ninety days trial of a flat 10-cent fare rate, with transfer privilege, in place of the present 6-cent fare zone system. This followed repeated complaints against the zone system on the part of residents in certain sections. Action was deferred until the next meeting.

Signs to Inform Tourists.—George F. Russell, superintendent of public utilities at Seattle, Wash., announces that during the summer months cars running to the salt and fresh water beaches, to the various parks and other points of interest in the city will bear large signs, descriptive of the various places to which they travel. It is believed that this will not only furnish convenient and desirable information to tourists and strangers in the city, but will also suggest trips which will mean increased revenue for the Municipal Railway.

Rerouting Deferred.—General rerouting of all car lines of Indianapolis along a plan being prepared by officials of the Indianapolis Street Railway and city officials, together with the rehabilitation of the system when the Terre Haute, Indianapolis & Eastern Traction Company installs its new plant, makes it impractical to change more lines at this time, it has been announced. The chairman of the Board of Works in answering a petition for changes divulged the fact that a number of changes in car service and routing will be made later.

Fare Lowered.—The North Carolina Public Service Company, owners of the railway system in Concord, N. C., recently announced a fare reduction in Concord. The new rate is 7 cents instead of the former rate of 10 cents. The electric railway in Concord has been in bad shape financially for some time and the fare reduction is made with the hope that it will increase traffic on the system. This is the opinion of R. J. Hole, vice-president and general manager, who made known the reduction in a letter to City Attorney Caldwell.

Experimental Fare Period Has Expired.—On March 1 the one-year period expired during which a 6-cent fare was authorized by the California State Railroad Commission to apply on the local lines of the Fresno Traction Company. The company is obliged to file with the commission a statement of its earnings and expenses in order to determine the future fare. On a basis of the reports of the commission as to the physical valuation of the railway's holdings, company officials have stated that in all probability the 6-cent fare will obtain for the next twelve months. It is the opinion of city officials, however, that the results portend a return to the former fare of 5 cents, on the basis of the 8 per cent of property valuation allowed the company for profit.

Seeks Higher Fare and Abandonments.—The State Corporation Commission in Richmond was petitioned by the Virginia Railway & Power Company recently for an increase in fares to 7 cents in the city of Norfolk and the abandonment of four lines, the Mason's Creek, Lambert Point, Compostella and Edgewater. The commission heard argument made by the company and the citizens concerning the proposed abandonment and took the case under advisement. In its petition to the commission the company stated that bus competition was directly responsible for the proposed increase and that unless some action was taken by the Norfolk City Council to assist the company "some strenuous means" to avoid disastrous losses would have to be taken.

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Personal Items

New Assistant Manager Has Filled Many Positions

H. U. Wallace has been appointed assistant general manager of the Little Rock Railway & Electric Company, Little Rock, Ark. Mr. Wallace is an up-and-doing individual, having worked at various times for utility companies, for Uncle Sam and for himself. He was born in Rock Island, Ill., in 1872. Doubtless many things happened to Mr. Wallace from that time until he was twenty-two years old, but Mr. Wallace, to whom publicity is anathema, has guarded well the secrets of his youth. In 1894 he became identified with the Illinois Central Railroad and until 1905 he served with that company in the above-mentioned role, as superintendent and chief engineer. Private consulting engineering work was his next hobby, which was followed later by his becoming general manager of the Chicago, Lake Shore & South Bend Railroad. He had charge for the construction of the Fort Dodge & Southern Railway and among his achievements there was the supervision of the electrification of part electric and part steam, and the changing for higher voltage. At that time he was doing a combined passenger and freight business. In 1912 Mr. Wallace vice-president and general manager of the Western Power Company, was appointed Federal Power Commissioner, when the latter was [illegible] and as a result he [illegible] as Major of Engineers and assisted in construction division with the supervised construction of various plants for manufacturing shells, construction of projectiles and the erection of the Edgewood Arsenal. He left the Army June 1, 1919. From that time until his recent appointment he was engaged in private practice.

Appointment Waits on Acts of Legislature

Governor Smith will not appoint a successor to Charles M. Blakeslee of Binghamton, N. Y., Public Service Commissioner, until he finds out what the Legislature will do with bills to be introduced reorganizing the State Public Service Commission. Mr. Blakeslee's term expired at midnight Jan. 31, and under the terms of the public service commission law Commissioner Blakeslee will hold over until his successor is named. There are five members of the present commission. Governor Smith favors a three-headed commission with less power than vested in the present commission. He would give localities control over all public utilities operating within their respective corporate limits. It is expected an agreement will be reached within the next few days as to just how far the Republican majority in the Assembly will go in meeting the program of the Governor on utility legislation.

New Manager of Washington Coast Utilities

R. U. Muffley, formerly superintendent of light and power of the Puget Sound Light & Power Company, Bellingham, Wash., was recently named manager of the Washington Coast Utilities. Headquarters for this corporation,

R. U. Muffley

the common stock of which was recently purchased by the Puget Sound Light & Power Company, Seattle, are maintained in the New York block, and from this location the affairs of this concern are managed.

Mr. Muffley was born in Fairmont, Minn., in 1883. He was educated in the public schools of Fairmont and was graduated from Tolands Business College at La Crosse, Wis. After finishing school, he returned to Fairmont, where he was employed for four years as fireman in the plant of the Fairmont Electric Light Company.

He migrated West in 1903, stopping en route to the coast at Spokane. In the latter part of 1903 he entered the employ of the Globe Electric Company in Seattle, engaging in miscellaneous construction operations.

Early in 1904 he removed to Bellingham and became affiliated with the organization of the Whatcom County Railway & Light Company, first as a motor repairman and wireman. In 1906 he was promoted to foreman of inside construction and motor repairs. During this year, the Whatcom County Railway & Light Company absorbed the electric properties of the Bellingham Bay Improvement Company, these properties including a power plant at Nooksack Falls under construction. In 1908 Mr. Muffley was named superintendent of distribution, succeeding W. S. Quimby, and in 1911 was again promoted, this time to superintendent of light and power, in charge of all light and power plants, electric railway lines and a gas plant owned by the corporation. This position he held until his promotion and transfer to his present post, that of manager of the Washington Coast Utilities.

The holdings of the Washington Coast Utilities include the properties in the following places operating these services: Wenatchee, gas, light and power; Arlington, light, power and water; Vashon, light, power and telephone system; Port Townsend, light, power, gas and an ice plant; Elma, light and water; South Bend, water; Tenino, water; Edmonds and Richmond Beach, light and water.

The gross revenues of the Washington Coast Utilities are about $700,000 a year.

Major-General O'Ryan Will Investigate Veterans' Bureau

Mars may or may not be at perihelion, but O'Ryan is always in the public eye. As if it were not enough to be constantly under fire as a member of the New York Transit Commission Major-General John F. O'Ryan has been retained as counsel by the special Senate committee which will investigate affairs of the Veterans' Bureau. The Senate committee will meet during the summer and General O'Ryan expects to be able to carry on his part of the job without interrupting his work with the commission.

Because this member of the Transit Commission is in the midst of Mayor Hylan's steely shots of "Home Rule" and "A 5-Cent Fare" and equally steely protests from an indignant 8:30 a.m. commuter he does not lose his perspective. Einstein's theory of relativity he seems to have mastered as it relates to this particular problem of an infinitesimal section of the cosmos. For Major General O'Ryan realizes that he cannot push out the traction companies and overnight sweep the city clean of troubles.

While sitting through weeks and weeks of testimony, while plotting ways to relieve the congestion instantly, keep a 5-cent fare forever and ever, provide a seat for every passenger, abolish straps and straphangers by miraculous power, Major General O'Ryan has kept his head, when all about have been losing theirs and somewhat blaming it on him.

In the New York *Times* a short time ago the Major explained this plan over which he has spent so much time since early in 1921. To the general public that explanation must have been like the flash of the revolving light from the tower of a lighthouse, for it proves in unmistakable terms that there is stability and solid foundation amidst what to most people must up to the present time been utter blackness. There have been, of course a few all

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along who have understood, just as the ship's captain who has his charts to guide him knows all about the lighthouse without seeing the red flash, but it is to the crying multitude that this flash of clarity in the whole doings gives assurance.

One might never guess that this member of the Transit Commission, with the title of Major-General, is a lawyer by profession. That is, one would never guess it unless he had attended the hearings of the commission and heard the office-lawyer interject into the proceedings clear, logical questions and remarks which have the quality of leadership belonging to the military part of him. He commanded a division in the A. E. F., and was the only militia officer thus honored.

Employee Re-elected to Louisville Railway Board

The policy adopted last year of election of one director to the board of the Louisville (Ky.) Railway by his fellow employees has proved very helpful to all concerned. D. L. Kehl, way department representative on the general committee, who has acted as a director of the company during the past year, was, at an election held on Feb. 14, 1923, re-elected to that position by a majority of the votes cast, 89 per cent of those in the Co-operative Welfare Association voting in this election.

John S. Bleecker, general manager of the Indiana, Columbus & Eastern Traction Company, was recently called from Springfield, Ohio, to Nashville to be at the bedside of his dying wife. Mrs. Bleecker succumbed on March 8.

A. H. Favreau has replaced George W. Cook as superintendent of the Southern Illinois Railway & Power Company, Harrisburg, Ill. The position of general superintendent has been given to Fred L. Shimer and general agent to M. H. Wetlaw.

Percival Chrystie has been elected president of the Taylor-Wharton Iron & Steel Company, High Bridge, N. J., to succeed the late Knox Taylor. Mr. Chrystie was formerly vice-president and has been acting president since Mr. Taylor's death. He progressed through the various departments of the company during his thirty or more years of service, acting as superintendent of the steel foundry, then secretary and treasurer and finally vice-president, a position he held for many years.

J. F. Uffert, who as superintendent of equipment of the New York State Railways, Rochester, N. Y., was called upon in the emergency to supervise the restoration of the equipment of the Schenectady Railway when the collapse of the latter's rolling stock came in January, has been made superintendent of equipment on the Schenectady lines. Mr. Uffert retains his position with the New York State Railways in Utica, Syracuse and Rochester. He is also holding a similar position with the New York & Harlem Railroad, New York City.

Mr. Buck on the Journal Staff

Morris Buck has resigned his connection with John A. Beeler, consulting engineer of New York, to become associate editor of ELECTRIC RAILWAY JOURNAL, with headquarters in New York. For the past seven years he has been Mr. Beeler's principal associate in the extensive consulting work in which the Beeler organization has engaged in the electric railway field. He has had charge of important investigations on many surface, rapid transit and interurban railways throughout the country, including the studies made for such systems as those in Boston, eastern Massachusetts, New York, Philadelphia, Washington, Newark, Chicago, Kansas City, Richmond, New Orleans and other places. This work has been of a varied character, including a wide range of operating and valuation problems, and with railways, municipalities and commissions as clients. Mr. Buck thus brings to the JOURNAL staff a mind

Morris Buck

trained in investigation and analysis work, a background of practical observation, and a round of experience before public bodies that should be invaluable as reflected in the columns of the JOURNAL for the benefit of the industry as a whole.

While Mr. Buck's consulting experience is of greatest interest, his earlier education and experience have been of a character to round out his knowledge and peculiarly fit him for the work now at hand. His early education was in the public schools of Washington, D. C. He received the degree of mechanical engineer from Cornell University in 1904, and the degree of electrical engineer from the University of Illinois in 1917. He served as a machinist's helper and special apprentice on the Delaware, Lackawanna & Western Railroad during his course at Cornell. Upon graduation he went into the employ of the Westinghouse Electric & Manufacturing Company as a designing engineer and then in 1905 took a position as instructor in electrical engineering at Cornell University. During 1906 he acted as engineer for the Mechanical Appliance Company and then returned to the Westinghouse Electric & Manufacturing Company for a year. He was employed as cost analyst by the Mellon National Bank, Pittsburgh, during 1908, and for two years following was assistant professor of electrical engineering at New Hampshire State College. During the next year he served as professor of electrical engineering at Clarkson College of Technology, and following this went to the University of Illinois as assistant professor in charge of the electric railway courses. During his six years at the University of Illinois he became very well known in the electric railway field for the work done in analyzing railway engineering problems graphically and the development of test equipment.

Mr. Buck is the author of "The Electric Railway," a standard text book in general use. He is a Member of the American Institute of Electrical Engineers, Fellow of the American Association for the Advancement of Science, and holds membership also in the American Electric Railway Association and the Society for Promotion of Engineering Education. Mr. Buck was born in Washington, D. C., in 1881.

John Brandon was recently elected secretary of the Alabama Public Service Commission. He succeeds [illegible] White, appointed special attorney [illegible] Brandon for a number of [illegible] secretary of the Alabama [illegible] mission.

Obit[illegible]

George [illegible] Hunter

Geor[illegible] the [illegible] d[illegible] [illegible] that tim[illegible] [illegible] umbers and [illegible] construction of the [illegible] al railway at Holyo[illegible] he was employed by [illegible] Thread Company. After [illegible] line at Holyoke was completed [illegible] Hunter alternated in the service by driving a horse car in winter and acting as foreman of the track repair gang in summer. It was not long, however, before the road was equipped for operation by electricity. With the change in motive power he was made superintendent. Mr. Hunter was born in Quebec sixty-four years ago. He had resided in Holyoke forty-five years. He was extremely popular with the rank and file of the men employed by the company. Mr. Hunter is survived by his wife.

William H. McChell, Commissioner of Public Safety for the City of Guthrie, Okla., for the last eight years, died at his home in Guthrie recently after an attack of neuralgia of the heart. Mr. McChell was sixty years old. He had been interested in traction affairs for a number of years and was one of the best-known city officials in the state.

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Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

To Consider European Trade

Practical Problems of Foreign Sales Management to Be Discussed at Foreign Trade Convention

The preliminary program of the Tenth National Foreign Trade Convention, New Orleans, May 2-3-4, has been announced by O. K. Davis, secretary of the National Foreign Trade Council. Mr. Davis said that the convention will center around the theme "European Conditions as Relating to World Trade."

HALF OUR EXPORTS TO EUROPE

This subject is regarded by all odds the overshadowing factor in our foreign trade and domestic prosperity today. In spite of all that has been said on this subject, Mr. Davis says there does not yet seem to be a clear understanding of the part which Europe plays in our daily life. More than half our exports are sent to Europe; more than one-third of our imports come from Europe. Under such conditions it is not too much to say that every man, woman and child in the United States is vitally interested in the present developments in the countries of Europe.

GERMANY A BIG BUYER

Mr. Davis says the situation with regard to Germany is particularly important. Germany consumes more American products than any other country, except the United Kingdom and Canada. These exports to Germany are largely foodstuffs and crude materials, in the production of which American farmers are particularly concerned. The cotton planters of the South, the grain-growers of the Middle West, the cattlemen of the Southwest, and the copper miners of the Northwest, says Mr. Davis, all have a real personal stake in our trade with Germany.

The full outline of the program follows:

WEDNESDAY, MAY 2

First General Session: Report on European Conditions Today; European Progress During the Last Year; Trade Barriers; Trading in the Face of Depressed Exchange.

Group Sessions: "Education for Foreign Trade"; "Banking Facilities for Foreign Trade"; "Export Managers" (in co-operation with the Export Managers Club of New York).

THURSDAY, MAY 3

Second General Session: The Farmers' Stake in Foreign Trade; The Selling Value of Imports; Need for Foreign Trade Zones; Foreign Trade Facilities of the Federal Reserve System.

Group Sessions: "Expanding Exports" (in co-operation with the American Manufacturers Export Association); "Trading in Latin America"; "Export Merchant."

Trade Adviser Service:

FRIDAY, MAY 4

Third-General Session: Inland Water Transportation as Affecting the Farm and the Railway; Railway Service for Foreign Trade; The Shipping Situation of the World.

Group Sessions: "Pacific Coast Problems" (in co-operation with the Pacific Foreign Trade Council); "Foreign Credits" (in co-operation with the National Association of Credit Men); "Export Advertising."

Banquet:

SATURDAY, MAY 5

Inspection of Port, Industrial Canal and Inner Harbor.

Copper Costs More

Supply of Refined Metal Reduced to Less Than Six Weeks' Supply—Buyers Bidding Material Up

Copper may not be king just now, but it is apparently headed that way. For months the market for the red metal was in the doldrums while the surplus production was being worked off that had accumulated during the war-time period. With the return of business activity the stocks of the metal on hand have been reduced and the price is climbing. At first the quotation changes were hardly perceptible separated as they were by long intervals, but recent weeks have seen the price advanced until on March 15 it was 17 to 17½ cents.

COSTS REFLECTED IN MANUFACTURED ARTICLES

This advance will of course be reflected in the cost of the manufactured articles into which copper enters, and as such articles are innumerable in electric railway work it means another addition to the cost of doing business. Statistics of the trade show many manufacturers stocked up well ahead with metal accumulated at or near the low price, but despite this the price quotations for some of the manufactured articles almost immediately reflected the increase in the price of the raw material. In the case of copper wire, to mention just one article, the advance in price has been close to 6 per cent since the first of the year.

Everybody who has thought about the matter knew that a condition could not exist indefinitely where the cost of producing and mining the raw product exceeded in many cases the selling price of the metal itself. Those who were foresighted and at the same time forearmed with funds anticipated their immediate demands. Over them there is no immediate need for concern. The question more properly is, What of the future?

Predictions as to future prices in any line are always precarious, for the variable factors that enter into consideration make it impossible to look very far ahead. If this were not true then given any set of conditions, the matter of prediction could be reduced to a formula. As for buying it is nearly always very largely on an upward scale. So it has been with copper. No sooner had the price advance begun than the purchase demand increased. Buyers are bidding against each other. Despite this the quotation for the metal has remained fairly firm near present levels for some days now. This is not taken to mean that the upward trend of the market has run its course, but rather that quotations are marking time in advance of another upward march.

As one authority sees it some of the principal factors that have contributed to the present price movement of copper are:

1. Reduction in refined surplus from 747,000,000 pounds to 268,000,000, or less than six weeks' supply.
2. Exports almost 75 per cent of pre-war takings despite present chaotic political conditions in Europe.
3. Relatively low price level for copper in comparison with other basic commodities.
4. Great expansion in the avenues of copper consumption.
5. High rate of consumption for all commodities essential in construction.
6. Inability greatly to increase copper output due to shortage of mining labor.
7. No new sources of copper supply developing.
8. Elimination of cheaply produced South American metal as menace to price.

There is no need to recite the various uses to which copper is put in the electric railway industry. A long list of such uses will suggest itself at once to everybody engaged in the industry. There are no really accurate figures of the consumption of copper in the electric railway field, but a survey made some time ago by the ELECTRIC RAILWAY JOURNAL indicates that for wire alone more than 12,000,000 pounds are used annually, this amount including the consumption for such items as trolley wire, transmission wire, trolley wheels, rail bonds, etc. The consumption of trolley wheels has been placed at 500,000 annually.

On the basis of this consumption figure the added cost to the electric railways for a 1-cent increase in the cost of copper would appear to be infinitesimal, but it must be remembered that the increase in the quoted price is several cents over the figure of a few weeks ago and that every increase in the price of raw material is reflected in an advance proportionately much larger in the price of the manufactured article into which the use of copper enters.

Metal, Coal and Material Prices

Metals—New York	March 13, 1923
Copper, electrolytic, cents per lb.	16.875
Copper wire base, cents per lb.	19.125
Lead, cents per lb.	8.25
Zinc, cents per lb.	8.025
Tin, Straits, cents per lb.	51.25
Bituminous Coal. f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$7.00
Somerset mine run, Boston, net tons	3.625
Pittsburgh mine run, Pittsburgh, net tons.	2.55
Franklin, Ill., screenings, Chicago, net tons	2.375
Central, Ill., screenings, Chicago, net tons.	1.45
Kansas screenings, Kansas City, net tons..	2.625
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.	7.50
Weatherproof wire base, N.Y., cents per lb.	19.50
Cement, Chicago net prices, without bags.	$2.20
Linseed oil (5-bbl.lots), N.Y., cents per gal..	1.01
White lead, (100-lb.keg), N.Y., cents per lb.	13.375
Turpentine (bbl. lots), N. Y., per gal.	$1.53

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Coal Commission Speeds Its Work

With the removal of uncertainty with regard to its appropriation, and in fact its very existence, the President's Coal Commission is bustling with increased activity. The statistical force has been expanded and the tabulation of the information contained on the questionnaires has been speeded up decidedly. During the week ended March 10 a material increase in the rate of tabulation was achieved. The returns also are being received in greater numbers.

New questionnaires now are being prepared to cover certain phases of distribution. The American Wholesale Coal Association and the Retail Coal Merchants' Association are being consulted in connection with the preparation of these schedules. The field investigations in connection with wholesale and retail practices in the larger cities are now being completed.

Federal Distributor Wadleigh reported on March 11 that there has been some improvement in the fuel situation in New England and northern New York. Largely due to motive power trouble, there still is room for great improvement in the railway service. Difficulties continue in New England harbors and a number of applications for service orders intended to give priority to the discharge of coal cargoes have been filed. Mr. Wadleigh stated that it is the present plan to issue another stock report on April 1 and still another on June 1.

Finance Committee Approves Municipal Railway Car Plan

The finance committee of the City Council of Seattle, Wash., by unanimous vote has recommended passage of an ordinance authorizing the Board of Public Works to call for bids for 100 new lightweight, modern type cars, with seating capacity for fifty-eight passengers each, and equipped with the latest appliances, including electric heaters. It is proposed to lease the cars with an option. It is confidently expected that the Council will approve the plan. If it does the Board of Public Works will immediately issue a call for bids. Finance Chairman E. L. Blaine said he felt certain the call would bring offers, unless the car building companies are so rushed with business that the proposition might not be attractive at this time. The new cars will be used to replace ninety-one cars of the 600-type now in use. It is proposed to have seventy-five cars of the 500-class remodeled in the department's shops.

Rolling Stock

St. Petersburg, Fla.—Bids will be open this week by the city on the new cars to be purchased for the Municipal Railway, at an estimated cost of $30,000.

Brooklyn (N. Y.) City Railroad has placed an order for fifty-four pair of Brill type 62-E 1 trucks for use in motorizing fifty-four trailers, as reported in last week's issue of the JOURNAL.

Groton & Stonington Traction Company. Norwich, Conn., has purchased two Fageol buses of the street railway type or city type. The company has also purchased one of the Model 50 White buses which is now in use on the branch line between Mystic and Old Mystic.

Johnstown (Pa.) Traction Company has received four double-truck cars, purchased from the Cleveland Railway. They will replace single-truck cars. Eleven more cars are to be received within the next few months. The cars will be repainted and re-equipped and placed in immediate service.

Pennsylvania Railroad. New York, N. Y., has ordered new equipment to be placed in service this year which involves an expenditure of more than $57,000,000. The orders include three electric locomotives and fifteen suburban type steel passenger cars equipped with electric apparatus for electric suburban service.

Track and Roadway

Union Traction Company, Coffeyville, Kan., is planning to extend its electric line into Oklahoma, and will have the terminus near Oolgah, Okla., where the company has recently acquired leases on a large block of coal land. The company will open several mines and develop the leases, and it is expected that considerable tonnage for the electric line will thus be provided.

New Haven, Conn.—The Southern Connecticut Electric Company is seeking a charter to operate over the abandoned stretch of the old Shore Line east of New Haven. William A. Sperry, interested in the incorporation of this company, recently purchased the part of the Shore Line Electric Railway between New Haven and Saybrook, which had not been in operation for several years.

Springfield (Mass.) Street Railway has petitioned the city of Springfield for a double-track location through Vernon Street and in a loop through Broadway, Pynchon Street and Water Street to the Hampden County Memorial Bridge. This is proposed to be a terminal for lines coming into the city over the new bridge and also for certain other lines, and if approved the loop will supersede the present loop around Court Square.

Youngstown (Ohio) Municipal Railway expects to rebuild its lines on Albert Street. This is the next improvement in the company's program stated by Superintendent Stewart at the recent meeting of the Council street railway committee with Commissioner Engle. The work will cost about $46,000, of which about half will be charged to maintenance expenses and half to the company's capital value under the provisions of the franchise.

Trade Notes

J. G. Brill Company, Philadelphia, Pa., has delivered all the gasoline-driven cars to the Pennsylvania Railroad which the company ordered last year.

Pure Carbon Company, Wellsville, N. Y., announces the recent establishment of a northern West Virginia representative, Norman Strugnell, Clarksburg, W. Va. Mr. Strugnell is qualified to give personal engineering service on all brush problems and requirements in this territory.

Harry Marlin, European representative of the Railway Supply & Manufacturing Company, Cincinnati, Ohio, and Arthur Joseph and F. A. Hamilton, vice-president and secretary respectively of the concern, sailed for Europe on the "Majestic," March 10. Mr. Marlin recently returned from Dresden, after spending a year there. He is returning to that city for a stay of another year or two. Messrs. Joseph and Hamilton will remain abroad about six or seven weeks, visiting the company's foreign business associates with Mr. Marlin.

Standard Underground Cable Company will, on April 1, move its general offices and Pittsburgh sales office from the Westinghouse Building to the company's new factory and office building at 100-108 Seventeenth Street. The Standard Underground Cable Company also announces the opening of a branch of its St. Louis sales office in the Scarritt Arcade Building, 817-819 Walnut Street, Kansas City, Mo. E. H. Shutt will be in charge of the new office as district sales agent. Mr. Shutt has been connected with the company for several years.

New Advertising Literature

Graver Corporation, East Chicago, Ind., has issued bulletin No. 509, which describes the Graver zeolite water-softening equipment.

Pittsburgh (Pa.) Testing Laboratory has issued bulletin No. 28, which shows the service its inspecting engineers and chemists are prepared to render on electric railway equipment.

Railway Improvement Company, New York, N. Y., has issued an illustrated booklet on the Ransom vacuum oiler. It shows the oiler installed on motors on a large number of properties.

J. G. Brill Company, Philadelphia, Pa., will publish the Brill magazine quarterly beginning with April of this year. The magazine is distributed gratis to individuals affiliated with the electric railway industry.

General Electric Company, Schenectady, N. Y., has issued bulletin No. 46,053, describing with illustrations the portable timing device. This device consists of an increased clock, to be used with a standardized clock, as a means of secondary timing, to supplant the stop watch.

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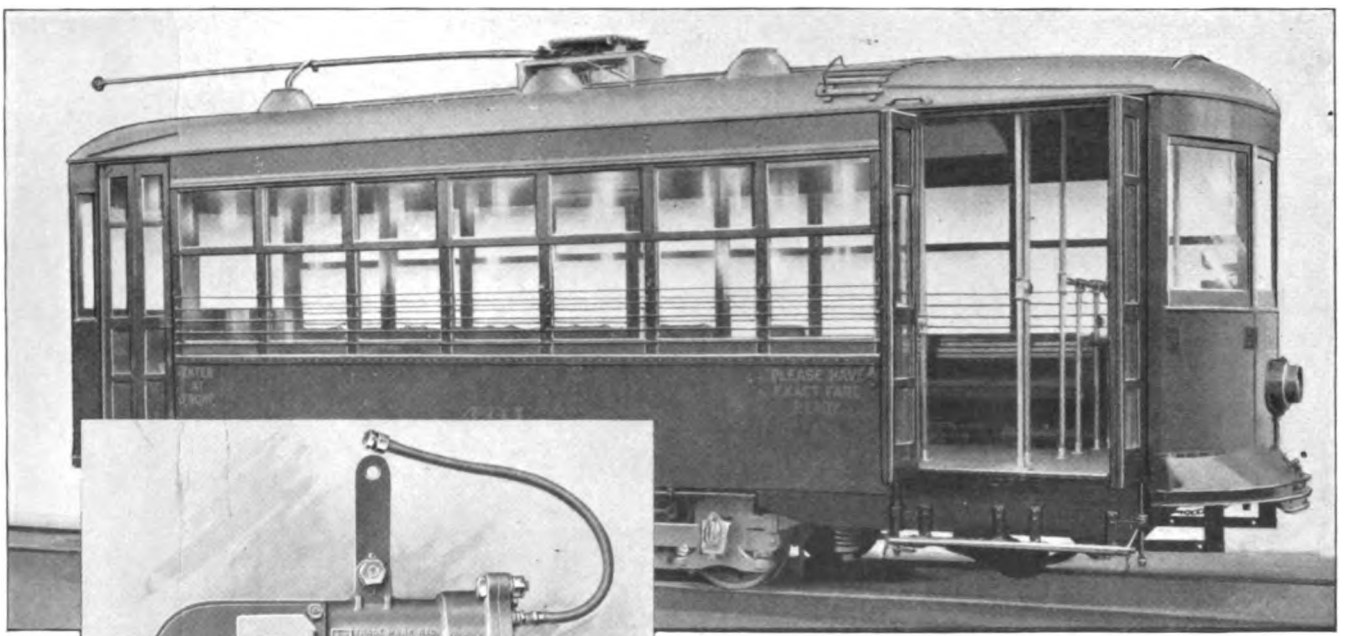

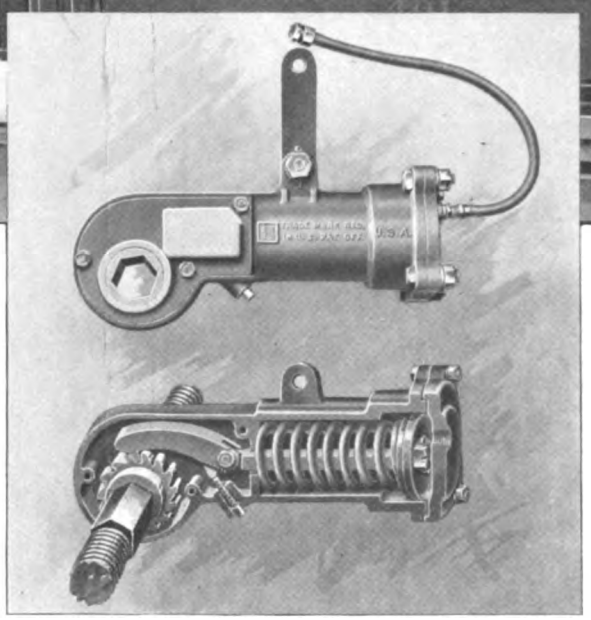

Louisville's 55 New Safety Cars

Equipped with

BRILL AUTOMATIC SLACK ADJUSTERS

The Brill Automatic Slack Adjuster has been adopted by many railway companies as standard equipment for their Birney Safety Cars. To these has just been added the Louisville Railway Company, which recently received fifty-five new Safety Cars built by us, all of which were equipped with this new Air-Operated Slack Adjuster for compensating for wheel and brake shoe wear.

Its application direct to the bottom brake rod is an assurance of the absence of lost motion, and the fact that it operates only when brake adjustment is necessary reduces maintenance to the minimum.

With Brill Automatic Slack Adjusters on your Safety Cars your brake rigging is always adjusted and safe and efficient brake operation is assured.

Write for full particulars.

THE J. G. BRILL COMPANY
PHILADELPHIA, PA.

AMERICAN CAR CO. ST. LOUIS MO. — G.C. KUHLMAN CAR CO. CLEVELAND, OHIO. — WASON MANF'G CO. SPRINGFIELD, MASS.

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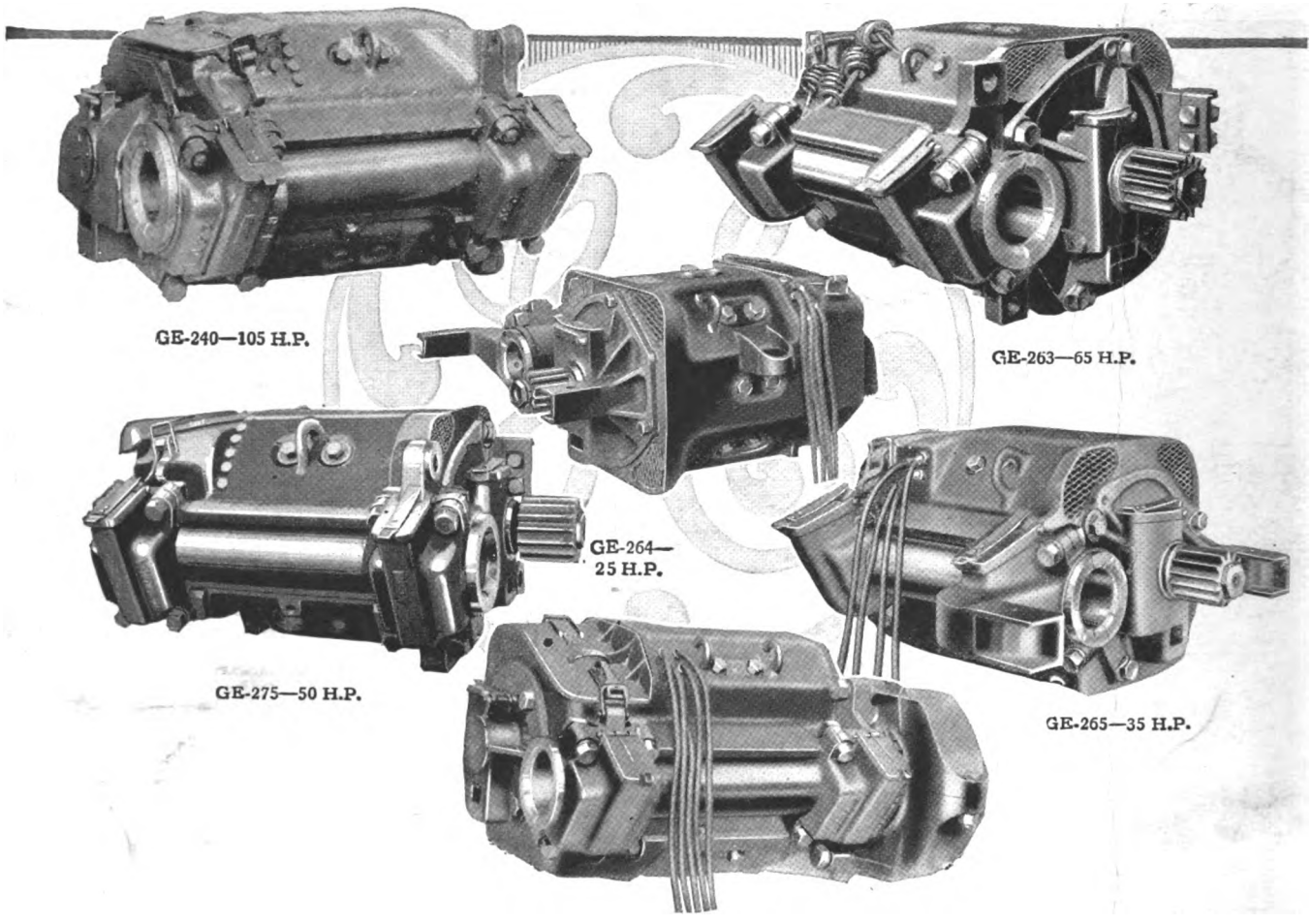
Maintenance is Less with Modern Motors



—and service is improved

Records of a large number of railway motors which have been in service 15 to 20 years show annual maintenance and inspection costs of $120 to $250 per motor.

Similar records on modern G-E railway motors show annual maintenance and inspection costs of only $35 per motor.

Investigate the savings in operating costs, and the increased reliability of service which can be obtained by replacing your older machines.

General Electric Company

General Office
Schenectady, N.Y.

Sales Offices in all large cities

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McGraw-Hill Co., Inc. March 24, 1923 Twenty Cents Per Copy

ELECTRIC RAILWAY JOURNAL

PNEUMATIC TIE TAMPERS

Enable small gangs to equal the work output of large ones

A five man gang with I-R Pneumatic Tampers will tamp more track and do a better job than sixteen men hand tamping.

INGERSOLL-RAND COMPANY
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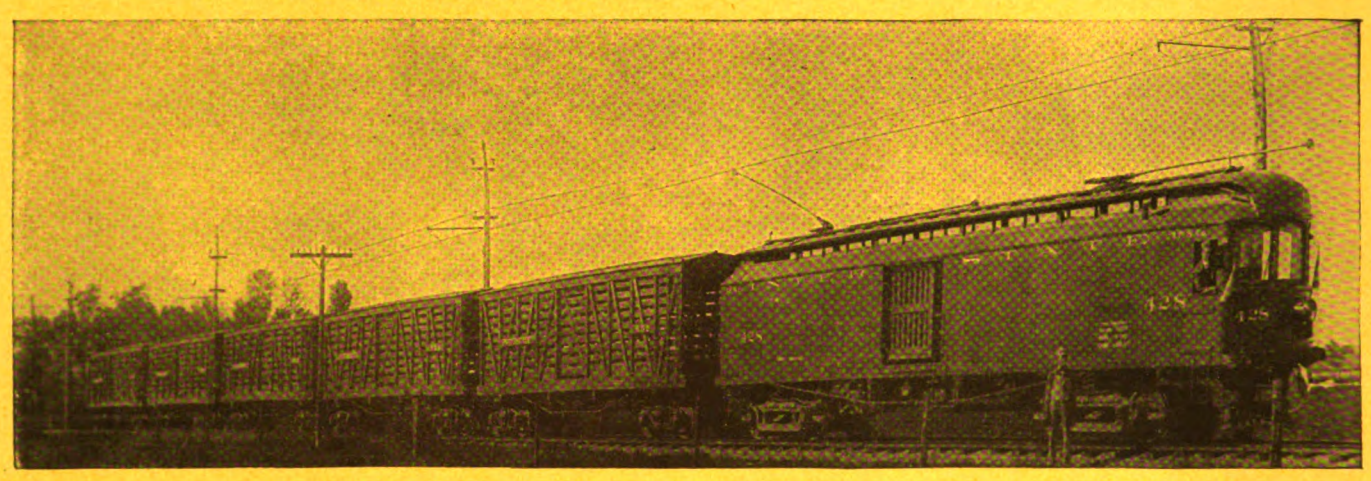
Advertising For Freight



The advertisement reproduced in the circle to the right, speaks for itself.

Why not follow the example of such roads?

They do not wait for business to come to them—

They go after it.

Baldwin-Westinghouse Electric Locomotives and Westinghouse Baggage-Car Equipments will haul your freight economically and provide dependable service.

FAST FREIGHT SERVICE
INDIANAPOLIS TO LOUISVILLE

Early Morning Delivery to Both Cities

THROUGH RATES

Louisville, Ky. and Intermediate Points
TO
All Points Reached by Electric Railways

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Terre Haute, Lafayette, Logansport, South Bend, Fort Wayne, Ind.; Dayton, Toledo, Cleveland, Ohio; Detroit, Flint, Jackson, Lansing and Grand Rapids, Mich.

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INTERSTATE PUBLIC SERVICE COMPANY

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W WESTINGHOUSE ELECTRIC

Westinghouse Electric & Manufacturing Company
East Pittsburgh, Pa.

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ELECTRIC RAILWAY JOURNAL

Consolidation of Street Railway Journal and Electric Railway Review
Published by McGraw-Hill Company, Inc.
HENRY W. BLAKE and HARRY L. BROWN, *Editors*

Volume 61 New York, Saturday, March 24, 1923 *Number* 12

"So the People May Know"

IN THE series of bulletins issued on the Detroit municipal street railway system, Walter Jackson continues to praise the practices adopted by the city's engineers. Sometimes this desire appears to have led him into statements that are difficult to sustain. For instance, when he says that "a hard-drawn copper wire is especially uncertain because only the skin of this kind of wire is hard" it hardly squares with experience. Of course it is true, as he says, that a knowledge of wire wear, had the D.U.R. left the record, would have helped to prevent breakdowns. He estimates a loss in revenue of $12,000 a month from trolley breakages, resting his argument on the statement, "Suppose that the breakage of a trolley wire has caused the loss of only 100 car-miles," and combining it with average revenues for the entire system of 40 cents per car-mile. Situations can be conceived where the wire may be broken and no car-miles lost, as a delay of a few minutes does not imply that the cars would not complete their trips. The loss of 100 car-miles, referred to as the minimum likely loss by Mr. Jackson, would mean, for instance, that each of ten cars actually failed to make a 10-mile trip. Since he states that trolley breaks averaged ten a day, there must have been 1,000 car-miles loss every day.

It is pointed out that the city is using the trainmen "efficiently, humanely and with minimum outlay for overtime and bonus rates." To illustrate this he cities the Woodward Avenue schedule, which has forty straight runs out of 114, or only 35 per cent of the total. The schedule also includes sixteen three-piece runs, or 14 per cent of the total. A street railway that today can get away with such a schedule is indeed fortunate. One prominent system comes to mind whose men demand and get 60 per cent straight runs, with three-piece runs practically barred.

His severe condemnation of the single-end car would indicate that many operators of large properties are wholly incompetent. He says quite a large school of electric railway operators "deliberately crippled the flexibility of their railways by adopting what is termed the single-end car, but which might more appropriately be called the one-armed car." This indicts the managements in a score of cities where the single-end car gives excellent service.

The climax is reached when, with a series of "supposes" as a basis, the consultant attempts to show that the average fare in Detroit is the lowest in the United States, 3.86 cents. If there is any authority back of this figure it is not given. The Department of Street Railways keeps statistics that might well be used for such a comparison so that the public might have figures based on facts. From the actual figures, the average fare per total passenger during January, 1923, is found to be 4.03 cents.

Numerous other illustrations could be cited, but these suffice to show the character of the consulting work acceptable to the municipal operators in Detroit. Of course, it is to be remembered that an election is to take place April 2 and the people must be "prepared."

A Wide Acquaintance Helps to Foster Good Will

THE electric railway executive should be well known in his community in order that the problems of his company shall receive the fair consideration they deserve from the public. There is probably no better time for him to meet the representative men of other industries than at midday lunch. Chambers of commerce, rotary clubs, athletic clubs, the public restaurant are all desirable places in which to spend the luncheon hour. Acquaintances and friendships made at these luncheons may some day prove of great benefit. On the other hand, if the officials of a railway company have a clannish spirit, lunch together by themselves, and associate very little with the general public, they are throwing away an opportunity to foster good will. The company-furnished lunch, for this reason, is not as desirable as might be thought when considering only its value as a measure to increase intra-company business efficiency.

A Word in Defense of the Unpopular Questionnaire

THIS is the season of the questionnaire. During the next few weeks electric railway department heads will be bombarded by committees with lists of questions to answer for the benefit of the industry. Each year the number grows larger, or at least it appears to do so. Some of the victims are inclined to feel that research by this method is being carried too far.

Of course the complainants realize that the questionnaires are intended for their benefit; that there is "nothing in it" for the committees which send them out. In fact the questions are framed at meetings where the attendants not only are spending their time and energy but the cost of attending which must be borne by themselves or their companies. Further, the complainants appreciate the fact that the questionnaire furnishes the most practicable means, and in many cases the only means, for securing information as to present practice. Many of the investigations aim toward standardization, which is possible only if reasonably full knowledge of the practice of the electric railways generally is available. In spite of the above facts, however, men question the usefulness of the ubiquitous data sheet.

There is no doubt that some questionnaires are not as carefully framed as they might be. In fact, some

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could be omitted altogether, the information being gathered by other means. This points to the need for very careful consideration, first as to whether any questionnaire should be sent out, and, second, as to the merit of the details of the questionnaire.

On the whole, however, the requests of the committees of the American Association and its affiliates are reasonable. If they are thought to be otherwise the way to remedy the matter is not to pigeon-hole the communications or consign them to the waste basket. This is a negative, although popular, procedure. It would be far better to answer the questionnaire and then frankly state to the committee chairman that the request is unreasonable and that the probable good to be accomplished from complying does not warrant the necessary expenditure of time and effort. Such comment would at least be positive. It should be remembered, however, that progress in the electric railway industry, as in other fields, depends upon data—facts. These can only be secured from the places where they are produced, namely, from the railway properties.

Party Whip Being Wielded in New York

GOVERNOR SMITH of New York is growing restive. He scents defeat ahead for his program of public utility bills. In consequence he is using the whip on the members of his party in the Senate, which is Democratic, while on the members of the Assembly, which is Republican, he is seeking to achieve his ends by duress. He is, of course, interested in having his program of elective home rule put through for the cities of the state not included in Greater New York, but he is particularly solicitous for the passage of the measure which would give Mayor Hylan a free hand in New York City.

As for the New York City bills they are so loosely drawn, so iniquitous in the degree of latitude that they allow Mayor Hylan, as to be laughable if they were not at the same time in intent disastrous to the city. At first newspaper sentiment seemed to be to let the New York City bill pass and to give Mayor Hylan the necessary rope with which to hang himself. More sober opinion, however, has veered around to the position that however desirable it might be to have the Mayor commit political suicide, there is a price limit beyond which the city dare not go. On his part the Mayor is still berating the interests and threatening to run for office again if the measure for New York City is defeated.

The outlook is, indeed, most alarming. If the bills pass the Mayor most certainly cannot make good. If the bills do not pass the Transit Commission's hands can be tied by the refusal of the New York City Board of Estimate to appropriate money to be spent for new construction by a commission which has survived a régime at Albany that was overwhelmingly defeated at the last election. Shrewd lawyer that he is, Governor Miller either failed to take into account the power of the Board of Estimate to block his program by refusing appropriations for new construction or else he misjudged the political situation and concluded that because the merit of his measure warranted it, he would be backed by the election in New York of a local board in sympathy with his program.

The traction companies may or may not have finally accepted in toto the plan which the present New York Transit Commission advanced for the unification of the local lines there. It may or may not have been possible to reconcile the difference of opinion which developed between the companies and the commission over the valuation figures promulgated by the commission. This much, however, is certain. The work of the present commission has been constructive. In the case of the Interborough Rapid Transit and the Manhattan Railway readjustment it achieved something of real benefit to the residents of the Greater City. As for the present measure the arguments of its proponents have not even the merit of being plausible.

Study the Sentiment of the Public You Serve

BECAUSE they felt that the street railway company was not treating them fairly, 500 residents of a Pacific Coast city recently held a mass meeting to agree upon the most effective ways and means of boycotting the local railway. A temporary organization was formed and more than 200 who attended the meeting, according to press reports, paid a $1 initiation fee to the treasurer to provide funds for attaining the desired ends. The first move was a program for canvassing every automobile owner in the district affected to pledge him to bring to and from work three men or women who otherwise would have to patronize the street railway. The secretary to the Mayor, who called the meeting to order, intimated that if jitneys appeared in competition with the railway company they would be immune from police interference.

It may be that this situation grew out of circumstances over which the railway company had no control, and perhaps no blame whatever can be attached to the officials of the company for not foreseeing the trend of public sentiment and, while there was yet time, taking steps to prevent its reaching such a high pitch. Quite apart from any discussion of the causes of such a situation, however, the effect is well worth analysis.

It is axiomatic that unless a public utility renders service that is satisfactory to the consumer and profitable to itself it is not on a sound economic basis. Antagonistic public sentiment is evidence of dissatisfaction and, moreover, profit, the other requisite of economic stability, is very likely to be lost when service is no longer satisfactory.

In the case of the electric railway, perhaps more than with any other utility, public opposition constitutes an almost insurmountable obstacle to success; or, to put it in more general terms, public sentiment takes precedence over almost any other consideration. One of the most important functions of the electric railway company executives, therefore, is the study of the trend of public sentiment in order that they may foresee wherein danger lies and take steps to appease any feeling before it crystallizes in any measure injurious to the company.

Consistency, Thou Art a Jewel

IT IS a fine thing for the electric railways to ask for co-operation from the public. They deserve it and ought to get it. But sometimes their manner of asking is not the most tactful. To cover several of the windows of a car with posters describing the company's effort to please its patrons is inconsistent. The function of windows is to admit light and let passengers see out. If the railway makes a sort of billboard of them, a good message may easily become an irritating notice.

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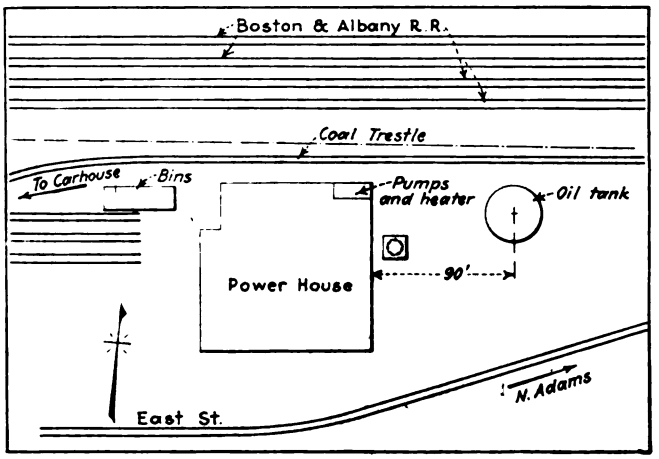
Remodeling Power Plant for Fuel Oil Use

Berkshire Street Railway, Pittsfield, Mass., Is Changing Over Six Boilers, Using the Steam Atomizing System—A 100,000-Gal. Oil Tank, Which Is Filled from Tank Cars by Gravity, Provides Ample Reserve Supply of Fuel

OWING to the cost and difficulty of securing and storing its supply of coal for the power plant at Pittsfield, the Berkshire Street Railway is making extensive changes to permit the use of fuel oil. Six Altman & Taylor water-tube boilers, rated at 380 hp. each, are being remodeled to provide for economical burning of the oil in accordance with the steam atomizing system of the Engineer Company. Flexibility and reliability of oil supply were two of the important factors in the design.

The normal supply of oil is from a 100,000-gal. steel tank, placed at a suitable distance from the plant to comply with the rules of the National Board of Fire Underwriters, which prescribes a minimum distance of 75 ft. for tanks of this capacity. Oil can, however, be pumped directly from tank cars to the plant. The company ran two boilers in this way while the tank was under construction. Oil can also be reclaimed from the tank and pumped back into tank cars, which might be desirable in case of fire or if it were necessary to help out another oil-burning plant.

The steam atomizer system of oil burning was selected on account of the small space required for the pump and heater, the low pressure (45 lb.) and temperature (120 deg. F.) of the oil at the nozzles, and the flexibility of control. The consumption in the burners of 1 per cent of the generated steam was considered reasonable in view of these virtues.



General Plan of Berkshire Street Railway Power Plant Property, Showing Location of Oil Tank, Oil Pumps and Heater, Coal Trestle, Etc.

Large Combustion Space Provided in the Boilers

In the remodeling of the boilers the first step was to remove the ash pits and move back the bridge wall to give an inside depth of combustion space of 11 ft. This bridge wall was erected on a substantial foundation of standard construction. It is 24 in. thick at the bottom, and comprises a 9-in. facing of No. 1 fire brick with a backing of No. 2 fire brick. The floor of the combustion chamber was laid up of fire brick on a cinder fill, with a 1-in. expansion space all around the lower two of the three layers of brick.

The design of the combustion space was governed, within the limitations of the existing dimensions of the boiler, by the following considerations:

First, it was desired to secure as low a velocity of the gases as possible, so as to allow ample time for combustion before they pass into the boiler proper.

Second, ample room was desired for flame travel, the idea being that the flame would about reach to the bridge wall. By thus keeping the flame well down in the furnace, long life of the tubes is secured and the lower tubes are not likely to become covered with slag.

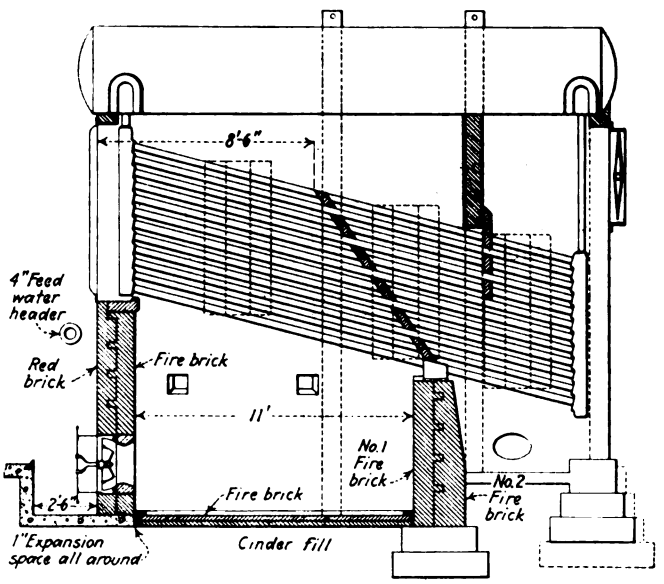
Third, a liberal volume of furnace space permits comparatively slow combustion, with corresponding low furnace temperature. There is thus less burning out of the refractories, with less danger of burning out of the tubes.

Fourth, a deep combustion space gives large exposure of the lower rows of tubes to the flame, conducing to large absorption of heat in the first pass. The area of the first pass is large, and the gas velocity low, permitting ample time for absorption of heat in the tubes.

The boilers at Pittsfield operate at about 0.06 in. of draft when giving 150 per cent of rating. They can be forced to 250 per cent. At the lower load the flue gases are estimated to have a temperature of about 480 deg. on entering the stack.

Baffling Was Given Special Attention

The arrangement of baffles is shown in the accompanying longitudinal section of the boilers and setting. The baffles are of the Turner type, consisting of corrugated tile, placed in the diagonal alleys which run from the top to the bottom of the boiler, with the pockets or resulting detached spaces between the tubes filled with fireproof plastic cement. A baffle thus constructed has a certain amount of elasticity, permitting it to accommodate itself to expansion and contraction of the boiler.



380-Hp. Boiler Setting, Arranged for Fuel Oil Burning

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In setting, the plastic material detaches itself sufficiently from the tubes so that the latter may be replaced without breaking the baffle, provided that the tube is straight and reasonably smooth.

The joint between the front baffle and the bridge wall on which it rests is made by means of a special tube block, made of fire brick. The tube blocks interlock so as to form a continuous bond between the bridge wall and the baffle proper.

As will be noted in the section, the front baffle is inclined toward the front of the boiler, so as to give a tapering cross-section in the first pass for the gases, the depth reducing from about 12 ft. to 7 ft. This provides for a reduction in area to compensate for the reduced volume of the gases as they cool.

The rear baffle hangs from behind the curtain wall, so placed as to continue the tapering of the cross-section of the gas path, the tapering, however, being omitted in the last pass. By the time the gases have reached this, the third pass, they have practically reached flue temperature.

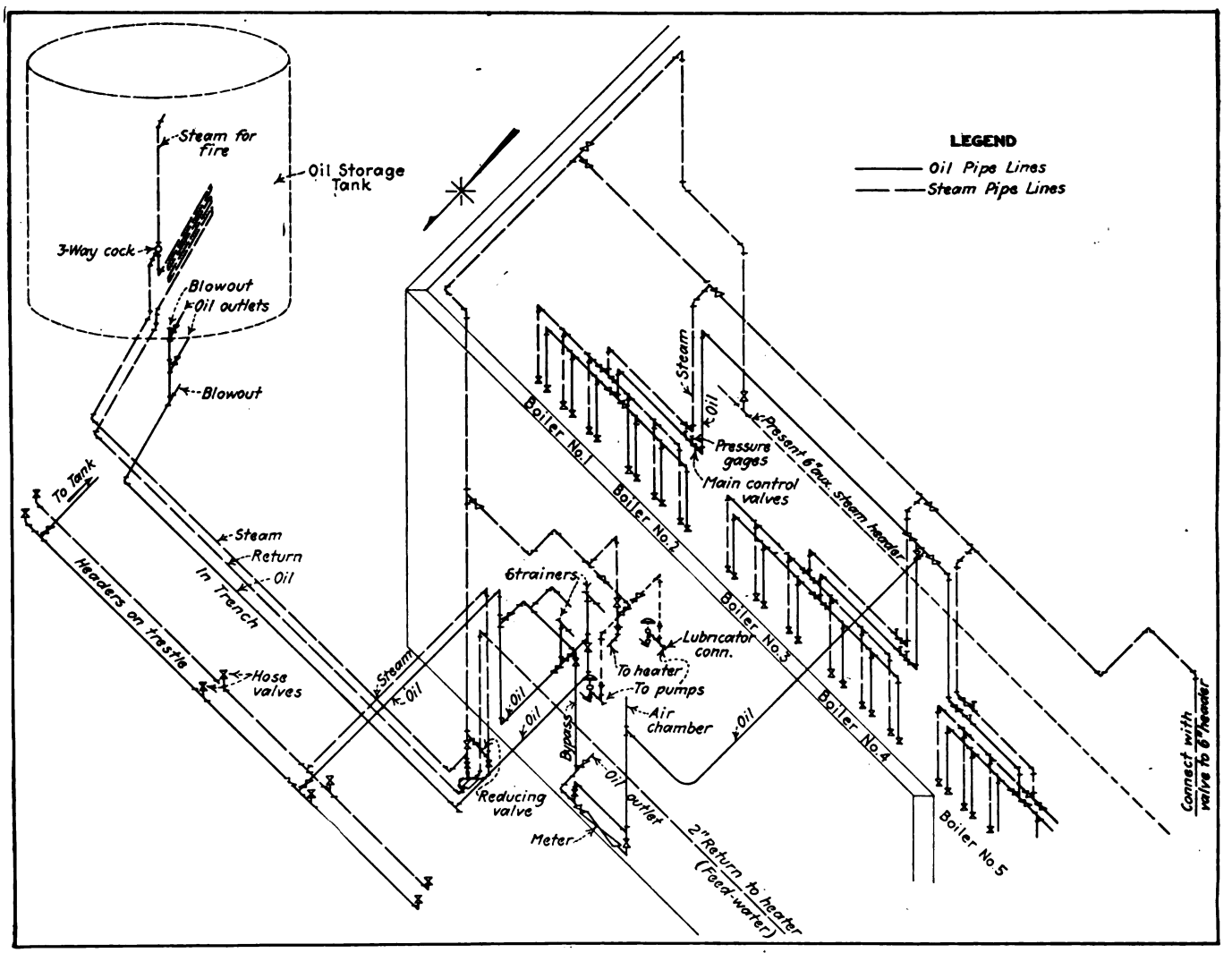
This arrangement of baffles not only serves the purposes mentioned, but also prevents the accumulation of soot. The soot which falls on the back of the front baffle, in the second pass, slides down into the soot chamber.

The second step in the reconstruction was to build, in place of the metal fronts of the boilers which had been removed, an 18-in. brick wall, the inside 9 in. of fire brick and the outside of red brick. This wall was built up from the bottom of a trench, 2 ft. deep and floored and walled with concrete, which was necessary in order to get the burners low and to permit the utilization of all of the ash-pit space for combustion purposes. Another feature, possibly the essential one, in thus placing the burners low was to insure the combustion of the oil as far as possible below the tubes.

There are three burners for each boiler, each having its own oil and steam lines. Each burner occupies a space in the front wall 28 in. square, and is set in special tile furnished by the manufacturer. The burners are of the well-known Enco C atomizer type.

The principle of this burner is shown in the accompanying cross-section. The steam enters by the passages AAA, part discharging into the mixing chamber E through the Venturi nozzle C. Oil enters through inlet B and is drawn into the jet of steam and partially atomized as it is thus forced into the mixing chamber. Just before reaching the mixing chamber, the partly atomized oil is given a rapid rotary motion by the tangential steam jets D, which receive steam from A. This whirling motion increases the atomization in the mixing chamber. The partly atomized oil is discharged through the hollow cone spray outlet G, in the nozzle F, and is completely atomized by the sudden expansion of the steam.

The burner fits in the middle of an air register, which consists of a large annular opening surrounding



Isometric Drawing of Steam and Oil Piping in Berkshire Street Railway Power Plant

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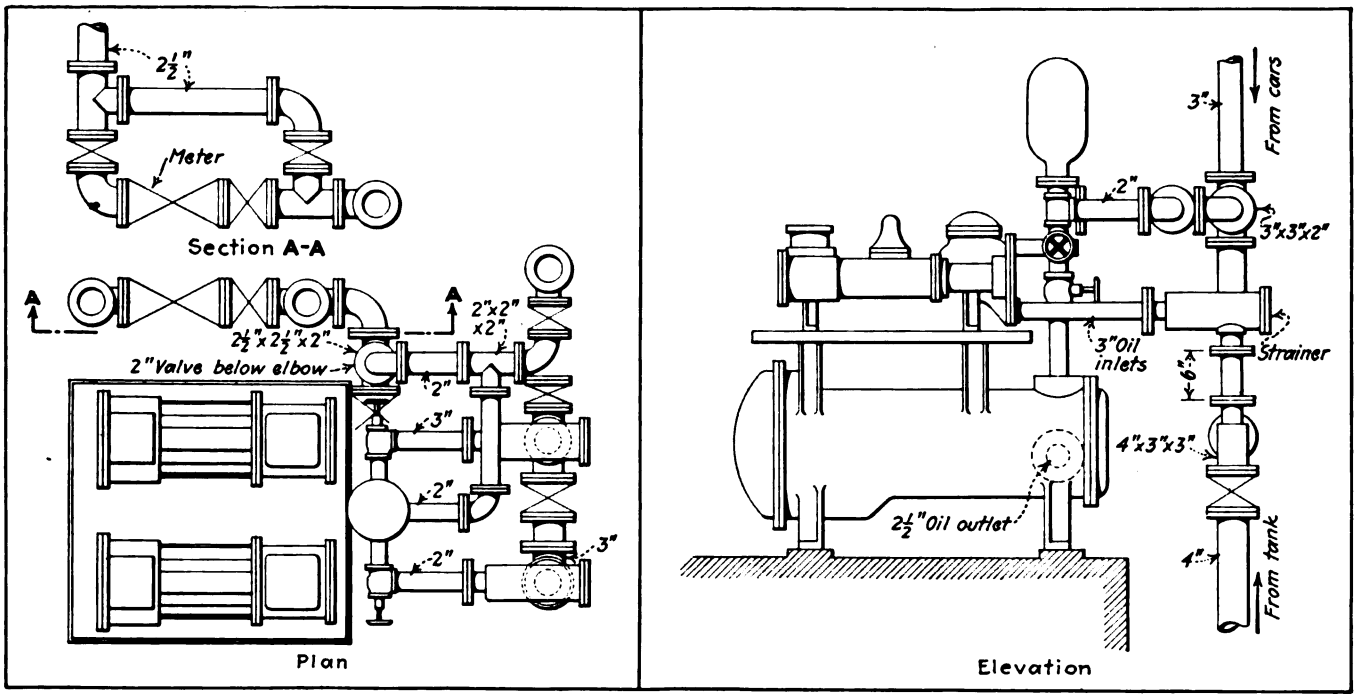
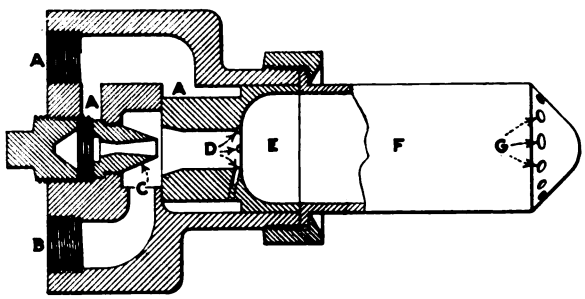


Plan and Elevation to Show Oil Piping and Oil Pumps and Oil Heater

the burner and equipped with vanes set up at an angle so as to give the air a rotary motion. Inside this is a secondary, adjustable central register, which gives the oil spray enough air to establish quick action.

Over the central burner on each boiler is installed an observation door of the "CEZ" type, to permit ready inspection of the interior of the combustion space. Each boiler is also provided with an Ellyson inclosed draft gage, placed on the front wall.



Longitudinal Section of Oil Burner

Other minor changes in the boiler setting were made, the principal one being the necessary moving of the manhole nearer to the rear, to permit the removal of soot from the soot chamber.

THE OIL AND STEAM PIPING

A 4-in. oil pipe leads underground from the storage tank, from which oil can be taken off at two levels, one 8 in. and the other 4 ft. 8 in. above the bottom. Before reaching the pumps the oil passes through strainers, of which there is one to each of the two pumps, flowing thence through one or other or both of the pumps to the single heater where its temperature is raised by means of live steam.

In the oil circuit is included a meter through which the oil can be passed if desired or the oil may be fed direct to the boiler line through a 2½-in. pipe.

The accompanying isometric drawing of the entire piping system shows the layout with conventional representation of valves, fitting flanges, etc. A detail of the piping at the pumps and heater is reproduced also in order to render the outline drawing more intelligible.

Steam for operating the pumps and heaters, and for heating the oil in the tank and tank cars, is drawn from the boiler steam line through a 3-in. pipe and is distributed as shown in the isometric drawing.

The pumping and heating equipment used in this plant is the Engineer Company's type B. The general arrangement of this set is shown by the plan and elevations reproduced. It comprises two duplex pumps, these being used rather than single piston pumps in order to insure a steady pressure of the oil. The pumps are mounted on a table carried on top of the heater, which rests upon the foundation. The drawings show, diagrammatically, the valves and the meter referred to.

In an oil-burning plant of this kind it is necessary to provide for the shutting off of the oil supply to the burners in case of blowout, fracture, leaking joints or any contingency arising to the oil discharge piping from the pumps. For this purpose in the Pittsfield plant a Foster special automatic stop and check pump governor, of the type made by the Foster Engineering Company, was placed in the main steam line to the pumps with a small line connecting it to the oil discharge lines. In the event of an accident, a sudden or abrupt drop in the oil discharge pressure would automatically cut off the steam supply to the pumps, shutting off the supply of oil to the burners.

In operation one man will regulate the oil, steam and air supply for the entire six boilers which are being equipped for oil burning. These boilers are arranged in three batteries of two each, all in one row. The boiler man will also attend to the pumps and heater which are placed in one corner of the boiler room, the corner nearest to the oil storage tank.

The 100,000-gal. storage tank is of standard construction, 33 ft. in diameter, 16 ft. high at the circumference, and 17 ft. 9 in. high at the center of the roof.

There are four courses of steel plates in the shell, successively, ⅜, 5/16, ¼ and ¼ in. thick from the bottom up. The roof is of No. 10 U. S. gage steel plates, supported on 6-in., 8-lb. channel rafters. The 6-in. pipe column supports the rafters at the center, the load being dis-

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tributed through a crown plate of ⅜ in. steel 3 ft. 6 in. in diameter. The center column rests on a ½-in. steel plate 30 x 30 in. in size, and the bottom or floor of the tank is of ⅜ in. crown plate with ¼-in. "sketch plate." On one side of the tank is partitioned off a heating chamber in which a portion of the oil is warmed by means of a radiator of 1¼-in. pipe. This is fed with steam from the boiler house through a 2½-in. line and the drip is returned in a 2-in. line. From the radiator steam line a 2-in. pipe branches off near the entrance to the tank steam coil and leads into the top of the tank for use in case of fire.

A siding from the Boston & Albany Railroad is located near the power plant. This leads onto a trestle formerly used for unloading coal cars. The trestle is 17 ft. high, so that the tank cars on this trestle can discharge oil into the storage tank by gravity. A 3-in. oil line is mounted on the trestle, which is long enough for four tank cars, although only three are actually discharged at one time. From this line a 4-in. pipe leads to the roof of the tank. The oil line on the trestle is also connected with the pumping plant through a 3-in. line, so that, as mentioned earlier, oil can be drawn direct from the tank cars and pumped to the boilers. Along the trestle is also a steam line, fed through a 2-in. pipe with live steam, to provide a means for heating the oil in the tank cars.

The engineering and construction work on this job were done by Henry R. Kent & Company, engineers, under the general supervision of P. W. Ripple, the chief engineer of power and equipment of the railway company.

Further Accomplishments of Detroit Municipal System Described

Three More of Consultant's Series of Leaflets, Which Deal with Equipment, Overhead and Transportation—How Practices of the Detroit United Railway Have Been Changed Under Municipal Operation

THREE more bulletins prepared by Walter Jackson, consultant, planned for enlightening the general public of Detroit are available. They are four-page leaflets similar to the first one, on track, abstracted in the ELECTRIC RAILWAY JOURNAL for March 3, 1923, page 371.

The second bulletin deals with the equipment taken over from the Detroit United Railway by the city. It opens with a statement that when the Department of Street Railways took over the property on May 15, 1922, pull-ins were at first more than thirty a day. A table shows the reduction from 1,857 pull-ins during last June to 916 in December. The report goes on to say: "From the foregoing figures it will be seen that in the first month of city operation it was necessary to deal with a crippled car for practically every 2,000 car-miles operated. Since the average car in Detroit makes, say, 90 miles a day, this is equivalent to the breakdown of every twenty-second car run! The importance of preventing a run-in may be gaged from the fact that a car making 90 miles a day and averaging eight revenue passengers per car-mile is serving 720 patrons who pay $36. Hundreds of car-days and the revenue corresponding thereto were lost, therefore, through sheer deterioration of equipment."

A statement of the causes of breakdowns on one route follows. Mr. Jackson continues: "While no detail records were left with the Department of Street Railways by the predecessor company, it is declared that during the first two weeks of January, 1922, the Detroit United Railway suffered an average of 195 crippled cars in a day in the shops, whereas the same, harder-weather period of 1923 shows an average of seventy-five cars a day."

MAINTENANCE COSTS COMPARED

A comparison is given of the cost of maintenance, it being stated that for June, 1922, the Connecticut Company averaged 4.28 cents per car-mile for upkeep, while for the years 1919-1921 the Detroit United Railway averaged 5.23 to 4.96 cents per car-mile. A figure by H. L. Andrews of the General Electric Company apparently for the year 1921 is given as 4.2 cents for the average of 103 city lines. In contrast with this it is stated that the Department of Street Railways in May and June averaged 3.2 cents, while by November the cost of car maintenance had fallen to 2.2 to 2.3 cents per car-mile. Mr. Jackson goes on to state: "Broadly speaking, it is generally recognized that under existing wage conditions and material costs the maintenance cost of the larger and older types of cars throughout the United States will vary between 4 and 5 cents, and that the newer large cars may be expected to cost between 2.5 and 3 cents per car-mile during their first five years at least. The performance of the Department of Street Railways is far better than these averages. The engineers' memorandum of Jan. 22, 1923, segregating the upkeep costs of cars according to old, new and one-man, as requested by your consultant, shows that the D. U. R. cars are being maintained for 2.32 cents per car-mile, while the Peter Witt cars are being maintained for only 1.46 cents per car-mile.

"The one disappointing showing is that of the one-man cars, which are costing 1.73 cents per car-mile. This compares with 1.6 cents per car-mile for forty-six months and 9,707,707 miles safety car operation by the Terre Haute, Indianapolis & Eastern Traction Company for the period Jan. 1, 1919-Oct. 31, 1922. It is true that the wages paid by the Terre Haute company were lower, but on the other hand materials must have been higher during the greater part of this period. The Detroit safeties are run chiefly in the outer or less congested territory and so need be no more subject to accident than Terre Haute cars operating in every part of that city. The Detroit cost is not high compared to other safety car operators, but it is high compared to the department's own records with the other cars, for if allowance be made for the smaller capacity of the one-man cars their maintenance on a seat basis would practically be double the figure of 1.73 cents."

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The statement is made that the most creditable point is that the low maintenance costs have been obtained with a high wage scale, in proof of which rates paid by the Connecticut Company are shown in contrast, as follows:

Connecticut Company		Department of Street Railways Average hourly pay of:	
Car cleaners	$0.30	Car cleaners	$0.50
Car sweepers	.345	Car sweepers	.50
Truck and motor repair	.49	Chopmen	.648
Equipment inspection	.50	Shopmen	.648
Carpenters	.52		
Machinists	.55		
Blacksmiths	.575		
Foreman's weekly wage	45.85		

Reasons for Lower Upkeep Costs

The report then goes into detail to show how the reduction in maintenance costs has been obtained. Grease cup lubrication of trolley wheels has been replaced by graphite bushings. Babbitt-lined cast-iron axle bearings have given way to solid brass bearings. Motor coils now are dipped and baked in an improved electric oven. Push-button signals are changed over from dry battery operation to the line buzzer system. Cars are being rewired for center lighting. Considerable space is given to a discussion of the merits of steel car wheels, the Department of Street Railways having adopted them in place of the cast-iron wheels formerly used.

Miscellaneous features of the shops are commended, and several details of the new car equipment are recommended for use on the older cars, such as air-operated snow scrapers, automatic brake slack adjusters and interlocking door contacts. Mr. Jackson states: "On the basis of reports from the claims division covering the period May 15-Oct. 30, 1922, the superintendent figures that the average cost of step accidents is $65 per car per annum. At a cost of $200 per car for line switches and door contacts, he figures that this expense can be cut to $10 per annum, a saving of $55, which would pay for itself in less than four years on accident costs alone, without making allowance for reduction of car-mile losses and for good will. Owing to the age of so much D. U. R. equipment he proposes to apply this safety apparatus to but 604 out of 916 D. U. R. cars. The installation of these appliances would be good business."

The storage air brake system used on the Detroit United Railway cars is severely criticised. Mr. Jackson says the D. U. R. is the one city user of storage air brakes in the United States. A check made by the department developed that "a $400 individual compressor outfit at 6 per cent interest would cost only $24 a year investment charge, compared with $66 a year attendance for the storage system, saving possibly $42 per year per car."

Regarding cars Mr. Jackson's comment is: "While the company had no modern single-truck cars, it did have 173 single-truckers, of which fifty date from 1912 and twenty-five from 1913; the rest are older. The motors on most of the younger cars are of modern type, but the cars weigh 28,750 lb. for the twenty-five twenty-eight-seat single-truckers of 1913, or 1,026 lb. per seat, and 27,700 lb. for the fifty twenty-eight-seat group of 1912, or 990 lb. per seat. On the other hand, the Municipal single-truck cars seat thirty-two and range in weight from 16,000 to 18,000 lb., or between 500 lb. and 563 lb. per seat. In brief, twice as much current is required per seated passenger in the case of the older cars." It is recommended that all of this group be retired.

It is stated that 696 double-truck passenger cars were taken over. Out of a group of 193 cars built prior to 1910 the municipal railway engineer found that nearly 100 were so badly rotted as to call for retirement. He suggested that 100 cars of this group be fitted with new trucks, air compressors, etc., at a cost of $170,000. In general, these cars average around 1,000 lb. per seat and seat forty to forty-two passengers, contrasted with the department's cars, which weigh 718 lb. per seat and seat fifty-two passengers.

The next group of 227 cars dates from 1909 onward. "Except for fifty forty-three-seat cars, weighing 37,800 lb. each, this group runs even heavier per seat than the earlier cars, namely, up to 47,100 lb. for forty-two-seaters, and with only forty-three cars running less than 1,000 lb. per seat. On the whole, these cars are not especially attractive, but as much of the equipment is fairly modern, the engineers' suggestion of spending $700 each on these two-motor cars—a total of $158,900—for compressors, safety appliances, etc., is well taken."

Mr. Jackson states that the department engineer has also recommended an outlay of $193,900 for the 280 four-motor trailer-hauling cars built in 1915 and later. These cars seat forty-six passengers and weigh 46,400 lb. or 47,100 lb. The figure given by the engineer is approximately $700 per car and will permit a more efficient use of this equipment for another ten years.

According to Mr. Jackson, "the estimates quoted total $522,800 for 607 cars, and they appear justified in view of the need for maximum car capacity with minimum outlay of new capital."

A total of 219 trailers were taken over. All seat fifty-six passengers and their weight per passenger does not exceed 500 lb. The bulletin states: "It is unfortunate that the department will be compelled to use fifty more of the same trailers, despite the unsatisfactory arch-bar truck, but this could not be avoided as the material had already been assembled and prepared before the system was taken over. However, these later trailers will at least be fitted with headlining, line-voltage buzzers, better lighting, and so forth."

In concluding, Mr. Jackson recommends that several features that promote car riding, mentioned above, should be used, such as interlocking doors, low steps, steel wheels, individual air compressors, line-voltage buzzers, better lighting, headlining and brighter interiors generally, tail-end safety lights, legible route signs and electric heaters.

A significant paragraph in the summary of the report is, "No electric railway can be expected to purchase new cars out of earnings. Additional facilities imply new capital. It is entirely up to Detroit's citizens whether they will travel in cars that are efficient, safe and attractive or be carried in vehicles that are out of place in a genuine metropolis."

Overhead Practices

Bulletin No. 3 deals with the overhead division. Mr. Jackson makes statements indorsing the work of the Municipal Street Railway engineers, which are covered in the summary of the report following:

The overhead trolley wire as taken over was so badly worn that trolley wheels could not stay on the wire or give even, long-life wear. At first the line division had to deal with the unheard of average of ten wire breakages a day. the total for the period May 15-Dec. 31, 1922, running to the staggering sum of 1,400. The worst feature of this dangerous deterioration of the current-carrying wire was the delays caused to hundreds of thousands of car patrons and

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the loss of many thousands of dollars in revenue that would otherwise have been attracted.

It may have been excusable to stop spending money for new wire during the period of purchase negotiations, but it was inexcusable to leave no records of wear, since these records would have enabled the line division to replace most of the over-worn wire before instead of after breakage.

Perhaps the most glaring defect of the Detroit United line practice was that it had almost no long-life trolley wire in use at busy, hard-service locations, although such wire is common practice almost everywhere. On the other hand, the Detroit United seems to have enjoyed the doubtful honor of having more steel trolley wire—40 miles—than any other large electric railway system in America.

The Department of Street Railways has adopted alloy wire at least for curves and other special work, but it has a long way to go before it will be anywhere near the best practice. Such heavy lines as Woodward and Jefferson with all-day train service should be in alloy wire from end to end, so that the period between replacements can be doubled and possibly tripled.

In the other features of its line construction the Department of Street Railways has not only advanced over Detroit United practice but can show its heels to nearly all other electric railways. For example, preservative treatments that will protect wooden poles against rot and steel poles against corrosion have been adopted throughout in spite of the temptation to make a showing of seeming economy in first cost. The line division also used the specifications of the American Electric Railway Engineering Association wherever they were good enough, but for some items like cables, where safety was first, and for railroad crossings, where wire repair is doubly troublesome, higher standards were applied.

The Department of Street Railways seems to have been the first railway in America to dig pole holes by machine, and now that there is little construction, it has been business-like enough to sell one machine and rent the other, instead of having them rust in idleness.

Transportation Practices

Mr. Jackson's fourth bulletin deals with the transportation division of the Municipal Railway. After speaking of the lowered morale under the D. U. R. management, Mr. Jackson states that the car men now appreciate that their relationship to the community is on a better and higher plane than before. With regard to the increase in wages, he states: "It is hardly necessary to go into a detailed comparison of the preceding and present scales. This comparison would bring out the net result that in September, 1922, under the old scale, there were operated 733,053 car-hours for $436,430, which yields an average pay of 59 cents an hour, while in December the payroll for 795,198 car-hours was $499,338, or 62.8 cents per hour, an increase of about 6.4 per cent."

Regarding the wage scale, Mr. Jackson states: "The main features of the payroll change were the abandonment of the 55-58-60 cent scale for men working three, six and nine months, respectively, in favor of a per diem plan granting $4.50 for eight hours during the first three months, $4.75 for the next nine months, and $5 thereafter. To these daily wages a bonus of 40 cents, or five cents an hour, is added for safety car operation. The overtime pay has been simplified by adding enough to make a flat 75 cents an hour regardless of the eight-hour rate instead of figuring one and one-quarter time for weekdays and one and one-half time for Sundays. Operators on 'owl' safeties get 80 cents; on other 'owls,' 75 cents."

Mr. Jackson states that the conditions for recruits have been greatly improved, as a man now receives $2 a day as soon as assigned to a breaking in on a specific line, and $80 a month minimum instead of $9.25 a week minimum when assigned to the extra list.

With regard to schedules, Mr. Jackson states that an examination of the schedule used by the Department of Street Railways showed that advantage has been taken of the best thought of the industry, although the D. U. R. had already adopted a practice that its successor could retain. He says that no exact figures are available to make a comparison between the Municipal Railway schedule and the Detroit United schedule. As an example, Mr. Jackson cites the present schedule on Woodward Avenue as effective on weekdays, commencing Jan. 24, 1923. On this line trains run through the entire operating day (forty-six-seat motor and fifty-six-seat trailer), but the fluctuations of service call for a variation in headways from four minutes in the off hours to one minute in the rush. The exact schedule as analyzed by Mr. Jackson is as follows: "To meet these variations, we find that out of 114 runs, only the men on forty runs had what is termed a 'straight run,' namely, one that is uninterrupted over a platform-duty period ranging from eight hours to nine hours and twenty-two minutes. On the other hand, only sixteen runs were of the unpleasant three-piece variety, which means that the platform man had two breaks in his working day, as in Run No. 160, where the schedule called for the following:

On 7:53 a.m.—off 9:23 a.m.
On 12:40 p.m.—off 2:10 p.m.
On 2:26 p.m.—off 7:28 p.m.

"This crew spent only eight hours and eighteen minutes on duty, but this was sufficient to make use of them in both the morning and evening office peaks. The elapsed time, namely, 7:53 a.m. to 7:28 p.m., is eleven hours and thirty-five minutes. Crews are paid only for actual time on the platform plus ten minutes for make-ready and reporting time, this allowance being the same whether the runs are straight, two-piece or three-piece. Only one or two runs on the schedule show more than thirteen hours elapsed time. On the other hand, only four runs (extras) show less than eight hours, and it is even possible that they made up a full day's work elsewhere. All of this indicates that the labor power available is being used efficiently, humanely and with minimum outlay for overtime and bonus rates."

Mr. Jackson states that the practice of allowing a week's vacation with pay, which previously was confined to supervisory officials like inspectors, has been extended by the Department of Street Railways to the platform men as well. He thinks this should be highly popular with the men, and also states that vacations with pay are common practice on the municipal tramways of Great Britain.

Regarding discipline, it is stated that no man may be discharged until found guilty by a trial board, the chairman of which is the general manager or assistant general manager, the other members being any two department heads designated by the chairman, and either the superintendent of transportation or the assistant superintendent of transportation. The testimony is prepared by the chief of the intelligence bureau, due notice being given by letter to the defendant. Should he waive appearance he is asked to present his resignation. Full publicity is given to the results of the trial board hearings by means of carhouse bulletins. Thus the men learn the punishment meted out.

Mr. Jackson states that the rate of turnover is generally a pretty fair indication of the satisfaction of the men. "The turnover has been only 3 or 4 per cent a month as shown by the following data:

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ON AND OFF RECORD OF EMPLOYEES IN TRANSPORTATION DEPARTMENT

Year 1922	December	November	October
Total employed	3,255	3,218	3,167
Resigned	120	108	105
Qualified for service	319	184	102

"The increase in the number of men qualified for service indicates the efforts being made to fulfill traffic requirements, although cars as well as men are essential for that purpose."

It is stated that an undue number of accidents has occurred with the new or faster accelerating equipment. Mr. Jackson says that it is not uncommon during the first year of such operation to have an exceptional number of accidents, because the car operators are overconfident in the braking ability of the rolling stock. In this connection Mr. Jackson says: "Likely enough, the manufacturers will be glad to send some one without cost to the department. Communications on the subject might be made to Carl H. Beck, manager New York office Westinghouse Traction Brake Company, and to H. L. Andrews and J. C. Thirlwall, railway department General Electric Company, Schenectady, N. Y. These three gentlemen have had exceptional experience with safety car operation and can give valuable aid."

Another reason for the undue number of accidents with safety cars is stated to be that they are operated on lines for which they were not intended. This has been done because the outlying lines which were planned by the Municipal Railway for safety car operation have not all been constructed, so that the safety cars are being used on congested lines for much heavier service. It is said a power-saving campaign would also help in cutting down accidents, because the motorman who saves power is the motorman who has his car under best control.

Considerable space is taken in criticism of the use of the single-end cars on the Detroit United. Mr. Jackson states: "One would suppose that street cars suffered disability enough in being obliged to stick to a rail, but quite a large school of electric railway operators did not think so because they deliberately crippled the flexibility of their railways by adopting what is termed the 'single-end car,' but which might more appropriately be called the 'one-armed car.' The chief excuse was simply to save a few hundred dollars per car in first cost by omitting one controller, one engineer's valve, one circuit breaker, etc. Most of this saving was offset by the price of the lots necessary for loops on which to turn these one-armed cars quickly. It is possible to turn such cars on a 'Y,' but this calls for a piece of track up a side street and necessitates the blocking of traffic. The one-armed car obsession was strongest in the central states, and the Detroit United was one of the victims."

After giving specific instances of where turn-back facilities are not provided for the single-end cars within reasonable distances, Mr. Jackson states that he recommends the installation of crossovers wherever necessary and the exclusive use of double-end cars.

Mr. Jackson states that the Department of Street Railways is making an effort to get more work out of the cars by using them for initial or final runs on other than their regular routes. A car assigned to some specific route may make a trip before its regular run in the morning or after its regular run in the evening on some other route, in this way turning quite a lot of deadhead mileage into revenue mileage. He goes on to give specific examples of where this is being done.

As a result of this practice the transportation department is not in possession of accurate records as to car mileage. Mr. Jackson states: "Because of these and other changes in routing, the transportation division does not try to base its mileage records on reports from conductors' trip sheets. The mileage is figured directly from the schedules, subject to such addition or subtraction as determined from reports of the traffic inspectors to station masters. On more stabilized railways, it is possible to get a fairly accurate check from the conductors' trip sheets, especially if a system of symbols is used to distinguish standard turn-backs from regular full-length runs. This does not seem practicable at the moment on the Detroit lines."

Mr. Jackson suggests that it may be possible to improve car-loading conditions by the installation of loading platforms at various points, such as the Ford plant in Highland Park and the new plant at River Rouge. The intersection of Milwaukee Avenue and Chene Street is considered possibly the worst loading point, because least controlled. Prepayment areas and shelters are recommended for Cadillac Square. Mr. Jackson says: "It may be mentioned here that in European cities neat, glazed shelters for the street railway passenger are no novelty. A number have also been built in the United States. They are an excellent advertisement for the service and sometimes may be a source of revenue through news-stand concessions."

According to Mr. Jackson a standard feature of an up-to-date transportation department is a traffic-checking bureau. "Such a bureau keeps in constant touch with the larger employers of labor to learn of the number of people employed and their on and off periods; makes periodical surveys of different lines to see whether too much or too little service is being given, and also takes note of any obstructions to the quickest handling of passengers, whether these be hindrances along the line or in the loading arrangements at terminals or on the cars themselves."

It is stated that in Detroit there are now five men in the schedule department employed as traffic checkers, but who at present are not giving their time to this work. Outside of this staff the transportation division must depend almost solely upon the free lance operations of the supervisor of traffic, who is assisted partly by the assistant superintendent of transportation.

Mr. Jackson says that the traffic bureau has not yet assumed the importance it deserves on a system that is growing so tremendously. He says: "The force is too small even if it could be constantly employed in traffic check operations, which is not the case as we have seen. The work ought to be carried to at least the point where the superintendent of transportation will have before him seat-use graphs of different hours of the day on various lines. These graphs with their evidence of tremendous changes in volume of traffic during short periods may prove of more educational value than heaps of figures, both to the railway management and the railway customers."

Mr. Jackson says that the cars should be designed for either the pay-as-you-enter or pay-as-you-leave system of fare collection. He states specifically: "Any one can see the wonderful advantage of the present pay-leave cars where heavy loading is concerned. However, it is also true that Detroit has such a medley of loading and discharging areas that the car which loads fastest would not also be the car which discharged fastest when reaching some heavy crosstown point

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where half or more of the passengers wished to transfer. This is not so noticeable in comparing the Peter Witt car with the Detroit United kinds, but it would be more apparent if the Peter Witt had to bear comparison with a double-end car having ample flexibility to meet either pay-leave or pay-enter conditions. It is because of the importance of crosstown traffic in Detroit that thought should be given to a modification of the Peter Witt car that will permit both prepayment and postpayment at will according to the character of operation. The same flexibility should apply to all future train units excepting the trailers in hand."

Mr. Jackson says that Detroit has practically the lowest fare in the country, the rate being five cents cash and 1 cent for the initial transfer. To quote him:

This 5-cent fare is a wonderful help in handling traffic contrasted with what happens with the 7-cent, 8-cent and 9-cent fares in other large cities. The chief element of delay is introduced, first, by the necessity for a transfer by one-third of the cash riders; second, by the stopping to pay for said transfer. The cash rider has the exact fare to a considerable extent and need only drop his nickel in the box and pass in or out as the case may be. The transfer user must stop for a cash-in-hand transaction, often involving change-making because of the penny.

The department has liberalized the use of the transfer compared with the D. U. R. scale just preceding under which the free transfer on a transfer was limited to portions of the Grand Belt and Crosstown lines. What, now, is the true fare? Under the popular way used to figure average fares, namely, on the basis of fare per car, Detroit could claim a fare of 3.86 cents! Here's why:

"Out of 100 passengers counted as individuals—

Suppose sixty-seven pay 5 cents each, or	$3.35 for 67 single-car rides
Suppose twenty-eight pay 6 cents each, but are counted twice because they ride on two different cars, giving	$1.68 for 56 single-car rides
Suppose five pay 6 cents each, but are counted thrice because they ride on three different cars, giving	$0.30 for 15 single-car rides
Or	$5.33 for 138 rides = 3.86 cents a ride

The true average fare is as the rider sees it. In that case, we figure 67 per cent at 5 cents and 33 at 6 cents, making the average fare 5.33 cents. This is the lowest universal-transfer fare in the United States for the area covered with the possible exception of Cleveland under a similar scale.

Mr. Jackson says that like most properties in the central states, the Detroit lines have a majority of locked boxes for fares—a heritage from the days when cut-rate paper tickets were used. He says that no attempt is made to secure a check of box contents by means of overhead registers, although such registers were installed on all safety cars. However, he says that the use of a register for double-checking is of questionable value on a busy line where it is practically impossible for the conductor or operator to comply with the old-time rule that each fare must be rung up as collected. "Because of the non-use of registers all but a few multi-fare cars are entirely free from the annoying tintinnabulation of the fare register. It is to be hoped that the equally obsolete cord and bell signals will also be replaced by automatic door signal lights in the near future. Noise on a street car need no longer be taken as a matter of course."

The remainder of the bulletin is taken up with the subject of the weekly pass, as applied to Detroit. Mr. Jackson goes into the matter in some detail. This form of pass has been described in various issues of the ELECTRIC RAILWAY JOURNAL. He gives no figures for the recommended charge for the pass, but states: "The whole subject of the pass has so many aspects that it deserves a special detailed inquiry so that the department would have full light before deciding to try or reject this plan."

The Readers' Forum

Can Theft of Electric Light Bulbs Be Prevented?

Blankburgh, March 13, 1923.

To the Editors:

We are constantly annoyed by the loss of electric light bulbs from our cars. At night we have to keep a large number of the cars in open storage yards which are readily accessible to the public. Apparently some persons are making a practice of entering the cars under cover of darkness and stealing quantities of lamps. The car cleaners and others working around the yard at night have been instructed to watch for these thieves, but have been unable to prevent the stealing.

At one time it was our custom to have the name of the company etched in the glass of the bulbs. We thought that this might act as a deterrent to those who contemplated stealing them, but apparently it did not, for they were taken just the same. It has been suggested to us that we use a device to lock the bulb into the socket, but that scheme seems to present some difficulties. It has been further suggested that we use a socket of different size from the ordinary commercial socket, but it would be a very expensive thing to change the size of the fixtures in all of our cars.

At present we are put to no little inconvenience and expense to replace the lights that are stolen. I would be glad to hear what others are doing to prevent the theft of electric light bulbs. Has any one discovered a satisfactory solution of this problem? "EXECUTIVE."

Traffic Congestion in Newark

STATE OF NEW JERSEY
BOARD OF PUBLIC UTILITY COMMISSIONERS

NEWARK, March 6, 1923.

To the Editors:

The article entitled "Traffic Congestion Worries Newark" and more particularly your editorial entitled "Street Congestion Aiding Solution of Newark's Traffic Problem," in the issue of the JOURNAL for March 3, 1923, were read by the undersigned with much interest.

Reference to your files will disclose that your issue of Feb. 26, 1921, contained an article entitled "Commission Studies Newark Traffic." This was a rather lengthy abstract of a report by inspectors of the Board of Public Utility Commissioners, State of New Jersey, on street car and vehicular congestion in the center of Newark, and dated Nov. 19, 1920. This report contained several plates and maps showing the car flow during rush hours on all streets traversed by street railways in the congested section of the city. Several of these plates were reproduced with the published article. This report was drawn up following a detailed study of traffic conditions in the center of the city of Newark, particularly regarding street car traffic, and demonstrated through the medium of detailed data that the congestion of cars and vehicles on Broad and Market Streets was even then a serious matter. The utilization of other streets for routing street cars and vehicles was suggested and emphasized in the report as being necessary in order to relieve the existing congestion of traffic of every character in the main business section of the city.

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During the two years and more which have elapsed since this investigation was made there has been a steady increase in traffic, particularly vehicular traffic.

While the routing of motor buses and possibly some other vehicles on streets other than Broad and Market Streets would undoubtedly reduce the existing general traffic congestion on these thoroughfares, greatly reduced street car congestion on these streets, with its resultant delays, can never be obtained until certain rerouting of street cars, necessitating also the construction of certain track connections, has been accomplished. None of the suggestions contained in the report hereinbefore referred to have been adopted to date.

H. C. EDDY, Street Railway Engineer.

Economical Elevated Railway Construction in Brooklyn

BROOKLYN RAPID TRANSIT SYSTEM

BROOKLYN, N. Y., March 20, 1923.

To the Editors:

In the issue of the ELECTRIC RAILWAY JOURNAL for Jan. 6, 1923, page 3, was an editorial in which cost data were quoted to show that two-track or three-track elevated structure costs about $1,000,000 per mile.

Engineers familiar with the construction have recently been making some compilations of costs on the Jamaica Avenue extension, in Brooklyn, completed in 1919, and the Liberty Avenue extension, completed in 1916. It appears that these extensions were built at a cost of less than $1,000,000 per mile. Following are partial costs of this work:

SUMMARY OF COST DATA ON ELEVATED RAILWAY TRACK STRUCTURES

Jamaica Avenue Extension	
Three-track structure with two tracks built.	
Cost per foot of structure (without stations)	$75.79
Cost of structure per foot of single track (without stations)	35.16
Average cost per station (twelve stations)	53,474.00
Cost per mile of structure, without stations	403,000.00
Cost per mile of structure, including stations	545,000.00
Liberty Avenue Extension	
Three-track structure with three tracks built:	
Cost per foot of structure without stations	$80.95
Cost per foot of single track without stations	27.52
Average cost per station, (six stations)	62,356.00
Cost per mile of structure, no stations	427,500.00
Cost per mile of structure, including stations	603,700.00

The length of the Jamaica Avenue extension was 4.5 miles and that of the Liberty Avenue extension, 2.1 miles.

Following are the data in more detail: The Jamaica Avenue extension consists of two tracks generally, with foundations, columns and transverse girders designed for three tracks. The exact length of structure is 23,913 ft., and that of single track, 51,532 ft. The costs per lineal foot of structure and of track were:

	Cost Per Lineal Foot Structure	Cost Per Lineal Foot Single Track
For foundation, steel structure and shifting wires, clearing other public service lines	$56.69	$26.28
For track—special trackwork, footwalks, railings, signal towers and interlocking third rail, remote control, structure and track bonding	19.10	8.88
Grand totals	$75.79	$35.16

These costs do not include land damage, engineering, interest, legal expense, or storeroom expense.

The Liberty Avenue extension comprises 11,040 lin.ft. of structure and 32,450 lin.ft. of single track, and consists of three tracks throughout. The detail costs were:

	Cost Per Lineal Foot Structure	Cost Per Lineal Foot Single Track
Foundations, structure, clearing wires	$62.03	$21.09
Track, special trackwork, guard rail, footwalks, interlocking third-rail bonds, structure bonds	18.92	6.43
Grand totals	$80.95	$27.52

As above these costs do not include land damage, engineering, interest, legal expense or storeroom expense.

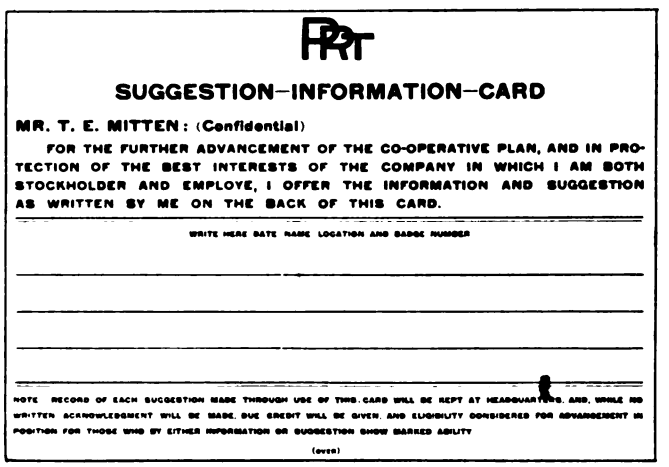
These figures show that the cost for the complete three-track structure referred to is but 7 per cent greater than the structure all ready for three tracks but without the longitudinal girders for the three tracks. The track proper shows a proportionate increase in cost about equal to the increase in number of tracks, that is, 30 per cent. These structures are of the regular deck girder type calling for open-track construction without ballast. This type of structure was selected primarily because it obstructs the light the least, which is an important factor in such construction on comparatively narrow streets with fairly tall buildings. Furthermore, three tracks are provided, or may be, so that an express service may be maintained as desired. The Brooklyn structures may be classed as utilitarian, without much attempt at beauty or noise prevention. The idea was to get a structure which could be extended quickly and as far as possible for a given sum.

R. C. CRAM,
Engineer of Surface Roadway.

Taking Employees' Suggestions Seriously

BEGINNING with 1923 suggestions made by employees of the Philadelphia Rapid Transit Company have been addressed to "T. E. Mitten, Personal," and they are given his personal and confidential analysis. While their receipt is not acknowledged the men understand that each suggestion is carefully considered and that due record is made which may affect promotions. Quite a feature is made of this.

In calling the attention of the men to the function of the "suggestion-information card," the company



PRT

SUGGESTION—INFORMATION—CARD

MR. T. E. MITTEN: (Confidential)

FOR THE FURTHER ADVANCEMENT OF THE CO-OPERATIVE PLAN, AND IN PROTECTION OF THE BEST INTERESTS OF THE COMPANY IN WHICH I AM BOTH STOCKHOLDER AND EMPLOYE, I OFFER THE INFORMATION AND SUGGESTION AS WRITTEN BY ME ON THE BACK OF THIS CARD.

WRITE HERE DATE NAME LOCATION AND BADGE NUMBER

NOTE RECORD OF EACH SUGGESTION MADE THROUGH USE OF THIS CARD WILL BE KEPT AT HEADQUARTERS AND, WHILE NO WRITTEN ACKNOWLEDGMENT WILL BE MADE, DUE CREDIT WILL BE GIVEN, AND ELIGIBILITY CONSIDERED FOR ADVANCEMENT IN POSITION FOR THOSE WHO BY EITHER INFORMATION OR SUGGESTION SHOW MARKED ABILITY

(over)

1923 Suggestion Card Used by Philadelphia Rapid Transit Company. Reverse Side Is Ruled for Suggestions

points out that a better knowledge of what the management desires of the men, a better realization of their new duties as employee-owners and increased confidence that their suggestions will be seriously considered will make the suggestion card a source of inestimable advantage to all concerned. Reports as to shortcomings in car operation, car and track inspection, power supply, signal operation, etc., with suggestions for betterment in practice or procedure, are strongly encouraged from every employee of the company.

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Association News & Discussions

Illinois Association Holds Third Joint Convention

Executive Problems, Highway Construction and Inventory Methods Hold Interest of Railway Men—Education and Public Relations Were Subjects of Joint Sessions Held with State Gas and Electric Associations

THE Illinois Electric Railway Association held its fourteenth annual meeting in Chicago on March 14 and 15. Joint meetings with the Illinois gas and Illinois electric associations were held in the forenoon of each day, while a joint banquet was held Wednesday evening. At the general session on the morning of March 14 Charles M. Thompson, Dean College of Commerce and Administration, University of Illinois, and Ralph E. Heilman, Dean Northwestern University School of Commerce, spoke on the subject of "Public Utility Education at the University." Dean Thompson invited the association to co-operate in the preparation of an outline for a curriculum for a public utility course at the University of Illinois. He gave in a general way what had been accomplished in the training of students for the public utility business. He pointed out that the men graduated from this course would be trained business men and have some training in technical subjects bearing directly on public utility companies. They would not be engineers, but would have just enough engineering to understand the blueprints. In other words, they would have descriptive engineering; they would also have a conception of the history of the public utility business.

Dean Heilman, speaking in his characteristic, forceful manner, explained why it was necessary to have a course of public relations. The present course in business training is not sufficient because a public utility is different from a large privately owned corporation. The policies of management are different because they might not fit into government regulations. He explained that the results derived from such an educational program would tend to professionalize the utility business, produce respect and cultivate a scientific attitude. In the discussion Britton I. Budd, Chicago Elevated Railroads, read a few notes on personnel and training and development of the young man. He referred to the common case where the young man has been misplaced and the young man discredited or lost from the service. This misfit circumstance has in a large measure been eliminated on the elevated lines by placing an official as sponsor for each young student engineer to see that he finds his niche.

The development of the Mazda lamp was the subject of F. T. Benson, General Electric Company, at the banquet held Wednesday evening. He introduced the new 30,000-watt lamp to the audience. In the large banquet room the lamp gave an illumination like sunlight. It had to be cooled with an electric fan. Britton I. Budd acted as toastmaster.

ELECTRIC RAILWAY SESSION

Stanley P. Farwell, Bureau of Commercial Economics, was the first speaker of the Wednesday afternoon session. His subject, "Stores and Inventory Methods," proved very interesting and brought out the necessity for adequate stores department methods and for an inventory either yearly or monthly. Mr. Farwell's paper, which is abstracted elsewhere in this issue, was discussed by W. H. Sawyer, president East St. Louis & Suburban Railway. He pointed out that a yearly inventory was somewhat of a "bugbear" to him and that he had replaced this operation with a more simple form known as a continuous inventory. The entire stock was divided into twelve groups and one group was inventoried each month. This required only the storekeeper and assistant and one from the auditing department to make such an inventory.

Mr. Sawyer's paper on "Electric Railway Executive's Problems" was the next one to be presented at the first afternoon session. An abstract of it is printed elsewhere in this issue. Following Mr. Sawyer's paper, a discussion was held on buses and the relation between bus transportation and street railway transportation. Mr. Sawyer said he believed the place for the bus is where the street car man puts it. Responsibility for service in any community rests with the railway company, as its business is to serve the public. He pointed out that buses are merely a temporary means of transportation where it is impossible to secure the money to lay track. While the operation may be a little more expensive, there is not as great an initial cost.

F. E. Fisher, general manager Chicago, Ottawa & Peoria Railway, questioned Mr. Sawyer about the bus competition on an interurban railway where the interurban was paralleled for its entire length by a concrete highway. Mr. Sawyer, replying, said that the competition on the concrete highway should be only private automobiles and not buses. Continuing, he said that the interurban is now coming into its own and it must either improve the service or scrap the equipment, as the Illinois Commissioners had been very fair in denying licenses to buses. J. R. Blackhall, general manager of the Chicago & Joliet Electric Railway, discussing the subject of buses, stated that although his road had a concrete highway running parallel to it the entire distance from Chicago to Joliet, it had not been troubled with bus competition. This was due to the co-operation on the part of the officials of municipalities through which the railway and the highway pass in refusing to allow buses to operate. Mr. Blackhall is now operating a bus line from Rockford to Stateville, the new penitentiary location, the fare being 15 cents and the distance 2½ miles. He agreed with Mr. Sawyer that the railway company must operate all transportation facilities.

"Advantages of Americanization of Railway Employees," by C. B. Goodsell, educational director Chicago, North Shore & Milwaukee Railroad, was the last paper on the first afternoon session. He summed up the results obtained from this work as follows:

"What can we say about the results of this work? First, we believe there is a marked improvement in the ability of these men to understand English and to talk it and with this has surely come less misunderstanding, mistakes and accidents. Our safety meetings certainly mean more to these men and our foremen have made marked improvement in their written reports, both in accuracy and legibility. Living conditions in the section houses have shown a marked improvement and a real pride in keeping the surroundings attractive is noticeable.

"Perhaps the greatest change has come in the better spirit which is shown by these men—a better spirit toward America, toward the men over them and toward the company. This is something which cannot be measured with a tape line but which nevertheless produces contentment and efficiency. A man's birthplace has little to do with his spirit, but his surroundings and the treatment he gets have much. We are trying to treat these men as we would the higher type of men which we want them to be. If you treat them as 'hunkeys' they will be little more. If you treat them as 'coming Americans' they will measure up. Perhaps not 100 per cent, but fully as well as the average American."

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This Americanization work on the North Shore Line was treated at length in ELECTRIC RAILWAY JOURNAL, issue of Aug. 27, 1921, page 332, and issue of March 3, 1923, page 373.

B. J. Mullaney, director Illinois Committee on Public Utility Information, described the work of his committee at the general session Thursday morning. He pointed out that where four years ago there was no such committee, now eighteen states have similar organizations. The object has been to give the newspapers the information that a utility has something to print. An idea of the results obtained by the committee was given by Mr. Mullaney. He stated that up to the present time 106,000 column inches, which is equivalent to 1,000 pages of newspaper space, had been printed in the newspapers of Illinois in the last four years. The committee had distributed 8,000,000 pieces of literature, of which 56,000 pamphlets had gone to high schools and were used in the instruction of high school students. The results or consequences of the work of this committee were beneficial to all utility companies. Where, in the 1919 Legislature, twenty bills were introduced hostile to public utilities, and had to be handled at considerable expense to the utilities, not a single bill was introduced in the 1922 session of the Legislature. He pointed out that something must have happened, and this could only be attributed to information distributed by his committee.

A paper by Walter Jackson entitled "The Sale of the Ride" was read at the second afternoon session of the electric railway section. Discussing Mr. Jackson's paper, C. E. Thompson pointed out that where competitive lines operate in a city the pass can be used to advantage on the line which covers the major downtown district, the pass being used to create an off-peak load.

A paper by C. E. Thompson, printed elsewhere in this issue, emphasized the fact that it is not only necessary to sell the ride, but is equally important to keep it sold. It was his opinion that the car builders were building interurban cars far too light, with large seating capacity, and eliminating to a large extent the comfort which should be derived from interurban travel. L. E. Gould, Economy Electric Devices Company, substantiating remarks made in Mr. Thompson's paper, stated that the power required to operate a large interurban car is little in excess of that required to operate the new present light-weight interurban cars. The saving derived from this source he felt did not offset the desirability of selling the patrons of the line something more than mere transportation.

Clifford C. Older, State Highway Engineer of Illinois, spoke on "Highway Construction Required to Meet Modern Road Traffic Conditions." The discussion that followed Mr. Older's paper served to indicate the weakness of present railway paving construction. Mr. Tinnon, engineer maintenance of way Chicago & Joliet Electric Railway, stated that the present method of paving between and around the tracks is not good. He said it was as though the companies were throwing their money in a well. With a permissible wheel load on trucks of 16,000 lb., the paving in between the tracks soon looks like a washboard, although the track itself is in perfect alignment. The load has been too much for the tie and the spikes cannot be expected to hold the tie up against the rail. In his opinion the only solution is to perfect a pavement which will support the load in the surface. He suggested that a 6-in. concrete slab surface might possibly carry this load. However, the objections to use of concrete at the surface have been voiced by municipalities because of the noise.

F. E. Fisher expressed himself as being opposed to laying the rail in solid concrete and voiced his disapproval of a substitute tie. He suggested that it might be possible to have a sub-slab underneath the tie and asked Mr. Older if such a piece of roadbed would be prepared by the State of Illinois. Mr. Older replied that the state engineering department would be willing to undertake the construction of an ideal track if the appropriation was made by the utility commissioners.

At the close of this session the following officers were elected: Arthur D. Mackie, Springfield, president; R. A. Moore, Joliet, first vice-president; J. F. Egolf, second vice-president; R. V. Prather, Springfield, secretary and treasurer. The executive committee remains the same with the exception of W. L. Arnold, whose place is taken by J. H. McClure, vice-president and general manager Chicago, Aurora & Elgin Railroad.

Training Young Engineers in Utility Work*

BY BRITTON I. BUDD
President Chicago Elevated Railways

AFTER a young man has completed his education and entered the employ of one of our public utility corporations it is of the utmost importance that we train and develop him so that he will become interested in his work and want to remain in the employ of the company. In the past many college men have entered the employ of utility companies after graduation, worked one or two years and then resigned to accept positions in other lines of work. Their time has been more or less wasted and the company has lost the amount of money invested in their preliminary training. This has been due to the fact that the young men have been placed in some department and left there without any official of the company being held responsible for their training or advancement.

The utility companies need young men specially trained in various phases of the business. It is just as essential to develop the personnel of the organization as it is to develop the physical property. If the utility companies are to draw the best men graduating from our universities into their organizations, they must offer them the same advantages and inducements as are offered by the big manufacturing concerns throughout the country. It is essential that some executive official be made responsible for the training of these young men for a certain period or until they work into a permanent place in the organization. The young men should be changed from one department to another until they get a general insight into the business as a whole and their salaries should be increased from time to time. Special care should be exercised by foremen or heads of departments to explain the technical details and reasons for doing things in a certain way. The supervising executive should interview these students frequently in regard to their work and give them a chance to offer suggestions. He should also make the young men understand that they are at liberty to come to him at any time in regard to matters in connection with their work or their personal affairs.

The supervising executive must keep these students interested in their work and develop this interest to the point where they will want to make the utility business their life work. A man who is simply working because he must and has no particular interest in his position certainly will not do as well and will not advance as fast as the man who has become thoroughly interested in the work he is doing and in the welfare and success of the company for which he is working. When these students become interested and feel that there is a future for them, they will induce other young men who are about to finish at the universities to enter the employ of the company for which they are working. The young man about to graduate will ask his friend who has been out of school a year or two questions such as, How are you getting along? Do you like your work? How much money are you making? and What are your chances for advancement? If his friend answers these questions satisfactorily, he will want to identify himself with the same organization and before long positions in that organization will be greatly sought after.

An electric railroad with which I am familiar has been working along this line for several years and one or two examples taken from their experience will suffice to illustrate my point:

*Discussion presented before joint meeting of Illinois electric railway, electric and gas associations, Chicago, March 14, 1923.

A graduate of the School of Electrical Engineering, Iowa University, class of 1917, was employed April, 1919, after being discharged from the U. S. Army as a second lieutenant, Signal Corps. He was placed in

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the electrical engineer's office and assigned to valuation work. His salary was fixed at $125 per month. In January, 1920, he was assigned general work in this department such as drafting, laying out wiring and conduit and obtaining material for construction work. At this time his salary was increased to $140 per month. During the next six months he broke in as a power supervisor and his salary was increased to $180 per month, on June 1, 1920. He has shown a special inclination for the work in the electrical department and has been definitely assigned to this department.

A graduate of the School of Electrical Engineering, University of Illinois, class of 1920, was employed June 19, 1920, and placed in the electrical engineer's office. He was assigned to valuation work and his salary fixed at $125 per month. After finishing the valuation work in November, 1920, he was given miscellaneous work in this department such as the planning of repair work and new construction work. On July 1, 1921, his rate was increased to $135 per month. In January, 1922, he was transferred from the electrical engineer's office to the shop department, assigned to miscellaneous engineering work, consisting of drafting, inspections, reports and the specification of material in connection with the maintenance and reconstruction of rolling stock. On June 1, 1922, his salary was increased to $160 per month. On September 1, 1922, he was transferred to the accounting department and placed in a special position requiring engineering knowledge and also some knowledge in accounting. When assigned to this work his salary was increased to $200 per month.

Manufacture of Electric Railway Equipment*

Comfort and Convenience of the Passengers Is Primary Consideration, and Light Weight and Other Economizing Measures Are Entirely Secondary

By C. E. THOMPSON
Assistant to the President,
Chicago, North Shore & Milwaukee Railroad, Highwood, Ill.

DURING the past few years volumes have been written dealing with the condition of the electric railway industry, and many and varied reasons have been advanced for the falling off in traffic and the lack of financial return. What has the manufacturer of railway equipment done to help the situation? What improvements have been made to add to the attractiveness of travel by street railway and interurban lines? Your answer is, probably, "little or nothing."

The tendency has been to reduce the cost of manufacture, to reduce the weight of equipment, to increase the seating capacity, to decrease the cost of operation—all at the sacrifice of comfort, convenience and appearance. Hard slat seats with straight backs, set so close together that knee room is lacking; springs so light that when car is loaded the body rides on the axle; maybe longitudinal seats, that more standing room may be provided; light-weight interurban cars operated at high speed over poorly maintained tracks. Why?

Because they can be manufactured at less cost and operated more cheaply. So many properties have operated cars so weatherbeaten and "down-at-the-heel" looking that it is a wonder the industry is not in worse repute than it is. And then, too, often the passenger is annoyed by noisy gears, dragging brake shoes, windows that rattle, body squeaks, lack of heat and poor ventilation. The manager who wants cars which provide for the comfort of his passengers must sell his ideas to the manufacturer and pay the extra cost of having his equipment built special.

Electric railway operators have too often taken the wrong view when traffic fell off due to increased rates or other causes. They attempted to meet the situation by reducing operating costs, by curtailing service, by using lighter equipment, by deferring maintenance and in many other ways—most, if not all, of which caused further decrease in riding and added to the feeling that the rates were too high. The cost of moving a ton 1 mile and the saving in operating costs per annum for each ton that could be eliminated from the weight of a car was once given great publicity, and many were the advocates of minimum-weight cars for all classes of service without regard for the comfort of passengers. Some eight years ago we were ordering our first lot of steel interurban cars. Our engineers designed a car weighing about 45 tons. Some car builders took the plans and showed us by nicely prepared exhibits and by somewhat convincing arguments that we should use for the contemplated service a car weighing between 30 and 35 tons. We took the position that a light-weight car operated at a speed of 65 or 70 miles per hour would not provide comfortable riding qualities, and that increased patronage was more to be desired than low operating costs. We were severely criticised by many and pitied by not a few for our lack of experience and vision, but we ordered fifteen of the 45-ton cars and have repeated the order until we now have sixty, and before another year passes we will have eighty of this type.

I do not want you to think that I am opposed to the light-weight car. Economy of every kind is both desirable and necessary. The point I want to make is that the comfort and convenience of the traveling public must have first consideration. The equipment should be designed for the character of the service it is to render.

After the comfort and convenience of the passengers is provided for, the cost of construction and the cost of operation should be considered in view of the service conditions. Because there has been opposition to increases in rates of fare, railway operators have too often concluded that low rates are the greatest desire of the car-riding public. But not so. What they want is *service*, and if given *real service* they are willing to pay reasonable rates.

While this weight and comfort elimination was going on the motor age entered. Has the motor car manufacturer waited for the customer to demand a change in the design providing for improved comfort and appearance? No! New styles stimulate trade. Just as Mrs. Smith wants a new hat that surpasses the new one worn last week by Mrs. Jones, so Mrs. Jones must have an automobile with a little more class, a little more speed and a little more comfort than the old bus driven by her friend Mrs. Smith. That is human nature! It is also human nature to want to patronize the dealer who offers new inducements, new comforts, better service, whether he deals in clothing, in automobiles, in flats or in transportation.

Added expense can easily be justified when it produces increased patronage. Reductions in investment and in operating costs are very expensive when they result, as they too often do, in loss of traffic. A recent experience on the North Shore Line will illustrate.

One-man safety cars were to be placed in operation on our Milwaukee city line. In designing these cars a number of improvements were provided, such as divided exit and entrance, wider aisles and wider seats with more knee space, and, most important, spring cushion seats upholstered in green plush. This added to the cost of the cars approximately $400 each and to the annual fixed charges probably $40 per car. At a 5-cent fare this requires 800 additional passengers per car per annum, or two extra passengers per day. Was the additional expense justified? I say it was. The cars have been in operation only about four weeks, but I venture any attempt on our part to remove these cars from Milwaukee service would meet a vigorous protest.

If you will pardon another reference to the North Shore, I will illustrate my point further. In our limited train service we operate regularly only steel cars, designed for both speed and comfort. On holidays we have to use the older wooden cars to provide a more frequent interval. In our express service we operate the steel cars when available. It is no unusual occurrence for patrons to let the train of older wooden cars go by, although these cars are kept in first class condition, and wait for ten minutes or even a half hour for the train with the steel cars.

This is an age of progress. Development is rapid. The methods of yesterday will not do today and today's methods may be out of date tomorrow. The horse has given way to the gasoline motor. The people want action, change and speed. They want things up to date, comfortable and convenient. Our industry is coming back. Better days and big opportunities are ahead for those properties which are up and doing and meeting the needs and demands of the communities which they serve.

Builders of street railway and inter-

*Paper presented before Illinois Electric Railway Association, Chicago, March 15, 1923.

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urban equipment should be the leaders in improved car designs. They should be constantly bringing to railway operators the fact that they should add to the attractiveness of their service, by making the interval more frequent, by providing comfortable riding cars with every possible convenience, by keeping the cars clean and well ventilated, by keeping the outward appearance good by the frequent application of paint. The result will be greater popularity for these railway services, with increased traffic and financial results which will permit of the purchase of more and better equipment.

The Sale of the Ride*

The Theory of the Pass to Develop Off-Peak Riding Is Set Forth, with Particulars from Different Installations

By Walter Jackson
Fare and Bus Consultant, Mount Vernon, N. Y.

FORMERLY there were two classes of car riders, the industrial or business rider and the homekeeper. The former were good for at least twelve rides a week each, and the latter could be depended upon to use the street cars if they rode at all. People who wanted a real pleasure ride used the electric railway. Now, with automobiles so numerous, these two classes of customers have changed, and there is but one class—irregular. Expressed in a sentence: We have changed from a monopolistic industry to a competitive business.

How can we assure ourselves of the greatest possible proportion of consistent, rain or shine, patronage? By lower fares, by short-haul fares, by off-peak fares, by wholesale ticket rates, by commutation? Let us see the possibilities of each of these schemes.

Five Ways to Increase Patronage

First—Lower fares: No doubt a certain amount of business was lost to electric railways when the convenient 5-cent fare disappeared and the higher, awkward odd fare took its place. No doubt also a certain amount of business would come back if pre-war fares were restored. There is no warrant, however, for assuming that the increase in traffic will be great enough to offset the decrease in average fare and extra mileage. A lower fare would make little appeal to the automobile riders. They do not ride in machines to save money, but to avoid annoyance in fare transactions and to enjoy more speed and comfort.

Second—Short haul fares: This method is practicable in communities so large as to have ½ to 1-mile trips within the central area devoted to offices, stores and theaters. Such a district is usually too congested for easy automobiling, and as it is the place where the various car routes overlap, there is always the short headway necessary to secure people who would otherwise walk. For small cities, the short-haul fare is not applicable, because the interval between the cars is usually so long that too many persons could walk from the full-fare zones into the low-fare zone.

Third—Off-peak fares: These are applicable to any kind of railway, small town or big city, urban or interurban. This is simply a question of analysis. How is the traffic divided now among the different hours of the day? To what pleasure grounds and indoor entertainments would people be likely to go oftener if the off-peak fares would be used as a reminder of such excursions? Would it be wise to co-operate with home merchants, theaters, ministors, schools and so forth, in an experiment to try off-peak fares on a certain day of the week, or possibly risk the test for a full month or more? Whether we lose, break even, or gain in revenue, we are sure to be winners in good will, because we have shown a willingness to try. The best antidote to the uneconomic rush-hour cut fare is the installation of an off-peak rate of fare.

Fourth—Wholesale tickets: This is the most common differentiation in fare used today. One-man car operation, especially, compels attention to cutting down the number of change-making transactions. But the wholesale ticket rate for fares, no matter how liberal, does not achieve the purpose of securing or assuring consistent and frequent use of the cars. There is no time limit on the use of the tickets or tokens, and they can be divided among as many persons as there are rides to be taken.

Fifth—Commutation: This is the only form of rate heretofore orthodox which seeks to make a consistent user of the purchaser of the railway transportation. Usually it is confined to distances so great that only a few rides in excess of two per business day are taken. It follows that there is no point in offering more than sixty rides per month, because there would be no need for a larger number. Commutation books are non-transferable. This is a practicable measure on suburban railways, where the conductor meets the same passengers every day, but is not practicable on street railways. The experience in San Diego with a monthly non-personal commutation book has shown that this style of transportation book does not encourage voluntary riding.

The Personal Card and Pass

The Schaddelee monthly personal card was a big step forward toward securing consistent patronage. The purchaser pays a fee of 50 cents to $1 for a calendar month card and then pays only 5 cents a ride during the month, when the usual casual fare is 10 cents. The feature that keeps the monthly card from encouraging traffic to the utmost is that it is still necessary to give us a tangible fare each time a ride is taken. This seems to be the only valid explanation of the fact that the average use of the monthly card is about two fares a day. Another fact is that while a wholesale rate is given for consistent use, the trips are taken almost entirely during the rush hours. In short, we arrive at the workmen's reduced rate tickets in another guise. It might be possible to secure a higher number of rides a day from the monthly card holders by making the card fully transferable. Transferability is really too good a talking point to overlook, even though there may be little transferring in practice. Besides, people are always irritated at a rule which they know cannot be enforced.

The unlimited ride, transferable weekly pass, installed by the writer on a number of electric railways, is a blend of the foreign season ticket for unlimited rides and weekly ticket with a limited number of rides. The price is based on the theory that the holder must use more than twelve rides a week to have a profit, so that the reduction is for off-peak rides. The weekly pass riders never average less than three through rides a day, the maximum being found in smaller cities where from four to four and one-quarter rides per day are possible through the higher proportion of luncheon riders. Where this pass has been introduced there has been little or no reduction in the number of full cash fares. The pass riders come out of the ranks of those who were already using reduced rate tickets.

Characteristics of the Pass in Cities of Different Size

The characteristic features of cities below 50,000 population are: Extremely large ratio of automobile owners, excessive amiability of automobile riders toward walkers and exceedingly short distances between the homes and jobs, entertainments, stores, etc. In such communities an increase in fare does more harm than elsewhere, because so few people are compelled to ride in the cars. When a pass is introduced in these towns, the average number of rides per pass goes as high as four through trips a day or more. The reason is that so many of the buyers find it possible to go home to lunch. The cost of the pass is usually fourteen or fifteen times the ticket rate, bringing it to either $1 or $1.25. Among the pass-using cities of this class are Ashtabula, Ohio; New Brighton, Pa.; Bellingham, Wash.; Everett, Wash.; Fort Smith, Ark.; Oil City, Pa.; Franklin, Pa.; Houghton-Hancock, Mich.; Kenosha, Wis.; Racine, Wis.; Paducah, Ky.; Pine Bluff, Ark., and Santa Barbara, Calif. All

*Abstract of paper presented before the Illinois Electric Railway Association, Chicago, Ill., March 15, 1923.

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are doing well, compared with previous records.

In cities between 50,000 and 100,000 population, the number of automobile owners and automobile pick-ups is relatively less than in the smaller towns. The services on several routes are also on closer headways, like ten and seven and one-half minutes, instead of fifteen and twenty minutes, so that there is a better chance to tempt walkers to ride. The opportunities for pass sale are enhanced by the fact that in cities between 50,000 and 100,000 there is often a variety of evening and holiday entertainments, in addition to a strong social intercourse. Cities of this kind using the pass are Fort Wayne, Ind.; Terre Haute, Ind.; Racine, Wis.; Tacoma, Wash., and San Diego, Calif. The pass is working out well in all those cities.

In cities with populations of more than 100,000, the distances tend to be too long to permit much luncheon riding except by the more leisurely office people and storekeepers. Therefore, rides in excess of two are not likely to be duplicates of the home-job rides. There are two cities of this kind with passes, i.e., Youngstown and Chicago —in the latter city used on the elevated railroads.

The pass was introduced in Youngstown, with 175,000 people, in October, 1921. The average number of through rides in Youngstown is about three to three and one-half a day per pass, due to the high percentage of transfers. The increase in earnings has been from a pre-war weekly average of $21,745 in September, 1921, to $26,143 in September, 1922, and then to more than $32,000 in November, 1922, before the company's motor buses added still further to the weekly gross. The increase in service has been well below the increase in traffic and revenue. The pass riders seem to me to consist of two contrasted types: The mill worker, who uses two lines and buys the pass for economy sake, because otherwise he would have to pay fare and transfer, and the office man, who buys the pass for the many extra rides he can secure. When the pass was introduced in Youngstown there were some 250 jitneys, but these have dropped to approximately one-half, the rest being able to hold on because of their taxicab operation, their freedom from regulation, their serving districts without car routes, etc. The company's own buses are now cutting down jitneys in that respect.

The Chicago Elevated Railways had no jitney competition to contend with, nor could automobile use and pick-ups be a really significant factor, but many riders had the choice of the elevated, the motor buses, the surface cars and the taxicab. The elevated pass not only offers to the regular rider the most convenient way of paying his fare, but also tempts him to use the service for short emergency trips that he might otherwise take in a different way. The elevated pass in Chicago alone is sold for $1.25, against a cash fare of 10 cents, and a ticket rate of three for 25 cents. Conclusions as to the effect of the pass cannot be drawn, because it was introduced simultaneously with a cut in the ticket fare from 8⅓ cents (four for 35 cents) to 8⅓ cents, with a sharp reduction in school tickets and the introduction of a 3-cent fare to children under twelve years of age.

The Future of the Electric Railway Business*

War Conditions Brought to a Climax Troubles Which Otherwise Might Have Taken Years to Remedy—How and Why Good Public Relations Should Be Established

By W. H. SAWYER
President East St. Louis & Suburban Railway

FOR some time it has been customary before starting to talk about the street railway situation as of today to refer back to the troublesome war period. But I want to suggest the thought that our industry has already received some recompense for hardships endured during the dark times from which we have emerged. The war brought on speedily a condition from which we could not have escaped, and which otherwise would have taken us many years to right. I refer primarily to the fixed fare, set many years before when conditions were radically different.

Nationally speaking, the fixed fare of a nickel is past. I believe many more companies would have gone bankrupt had the struggle been prolonged instead of being brought as it was to a focus in the period of a few years time, due to the abnormal conditions resulting from the war.

Our fight for existence during that period also brought to our attention the fact that if we were to survive we must do everything possible to merit survival and that there were still things which we had not done which it was possible to do to help save ourselves. Let us review the situation that confronts the executive as of today in the street railway industry. What is his most important duty? It is so to conduct the policy of his company that it will merit better public relations, and not only better public relations, but satisfactory public relations.

NOTHING MYSTICAL ABOUT PUBLIC RELATIONS

Important as it is, there is nothing mystical about the solving of our public relations problem. No other industry would expect to survive by simply quoting prices, accepting orders when sent in on proper form, and not following up and giving service after the sale was made. Our customers have a right to expect something more than platform room on which to stand after they have paid their fares. They should have courteous treatment, such as they would receive if they went as customers to the sales office of any other industry. One of the best rules to keep in mind is to operate as though there were a competing street car line on tracks alongside of ours and consider that every time we fail to satisfy a customer he will go over to the competing line. We must not forget that although we are legally and rightfully a monopoly, we still have competitors, and that proper, aggressive salesmanship and the four "c's," standing for courteous conductors and clean cars, will increase street car riding. Then we must give publicity to what we are doing and why we are doing it, just as any other business does which offers to sell good merchandise at a fair price.

There are still a few street railway company executives, as honest and sincere as you and I, who are not successful to the extent they should be because they do not know how their customers should be treated from a publicity standpoint. I have had executives tell me that they believed in advertising, but did not know what to advertise except when there was a change in schedule or in rates. My greatest trouble today is to find time and money to tell my customers the many things that I want to tell them in newspaper advertising. I am never at a loss for things to say. If there be a man among you who has as yet not whole-heartedly gone into newspaper advertising as one of the essential keys to success, do not longer hesitate. Go to your newspaper man; tell him your desires, and ask his help.

Second only to the public relations problem confronting an executive is employee relations. You cannot satisfy your public unless practically every employee is a sincere, enthusiastic salesman of your service and of you and your company. We often speak of welfare work, a proper term if properly interpreted. My own blunt way of saying it would be to say that we must treat our employees fairly. What we do should be done because it is right, because they are entitled to it. On the other hand, our employees are men and must stand on their own feet without undue coddling as to their personal actions and welfare.

Street railway wages today are more than 100 per cent higher than in 1913. The material purchased by street railway companies has increased over 70 per cent, construction cost has increased over 90 per cent, and the cost of living is close to 60 per cent above 1913, but street railway fares have increased approximately only 45 per cent. There must be efficiency to give the service which we are giving today at such a low comparative cost.

In spite of the publicity which we

*Abstract of paper presented at the meeting of the Illinois Electric Railway Association, Chicago, March 15, 1923.

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are giving and other commendable things which we are doing, we are confronted from time to time with well-meaning people who tell us that the price of everything else has come down and that we should reduce the carfare. They do not realize that these other prices were reduced because they had previously been increased to meet peak conditions, while our rates were never increased in that way. I am against a reduction in street carfares today. What our communities need today that they may grow and prosper is more and better service, not a lower fare. I believe in the electric railway, operating with steel wheels on rails, but buses are going to be used, and under some conditions they are better than street cars. Where we have a situation which calls for bus operation we should operate buses.

Some say we also have before us the problem of the public utility commission, but if we can maintain satisfactory public relations we are going to have no real utility commission problem. The worst any commission has ever done was that which the public wanted done, or thought it wanted done, regardless of the consequences. The better our public relations the less discussion there will be with public utility commissioners.

Stores and Inventory Methods*

Centralization of Physical Storage Essential to Prevent Duplication of Stocks in Reordering—Stores Control Analyzed—Steps Taken in the Preparation of an Inventory

By Stanley P. Farwell
Bureau of Commercial Economics, Inc.

THE major expenditures of the operating departments of any company fall into two classes — labor and materials. In many cases the responsibility for the receiving, storing, disbursing and replenishing of materials and supplies is placed with the several departments. The primary interest of the construction department is in the rapid and successful completion of improvements; that of the maintenance department is in having the men and materials on hand at all times to keep the property in physical condition for continuous operation; and that of the operating department is in furnishing service to the public without interruption.

The efficient and economical handling of stores as an incidental function of the several departments is questionable of accomplishment and cannot be controlled by the chief executive in a manner commensurate with its importance. It is, therefore, of prime importance that the handling of stores be organized as a separate and independent department of the company, serving all departments alike, reporting direct to the general manager and responsible to him for (1) service to all departments, (2) efficient handling of materials, and (3) conservative investment in stocks.

The general storekeeper will be selected for his business ability and knowledge of materials. It goes without saying that the custody and control of a large part of the current outlay of the company should be placed in the hands of a high-caliber employee. There will be a storekeeper in charge of each major stores location. If the size of the property warrants, an assistant to the general storekeeper, sometimes known as the traveling storekeeper, will be directly in charge of the local storekeepers, and in general will assist the general storekeeper in carrying on the departmental activities efficiently. The record keeping will be supervised by a chief clerk, reporting directly to the general storekeeper. His duties will be to see that necessary records are accurately and currently compiled, that the reports required by the general storekeeper are promptly available, and that proper office discipline is maintained.

Layout and Facilities

The efficient handling of materials calls for centralizing the physical storage to the greatest degree possible to prevent duplication of stocks and reordering of materials through lack of information as to available supplies. Any argument for scattered stores is more than offset, in the case of present-day frequent train service on interurban lines, by the possibilities of quick delivery and the benefits of rapid turnover.

The selection of storage yard location and equipment for the storage of bulky materials should be governed by unloading facilities involving minimum physical labor, and possibilities of bringing the storage yard under physical control of the stores department, to insure orderly storage and correct disbursing.

The handling and replenishing of roadway materials is expedited by laying out specific locations in the yard for the various materials, making use of the principle of "unit piling," that is, orderly piling with a marker between units of 25, 100, 200, or 500, as the case may demand. The ability to count the stock rapidly and accurately will be of assistance in checking records, planning requirements, and controlling purchases.

Old material removed for service and replaced by new is a prolific source of disorder in storage yards and stockrooms. Facilities should be provided for their prompt handling and sorting. Definite means should be provided to sort scrap from reclaimable materials as soon as it arrives at the storage yards.

Replaced materials have been removed for cause, and unless they can be economically repaired or reclaimed it is good practice to scrap them at once. Procrastination is costly in labor required to sort them periodically, uncertainty as to what is available, loss of use of the money represented by the scrap value, and the bad effect on housekeeping sense of the department.

Less bulky materials and materials liable to theft, to be properly controlled by the stores department, must be kept in closed storerooms to which only stores employees will be admitted. These storerooms must be near the shops served by them, otherwise much unproductive time is spent traveling between shop and storeroom. Orderly piling and proper segregation and absence of rubbish and scrap parts are the first requisite of a good storeroom. As a means to this end, we know of none better than the so-called "daylight" shelving and unit piling. The stacks of shelving have no backs and are merely skeleton frames on which are piled standard trays of materials, each containing a definite quantity, easy to count, and capable of unlimited expansion or contraction as the stock increases or decreases. The daylight shelving is usually painted a light color. The open construction results in practically an unobstructed view from one end of the storeroom to the other. Poor housekeeping may readily be eliminated thereby, concealment being difficult with this equipment.

Stores Control

The functions of the department having been outlined, an organization created, and layout and facilities provided, the proper routine must be evolved so that the department may give continuous, uninterrupted and efficient service.

The company must know that it receives, in good order, all materials it pays for. The company must know that the materials it buys are charged to the proper capital or expense accounts as and when they are used and in the correct quantities. Otherwise the accounts are misleading and do not reflect actual conditions. The department must know what the current requirements are for all items of stock and the relation between the supply and these requirements at all times. Otherwise the item will be either out of stock or overstocked, either condition being inexcusable. Certain well-defined procedures to meet these requirements will be outlined:

Receiving Methods: The employee actually unloading or checking incoming bulky material should list the contents on a receiving form and sign his name as certifying to the accuracy of his statement. If the materials are received in a storehouse, the receiving dock should be physically divided off from the storage space. In this space,

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the incoming goods should be unpacked, checked and listed on a receiving form, and the form should be signed by the same employee. Checking in of goods on miscellaneous scraps of paper, later to be transcribed to a receiving form, is a loose and inexcusable practice.

All material received should be checked against a copy of the purchase order to make sure that the purchase has been regularly authorized and that the vendor is delivering what has been contracted for.

The signed receiving form should be attached to the invoice as documentary evidence of the actual receipt of the goods by the company before payment is made.

The common practice of passing a material invoice upon the approval, for receipt, of any other person is indefensible and leaves a loophole for loss by carelessness or dishonesty, or both.

Insistence on the vendors showing the company purchase order number on all goods offered for delivery also is a great help to accurate and current receiving records.

Identification of Materials: An electric railway property will require from 3,000 to 10,000 different items and sizes of stock for its maintenance and operation. It is well known that any one article will be variously described by different employees. The descriptions are in many cases indefinite and misleading. Accurate record keeping under such circumstances is a difficult task.

The difficulty may be overcome in an entirely practical way by assigning a stock number to each item of stock and giving it a standard description that completely describes it. If the stock number with the standard description is used throughout the stores department on all forms, including purchase orders, receiving tickets, disbursing requisitions, bin markers, etc., the essential records will be increased in accuracy beyond all expectations.

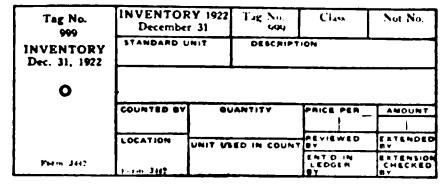
The continued success of such a plan, however, will depend upon placing the application of stock numbers to new items of stock and the keeping of a master file or index in the hands of one employee.

Disbursing Methods: Materials must be accurately disbursed, i.e., charged out to the proper accounts, at the proper time, and in the correct quantities; otherwise all the advantages of carrying stock accounts are lost. When operating departments are required to write disbursement requisitions from records of material previously used, an element of error is introduced. Failure to report the use of material in correct quantities, or even to report it at all, is certain to occur. Later check-ups disclose a discrepancy which must be rectified with a resultant upset to cost records and statistics of operations.

Wherever centralized stores and physical control by the stores department make it possible, it is certain to be of great advantage to disburse materials to the proper account when they are delivered to the operating department from the custody of the stores department. Certain stores, such as shop lumber and miscellaneous steel, are sometimes difficult to disburse as used. It is quite possible to make the distribution by means of a monthly inventory in connection with a carefully kept quantity stock record.

One method successfully employed to control the issue of certain classes of stock is to require the return of the worn-out or damaged part in exchange for the new one. This applies to tools, brass goods, and the like.

Certain small stocks are required to be on hand at distant parts of the system and in quantities not warranting the presence of a storekeeper. It is satisfactory in such cases to make weekly deliveries to these locations, charging out the materials to operating accounts as they leave the main storehouse. This practice should be safeguarded by a close scrutiny of the weekly requisitions, and at stated intervals all accumulations of stock at these points should be returned to the main storehouse for credit to stock, or to be salvaged or scrapped.



Form J. B. 449. 1500 sets. 12-22.

INVENTORY TAG CORRECTION — To .....Name Attached is Inventory Tag No.....Road..... Class.....Lot No..... Quantity..... Unit.....Description ....

This Tag is incorrect or incomplete as follows:

.....
.....
.....
.....

You will make necessary investigation and correct this discrepancy on the inventory tag by drawing a line through the portion in error, entering the correct information, and signing your name on the back of the tag. Return corrected tag and this form to Inventory Headquarters.

Reviewer.....

At Top, Facsimile of Coupon Tag and, Below, Wording of Form that Appears on the Back

Replenishing Stocks: In the general storekeeper's office a simple quantity stock record should be maintained, to which should be posted receipts and issues in quantity only. This record should at all times be strictly up to date. The balance on hand should correspond with the physical count of the stock in the storeroom.

It should be the means by which he governs his purchases so that he will not run out of stock, or will not have an over-supply. Improvements often have to wait because the stores department is over-stocked on parts about to become obsolete.

The requisitions for purchase from shop and road executives and from local storekeepers should be scrutinized on the showing of this record and recommendations to the management made accordingly.

It is recognized that errors are likely to creep into any stock record. They should, therefore, be currently checked up. The local storekeeper should be assigned a definite number of items to inventory each day for comparison with the stock record. The effect on the local storekeeper will be worth while, his knowledge of his stock increased, and slow-moving and obsolete materials brought to light.

Stores Accounting Methods: Stores accounting covers the distribution of purchase invoices to proper accounts and the pricing, extending, and checking of issue tickets and their distribution to the operating accounts, and the preparation of any statistical data from these documents that the management shall require. All documents involved in this accounting originate in, or pass through, the stores department.

It is usually very desirable, for many reasons, that this work be done by an organization independent of the stores department, because:

1. It is primarily a bookkeeping operation, and as such will be more successfully handled in auditing department.
2. If handled by the general storekeeper, it is certain to distract his attention from the prime responsibilities of his position.
3. It provides a check on the accuracy of the work of the stores department, whereas if handled within the department errors could continue indefinitely without chance of being brought to light.

The stores accounting division should provide the general storekeeper and the management with a periodical report to point out the extent to which proper storekeeping methods have been made use of. This is readily possible through the use of the "Material Classification" adopted by your association. The report should show the turnover of stock in each class of material for each storekeeper and for the department as a whole. The records of storekeepers could be compared one with the other, and each one with its previous record. This would be a sure method of revealing slow-moving stocks and unwarranted investment.

Inventory Methods

Having outlined the functions and methods of a properly organized stores department, it is proper now to call attention to the necessity for a yearly inventory which will, properly executed, reveal the extent to which the department has adhered to principles and routines, and will reconcile the values of the stores as shown by the general books with the physical facts.

The popular conception of a physical inventory is the assembling, on the day following their notification, of an inventory crew, provided with inventory cards or lists and instructed to make a record of everything in the place. This is accomplished after a few days of prodigious effort and the mass of detail is unloaded on the stores employees to decipher, classify, price, extend and total. These operations hang on interminably, the current work of the organ-

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ization falling farther and farther behind. The inventory finally completed is partly correct, partly complete and partly dependable.

We wish to present a method of inventorying, of which the two major results to be obtained are:

1. To take an accurate, complete, and dependable inventory.

2. To complete this inventory within a definite minimum time limit, insuring the least possible disturbance and inconvenience to the operating departments.

The lack of identification, standardized descriptions and status (stock or non-stock), which makes the compilation and computing of the inventory so arduous a task, must be foreseen and forestalled. This work should be done prior to the physical count, not after.

Also in view of the fact that the stores stocks of electric railways are usually scattered in yards, storehouses, repair shops, terminal shops and on the right-of-way, and further in view of the fact that there can be little reduction in operating and maintenance during the inventory period, it is essential that a schedule be adopted and adhered to unconditionally.

Experience shows that the following schedule is about right: Period of preparation for the physical count with minimum staff, seven weeks; period of physical count with maximum staff, one day; period of pricing and totalling inventory after count has been taken, ten days.

Briefly, the general plan is this:

All materials involved will be segregated, identified, and classified in advance of the inventory date. A coupon tag, with stock number, description, and issuing unit written on it in advance from the stock ledgers will be placed on each lot of material by the stores department in all locations protected from the weather before inventory day, so that counting only is necessary on that day. Outside materials will be taken on a list to be transferred to tags later for uniformity, assembling of like materials, and convenience in pricing and posting. These tags will be controlled by a serial number to insure collecting and recording every tag sent out.

A temporary inventory organization is assembled, independent of the operating departments, but selected from their personnel to secure men familiar with the materials and routines.

This organization will direct the advance preparation of the stocks and the writing and distribution of the detailed instructions and the inventory tags; will select the supervisors and counting crews for inventory day; review, price, and post the inventory as collected, and be generally responsible for all inventory plans and their execution.

The first step in building this organization will be the selection of a general inventory supervisor to be in charge of all operations and responsible for results throughout. He will be a man with some responsibility in the company, preferably from outside the stores department, accustomed to handling men and to plan and execute a program, and will be relieved of his routine duties, at least in part, for the period of the inventory program.

He will select his own staff, having been assured of the co-operation of the other department heads by the announced backing of the management.

The preparation for inventory will consist of the following steps, the starting time and allowed time for execution depending somewhat on local conditions:

OFFICE WORK

1. Design and order inventory tags.
2. Write up inventory tags from stock ledgers.
3. Compile written instructions for all steps in the program.
4. Determine correct price for every item shown on stock ledgers for purpose of pricing inventory.
5. Select personnel for counting organization and school them.
6. Select personnel for clerical organization and plan their work.

FIELD WORK

1. Eliminate obsolete materials from stock.
2. Dispose of all scrap.
3. Assemble all lots of identical materials in as few locations as practical.
4. Provide positive identification of all materials.
5. If material is special, identify permanently by painting or tagging it with stock number and description.
6. Separate new and second-hand materials unless their value is identical.
7. Identify by a distinctive tag all materials held as emergency parts, but of no intrinsic value and not to be included in inventory, also items of doubtful usefulness.
8. Pile materials so that they may be easily and accurately counted.
9. See that no items of stock are mixed in the same bin or pile.
10. See that operating departments do not upset these arrangements when removing new materials or bringing in old materials before inventory day.

The counting organization (to function for one day only) will be built up as follows:

A careful estimate will be made of the number of men necessary to count the stock in one day in each and every stock location of the company. These men will be grouped in units of three, with a supervisor whose function it will be to watch the count for accuracy and completeness. Assistant general supervisors will be appointed, to whom will be assigned a definite number of inventory crews, and who will be responsible for the completion of the inventory on schedule for the portion of the property assigned to them. The assistant general supervisor will report to the general inventory supervisor.

CAREFUL PREPARATION FOR INVENTORY

Complete instructions will be written for all members of the counting organization, who will have been selected for their familiarity with the particular material they are to count.

Care must be exercised, however, to avoid selecting men who in an operating emergency might be called away from the job, thus upsetting the schedule.

Crew supervisors and assistant general supervisors will meet at least three times before inventory day for schooling, and will go over the locations assigned to them so that they may lay out their work for inventory day.

The crew supervisors should be required to report, before the starting hour, arrival on the job and presence of their full crews. Written instructions should put them on their guard for the common errors. Constant watch will be maintained for material overlooked in the preliminary tagging.

The counter will enter the quantity and unit on both the main part of the inventory tag and the stub left on the material, and the crew supervisor will take notice of the quantities on each stub to catch radical errors.

A large number of details, too many to enumerate in this paper, enter into the carrying out of this program, both in the preparatory period and during the actual count. The count completed without mishap and on time, as it surely will be if the plans have been conservative, the tags, with sequence of numbers established, will be turned over to the general inventory supervisor and the counting organization will be disbanded.

The general inventory supervisor in the meantime will have assembled the clerical and technical organization to price and list the inventory. The work from this point will be handled by organized groups as follows:

1. Reviewing Group, which will review inventory tags for (a) missing numbers; (b) accuracy of description, unit and stock number; (c) legibility; (d) assembling of all tags with same stock number.
2. Correction Group, which will (a) look up missing tags; (b) correct faulty descriptions; (c) correct errors in count; (d) furnish information necessary for conversion of units.
3. Computing Group, which will (a) post inventory to stock ledgers; (b) price and extend inventory tags; (c) compile total value of inventory by stock classification.

After this work is completed and the general books adjusted, if need be, it is desirable to have the inventory listed in book form and in the necessary number of copies to supply interested departments. This should be a means whereby the general storekeeper may still further quicken his turnover. After so thorough a preparation it must be apparent that certain results will necessarily follow, to-wit:

1. The stores department starts the new period with work caught up since the inventory is planned and completed on a schedule and with an organization drawn from the personnel of all departments.

2. The thorough overhauling of all stocks has put them in the best possible shape to serve the operating departments.

3. Any weak spots in the routine and personnel of the stores department are certain to be brought to light.

4. The inventory, contrary to precedent, will be complete and accurate.

Standard Classification of Accounts

A NEW edition of the standard classification of accounts prescribed by the Interstate Commerce Commission and adopted as standard by the American Electric Railway Accountants' Association, together with accounting bulletin No. 19 of the Interstate Commerce Commission answering questions in connection with the classifications, both of which are government publications, have now been printed and copies are available to members at cost.

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Monthly Freight Journal Entries*

A Comprehensive Statement of the Procedure Followed by the Company with Which the Author Is Connected—The Records Are Explained Step by Step

By A. W. Heath
Chief Clerk South Bend & Northern Indiana Railway, South Bend Ind.

I HAVE been requested to explain the method used by the Chicago, South Bend & Northern Indiana Railway in compiling its freight journals. Let us start from the time the agents' reports are received at the company's office and go through the routine until complete compilation is ready to be used by the bookkeeper.

Recapitulation of Agents' Abstracts—On this form are shown the amount of freight charges received, advance charges received and prepaid charges forwarded on local, interline and express freight as debits to the various stations, as well as advance charges forwarded and prepaid charges received on local, interline and express freight as credits to each station.

Station Agents' Freight Journal—On this form are carried as debits against each agent the following: Balance from previous month, total freight received, prepaid forwarded, storage, switching, over-collections, auditor's debit advices, junction settlements, demurrage and any other items which should properly be charged to the freight agents' accounts. Each agent is credited with advances forwarded, auditor's credit advices, junction settlements, remittances and any other items which should be properly credited to the freight agents' accounts. On this form is worked out the net debit of each agent for the month. The "net debit" is the difference between the current charges and credits, not including remittances. To prove this form the total of previous month's balances is added to the total of net debits, deducting the remittances, which amount must equal the balance due the company for the month.

Interline Freight Journal—On this form as debits are shown the proportions of interline freight charges to be received from freight forwarded, the proportion of freight charges in which the company was the intermediate carrier, advance charges on interline freight forwarded (these amounts are taken from reports made by connecting lines), prepaid charges on interline freight received (this amount being taken from reports rendered to connecting lines) and correction accounts which are debits. As credits are shown the proportions of freight charges on interline freight received which have been reported to connecting lines, advance charges on interline freight received (these amounts being taken from the reports rendered to connecting lines), prepaid on interline freight forwarded (this amount being taken from reports made by connecting lines), and correction accounts which are credits.

On the debit side of this form is a column used for showing the balances due connecting lines, and on the credit side a column for showing the balances due the company. To prove this form the totals of debits as outlined above and the total balances due connecting lines must balance with the totals of credits as outlined and the balances due the company.

To the right of this form is a column showing the total amount of freight charges received from each connecting line, the total of which must balance with the total of interline freight charges received as shown on the recapitulation of agents' abstracts. In the next column on this form is shown the proportion of interline freight received, which added to the amount of proportions reported to connecting lines, must balance with the total of interline freight charges received as shown on this form, as well as the interline freight charges on the recapitulation of agents' abstracts. The total of prepaid charges received and advance charges received on interline freight as shown on this form must balance with the agents' recapitulation of abstracts.

Freight Revenue—In figuring the freight revenue for the month an entry is made up showing the total amount of proportions of freight charges received which have been reported to connecting lines, correction accounts which are debits, auditor's credit advices and all other charges which are a debit to freight revenue. As credits appear the proportion of freight forwarded reported by connecting lines, the proportion of overhead freight, over-collections, auditor's debit advices, and any other items which are a credit to freight revenue. The difference between these amounts will either be a net debit or credit to freight revenue, which deducted or added, as the case may be, to or from the total amount of freight received as shown on the station agent's freight journal, will show the total freight revenue for the month.

To prove the correctness of this take the company's proportion of interline freight received from the connecting lines, the proportion of freight forwarded and reported to connecting lines, the proportion of overhead freight, and the total of correction accounts which are debits (these items are to be found on the interline freight journal), over-collections and auditor's debit advices from the station agent's freight journal, and the amount of local freight and express from the recapitulation of agents' abstracts. From this total deduct the total of correction accounts, which are credits on the interline freight journal, and auditor's credit advices from the station agents' journal, the difference being the same amount as explained in previous statements.

Advance Suspense—To this are charged the total advances forwarded reported by agents and total advances received reported to connecting lines, and it is credited with total amount of advances received reported by agents and total advances forwarded reported by connecting lines. The difference between these items is carried to the final entry, and will reflect the amount of advances that are not settled, which are carried in the transit account.

Prepaid Suspense—To this are charged the total amount of prepaid received reported by agents and the total amount of prepaid forwarded reported by connecting lines, and it is credited with the total amount of prepaid forwarded reported by agents, and the total amount of prepaid received reported by connecting lines. The difference is carried to the final entry and will reflect the amount of prepaid charges that are not settled, which are carried in the transit account.

Final Entry for Use of Bookkeeper—After these details have been worked up, the following are listed: the agents' net debits, advance or prepaid suspense, if this is a debit, and balance due from connecting lines; then as credits are listed the various items which are credits to revenue accounts, advance or prepaid suspense, if this is a credit, and balances due connecting lines. This makes the complete journal voucher for posting to the general ledger accounts.

*Abstract of paper read at meeting of Central Electric Railway Accountants' Association, Lima, Ohio, Feb. 23 and 24, 1923. The forms referred to are not reproduced as their make-up is clear from the lists of headings given by the author.

Safety Code on Walkway Surfaces

A CONFERENCE attended by sixty-three representatives of trade associations, technical societies, safety organizations and government departments held in New York on Feb. 14 voted that it is desirable to have a nationally uniform safety code on walkway surfaces and that the development of this code should be carried out under the procedure of the American Engineering Standards Committee. This new code will apply to railway cars, railway stations and train platforms, schools, theaters, etc.

The performance characteristics to be considered in walkway surfaces are: Resistance to slipping, durability, freedom from the tripping hazard, and flammability. General and maintenance requirements will also be included in the code.

The next step in the development of this code will be the appointment of sponsors by the American Engineering Standards Committee and the organization of a sectional committee which will draft the code. This sectional committee will be composed of official representatives of all organizations concerned with the subject of safe walkway surfaces, either as producers, consumers, underwriters or officials.

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Railway Engineering Association Meets in Chicago

Attendance and Exhibits Good, Though Not as Large as in Some Former Years—Many Committee Reports Presented

THE twenty-fourth annual convention of the American Railway Engineering Association was held in Chicago March 12-16. An attendance of 1,000 members and guests was registered. While this was not as great as last year, the meetings were crowded, indicating that many attended who failed to register. Meetings each morning and afternoon, a banquet one evening and a continuous exhibit held simultaneously by the National Railway Appliance Association indicate the full program participated in by those in attendance.

Lack of economy and efficiency are the admitted faults of the railroads today, according to R. H. Aishton, president American Railway Association, who gave a brief address the opening morning of the convention. To overcome these conditions has been the problem confronted by the steam railroads, and whatever solution they may find will in a way be applicable to the electric railway. One of the most important problems confronting the railroads today is not only obtaining labor but to retain the labor. A committee which has this under consideration received the encouragement of Mr. Aishton.

President Campbell in his address delivered at the opening session commended all the committees on the resourceful work during the past year and summarized the collaboration of these committees with other organizations. He spoke at length about the committee on standardization and remarked that fifteen industrial countries had a national standardization body composed by association of representative engineering, industrial and governmental organizations for the work of standardization. While he well appreciated the work and effort of the American Engineering Standards Committee, which is the name of this body in the United States, he felt that since the requirements of the railways are so large, distinctive and important, they should make their own standards untrammeled by entangling alliances. However, in things used in common by the railways and others, the argument of the A.E.S.C. has some weight. Enlarging upon this question, Mr. Campbell stated that his objection to standardization is that it tends to stagnation of progress and improvement as to the thing standardized. If standardization was synonymous with perfection, his objection would be removed; however, perfection is rarely, perhaps never, attained. There may be standardization of some things highly developed, yet there should be an understanding that the standard is subject to revision from time to time as progress in the art warrants or requires.

Although the American Railway Engineering Association has been engaged for years upon the work of standardization for the roadbed and track it has recorded its results under the name of recommended practice. To emphasize this point Mr. Campbell spoke of a recent canvass he had made of companies in regard to their adopting recommended practices as printed in the Association's Manual. Of the replies received only 23.5 per cent have made the recommendations standard or as nearly standard as possible, while 36 per cent have taken the recommendations as a guide. He urged all members to sell these recommendations to their respective roads.

Upon request of the International Railway Congress for a subject to be considered in London in 1925, the association recommended the subject of "Grade and Alignment Revision vs. Heavy Steam Power or Electrification."

At the business meeting on Thursday Edward H. Lee, vice-president and chief engineer Chicago & Western Indiana Railroad, was elected president for the ensuing year of the American Railway Engineering Association. At the annual meeting of the National Railway Appliances Association, L. W. Shugg, General Electric Company, was elected president of that organization.

An abstract follows of some of the points of particular interest brought out in the committee reports or in the discussions which promise to be helpful to electric railway officials:

ELECTRICITY

The committee on electricity, E. B. Katté, chairman, presented a voluminous report, including the following specifications with the recommendations indicated:

Specifications for adhesive tape for general use for electrical purposes. (Same as A.S.T.M. Serial Designation D69-22T.) Submitted as recommended practice, to be printed in the Manual.

Specifications for rubber insulating tape. (Same as A.S.T.M. Serial Designation D119-22T.) Same recommendation as above.

Railroad specifications for electric light, power supply and trolley lines crossing railways. Approved by the committee Oct. 5, 1922. Same recommendation as above.

On the subject of water power, the committee presented a compilation of data, from several sources, showing in detail the water-power resources of the country. As to the "super-power survey" of the Geological Survey, this was stated to be a valuable contribution to the literature of the subject. However, the committee believes that the time is not yet opportune for the association, as a body, to interest itself in this major project.

With regard to electrolysis, mention was made of the close but negative vote on the motion to disband the American Committee on Electrolysis. The A.R.E.A. voted to disband, the A.E.R.A. to continue. The committee, however, recommended continuation of representation on the American committee; also that further reports on the effect of electrolysis on reinforced concrete be discontinued at least for the present.

The most interesting part of the report, to electric railway men, dealt with the year's developments on Part 2 of the National Electrical Safety Code. Referring to the famous conference of March 2, 1922, held under the auspices of the American Engineering Standards Committee, the report stated: "The conference resulted in the somewhat unusual action of the adoption by the A.E.S.C. of the U. S. Bureau of Standards' National Electrical Safety Code with the proviso that Part 2 thereof would be subjected immediately to revision by a sectional committee. . . . While the conference was called to determine whether there should be a set of national specifications for crossings between overhead electric wires and railways and between different wire crossings, the primary recommendation of the conference was the approval of the National Electrical Safety Code with provision for certain revisions." This procedure was opposed in the main committee of the A.E.S.C. by the A.R.A. representative, but by letter ballot the A.E.S.C. approved the "Code" and announced the formation of a sectional committee to consider revisions of Part 2.

The "Code" was stated in the report to be acceptable as to recommended practice except for certain requirements in Part 2 which pertain to factors of safety and clearances for wires and cables crossing over railroad rights-of-way. The representatives appointed to serve on the sectional committee are: George Gibbs, Long Island Railroad; W. L. Morse, New York Central Railroad; G. H. Dryden, Baltimore & Ohio Railroad; E. C. Keenan, New York Central Railroad. The committee recommended that co-operation with the U. S. Bureau of Standards be continued with a view to reconciling, so far as possible, the requirements of Part 2 of the National Electrical Safety Code and the association's 1922 specifications for electric light, power supply and trolley lines crossing steam railways.

The committee listed the state representatives and alternates who had been appointed, under authorization of the board of direction, to represent it, and recommended that members having transmission-line crossing problems confer directly with these representatives.

One other matter of interest was the recommendation that rules, given in the report, for the protection of oil sidings from danger due to stray currents be

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approved as recommended practice and printed in the Manual. As to recommendations for next year, these had principally to do with continuation of unfinished work, together with a study of insulators, and knife and snap switches and revision of the tables showing third-rail and overhead working conductor clearances.

Co-operation with A.E.S.C.

Close co-operation between the association and the American Engineering Standards Committee was recommended in the report of the committee on standardization. At present the association is a member of the A.E.S.C. only indirectly, through the American Railway Association, although it has presented to the A.E.S.C. for adoption as "American standards" two of its specifications, those for fixed and movable railway bridges. Discussion of the report dealt with the question of whether the association should become a member of the American Engineering Standards Committee.

A. W. Whitney, chairman of the latter body, and J. A. Capp, vice-chairman, addressed the meeting, giving reasons why the association should join. Mr. Whitney urged that the A.R.E.A. is not a sufficiently large interest to work by itself, out of contact with other interests. Mr. Capp argued that railroad men need the broadening effect of discussing their problems with other groups of men having related problems. On the other hand C. A. Morse, Rock Island Lines, expressed the view that the association has enough to do in getting the railways together in using the association's standards, and is little concerned with having these standards approved by outside interests. He held, also, that the problems of electric railways and of industrial trackage are distinct from those which are before the association. E. B. Katté, New York Central, said that the association's committee on electricity had recently been outvoted in a national standardizing body and a specification adopted that is less strict than the railway interest requires. To show that the work of the A.E.S.C. is too complex and too slow for the association's needs, he cited the delay of more than two years in formulating insulated wire specifications. The association would find itself in an unsatisfactory condition if it had not prepared its own specification. He favored continuing the present representation on the A.E.S.C. by one member, as against an increased representation.

O. F. Dalstrom, Chicago & Northwestern, made the point that the association must be represented in the A.E.S.C. in order to defend its own interests and prevent the adoption of standards not acceptable to it. He instanced the fact that two railway bridge specifications are now in the field, and that it is essential for the association to submit its own specifications to the A.E.S.C. for adoption, as it has done. E. A. Frink, Seaboard Air Line, argued that standardization by a single industry, such as the railways, can never equal that done by a national body such as the A.E.S.C.

No action was taken by the meeting.

Wooden Bridges and Trestles

The committee on wooden bridges and trestles recommended the approval of plans for open-deck pile and frame trestles and multiple-story trestles and ballast-deck pile trestles. The subcommittee, headed by J. B. Maddock, has made a very thorough study of the subject and the report contained many diagrams of recommended trestles.

Signs, Fences and Crossings

The enormous programs for highway construction in the United States and the increased importance of the highway grade crossing as a consequence of the marked increase in the number and speed of highway vehicles has been an incentive to the committee on signs, fences and crossings. Specifications for highway crossings, covering such matters as grade, width, drainage and flangeways, were submitted. A brief report was presented on substitutes for wooden crossing planks, indicating the results obtained with concrete and bitumen crossings. Advice has been received of the construction of 184 crossings of bituminous materials during the past year.

Iron and Steel Structures

The most important feature in the report of this committee was a complete set of specifications for steel highway bridges. These will fill a real need because railway engineering officials are now frequently required to design and construct highway bridges as a consequence of the enormous highway construction programs. The report also included specifications for the erection of steel railway bridges.

Masonry

A progress report was made by the committee on current developments in the art of mixing concrete. Another report made by this committee gave information as to the factors causing deterioration of concrete, based on reports obtained from various sources on defects found in existing railway structures. It was found that the first cause of deterioration was of chemical nature, a study of cases where concrete had been affected by acid, alkali, or sea water action. The second cause, namely, mechanical, was generally found to be of an abrasive nature. The action of clamshell buckets and ice or other floating objects caused this form of deterioration.

Records and Accounts

The report of a sub-committee brought out the feasibility of reporting engineering data in graphic form. It also submitted a number of recommended diagrams. While statistical data usually consist of tabulated figures which afford no perspective or mental picture, a graphic form can save much time and mental effort necessary to draw correct conclusions from the data. These charts or diagrams should be easy to draw and read and should be so made as to show both the actual and relative magnitude and importance of the several quantities.

Rules and Organization

The report of this committee brought out the peculiar position the committee now was in owing to the fact that all rules governing officers and employees except those involving matters of discipline must have some bearing on the manner of conducting the work. Therefore, the work of this committee frequently tends to overlap that of other committees dealing with particular phases of maintenance of way. A study has been made by the committee on the organization of work where mechanical appliances and tools are used.

Track and Stresses in Track

The joint committee of the association and the A.S.C.E. on stresses in track presented an extended progress report, the third in the series, and included the results of many tests on straight and curved track to determine the effect of counterbalance and speed, etc. Among the facts of special interest to electric railways brought out by the committee on track were the results of some tests on curved rails and the conclusions in regard to guard rails. One question considered in connection with curved track was whether railways were justified in going to the expense of pre-curving rails for curves instead of laying straight rails. In 1915 the association recommended that rails for curves of 4 deg. and over should be curved before being laid. In 1921 the rules committee suggested that rails should not be curved "except on very sharp curves, much sharper than usually found in main line tracks." A questionnaire showed a marked tendency toward not pre-curving the rails. The Baltimore & Ohio Railroad used both curved and straight rails on curves of 4 deg., and over, and decided that on curves up to 12 deg. 30 minutes, which was the heaviest curve in new rail territory, track could be maintained for line and gage as economically when laid with straight rails as with curved rails. The committee says in conclusion: "It seems to be a question whether pre-curving justifies the expense."

In its conclusions on guard rails for protecting curves, the track committee does not recommend their use except on sharp curves and in special locations, where the super-elevation is inadequate. Allowable speed should not be increased on curves because guard rails are installed.

Roadway

Under chemical killing of weeds, the committee reports that 31,500 miles of track have been treated with a chemical weed killer since 1914, sodium arsenite being used in practically all cases, one part of concentrated solution to twenty

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parts of water. The cost of the chemical on a strip 1 ft. wide and 1 mile long is $3.46. The chemical has no bad effect on the track, but treated vegetation is dangerous to stock and if the weeds are at points where stock can reach them, a chemical making them unpalatable should be used. The Erie Railroad reports good results with salt as a weed killer, 0.8 carload per mile being required. Regarding culverts, the committee says that corrugated metal culverts should preferably be used only in places where the top of the pipe is not less than 3 ft. nor more than 10 ft. below subgrade, and where the diameter of the pipe is not in excess of 48 in. The material should be high grade metal or as nearly pure as possible and with rust-resisting properties. Galvanizing alone is not sufficient to protect the metal from rust.

Wood Preservation

The report of the committee on wood preservation was largely taken up with the subject of marine piling, the subcommittee assignment having been "to make final reports, if practicable, on treatment to be used in the protection of piles and timbers in water infested by marine borers." As a result of elaborate investigation, given in extenso in the report, it was recommended that timber and piles be carefully creosoted, there being no other treatment in sight at present. Along with careful creosoting, certain features of selecting and preparing the lumber and piles before treatment, and of handling after treatment, are of vital importance. These the committee gives under the head of "recommendations for handling and installation." Sample recommendations are these:

"Do not use cant hooks or dogs in handling. Use rope slings. Frame and bore all timbers before treatment, whenever practicable. Particularly avoid cutting or boring below high water mark."

On the subject of service test records, the committee reported a lack of interest on the part of the railroads in sending data to the United States Forest Products Laboratory. The committee sent out a questionnaire to cover the practice in the use of treated timbers in bridges, docks and wharves. Replies indicated that on open deck bridges, the timbers treated with creosote have given a life from fifteen to twenty-five years and over; treated timbers used in ballasted deck bridges have given a life from fifteen to thirty years, and on docks and wharves, where treated material has been used, a life from fifteen to forty years has been secured.

Regarding the treatment of Douglas fir, this was stated to be a most difficult timber to treat, offering as it does such great resistance to the injection of the preservative. In the treatment excessively high temperatures in combination with excessively high pressures should be avoided as the timber may be injured thereby. Douglas fir is, however, thoroughly satisfactory if properly treated and given proper handling after treatment. The committee gave full specifications for the treatment and handling of Douglas fir.

The committee favored the application of preservative to all so-called "sap" ties of the species usually included under the term "white oaks." The so-called "heart" ties of the species usually included under the same term can be treated efficiently so that they should withstand decay in a manner similar to other treated ties, if proper precautions are taken. A decision to treat such ties should be made after a study of the conditions at hand on each particular line and in each particular locality has shown that economy can be effected thereby.

A sub-committee on mechanical preparation of timber for treatment, including adzing and boring for ties, called attention to the following salient points:

1. The framing of bridge timbers and particularly of bridge ties and guard rails before treatment is practicable and economical.

2. Practically all hewed ties and a large proportion of sawed ties require adzing, and this may be done at less cost by machinery than by hand.

3. Adzing of ties after treatment removes a portion of the most thoroughly impregnated wood and reduces the resistance of the tie to decay.

4. Spikes offer greater resistance to withdrawal when driven in bored holes of proper size than in the solid wood. The proper size of hole is a subject on which opinions differ, but for soft woods ⅛ in. less and for hard woods 1/16 in. less than the diameter of cut spikes appear to be accepted as correct.

5. The boring of holes before treatment greatly assists in the distribution of the preservative through the tie.

6. Holes should be bored all the way through the ties. This opens additional cross-sections to the direct action of the preservative and prevents the accumulation of water in the hole.

In an appendix to the report, directions for determining the penetration of sodium fluoride in wood were given. These had been prepared in conjunction with members of the preservative committee of the American Wood Preservers' Association.

This method requires the following chemicals and apparatus:

Solution 1. Ethyl alcohol (not denatured), 95 per cent, saturated with potassium thiocyanate.

Solution 2. Dehydrated ether, containing 1 gram ferric chloride for every 50 cu.cm. This solution should be kept tightly corked to prevent it from becoming too concentrated on account of evaporation of the ether.

To make tests mix equal portions of solutions 1 and 2 in an ordinary atomizer. Spray mixed solution on the dry section of wood to be tested. Spray mixed solution evenly all over. The line of demarkation between the treated and untreated portions will soon be noticed. The color of the treated wood will remain unchanged. The untreated wood will be stained red. Ordinarily the first spray will not yield a permanently distinct stain. Therefore, dry this section and repeat as often as necessary to obtain satisfactory depth of color. Water in the spraying solution causes the stain on red oak to turn black (tannic acid). Therefore, for staining red oak, add an equal quantity of ether to the ferric chloride ether stock solution, together with a few crystals of potassium thiocyanate, and spray as above.

Yards and Terminals

While the report of the committee on yards and terminals relates to operating conditions considerably different from those of electric railways, there is much in it that would be suggestive to electric railway managements planning new terminals or terminal reconstruction. The report contains plans of many terminals, a bibliography covering railway passenger stations, data (in curve form) regarding areas of different parts of terminals in terms of numbers of rush-hour passengers.

Ties

The principal part of the report of the committee on ties dealt with substitute ties. Reports of experience with various types were reported and recommendations as to features desired in such ties were listed. Four types were mentioned as worthy of further investigation, as adapted to steam railroad use. The committee also gave attention to piling of ties in storage, including diagrams of different plans for piling them.

Merits of the Company Publication*

It Possesses Certain Advantages Over Group Meetings in Promoting Employee Loyalty and Public Appreciation of the Service

By A. R. Baxter

General Superintendent Indianapolis & Cincinnati Traction Company, Rushville, Ind.

IN OUR work the fundamental idea is to bring departmental heads and their employees into a closer relationship, in order to secure better co-operation and, in turn, better service. Service is what we have to sell and if we do not produce a good brand, we cannot meet the demands of the market (the traveling public) and hence will not get our share of the business.

The heads of departments may get important matters before their men, as a body, through group meetings, or through the issuing of a company publication. The former has been tried and has produced some good results; but on account of the nature of railway service, many employees are unable to attend the meetings. The absentees may be the very ones who bring us closest

*Abstract of paper presented at the annual meeting of the Central Electric Railway Accountants' Association, Lima, Ohio, Feb. 23 and 24, 1923.

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to the public, and are those toward whom most criticism is thrust. Therefore this method falls short of our ideals.

The purpose of a house publication is threefold, and the essentials may be enumerated as follows:

1. To create in each employee an interest in the company and an earnest desire for its success; in other words, to sell the company to the employees and make them feel that they are a part of it.

2. To sell the company to the public; to make the service such that the public will feel proud of it; to show the public that it is the only system that will take care of transportation troubles at all times and in any kind of weather; to show the public that it is one of the best and cheapest necessities, and should be maintained and respected.

3. To convey to the employees ideas, rules and regulations for the betterment of the service.

The publication should be made so interesting and instructive that the appearance of each issue will be eagerly awaited by both employees and employer.

Each issue should contain personal items and the name of every employee should appear not less than once a year in its columns; giving him honorable mention for good work done, no matter how meager his task may be.

No opportunity should be neglected to publish historical or an educational article on the industry which the publication serves.

Each department of the organization should furnish enough items of various kinds to maintain a column in each issue.

The aim of a company publication should be to create a spirit of loyalty, fraternity and unity of purpose; that purpose being the success of each employee through the results he produces for his employer.

Jack-in-the-Pulpit Is Succeeding the Shrinking Violet*

Railways Should Publish the Facts on Transportation so That the Public Will Not Be Misled—How to Advertise

By Labert St. Clair
Director of Advertising Section, American Electric Railway Association

OLD Doc Coué has sounded a splendid motto for the country in general and electric railway men in particular. Every day in every way things are getting better and better with us. One sign of this is that the shrinking-violet type of electric railway manager is disappearing and the jack-in-the-pulpit type is taking his place. Electric railway managers all over the United States are standing up in public and informing the riding public about themselves and their problems.

This is the attitude that all electric railway managements should take. It is not only the proper one from the standpoint of his protection but it is a duty to the public.

Any electric railway man who cares two whoops for the future of his community is going to fight hard against the forces that oppose him because these forces almost invariably are the ones which would hinder the prosperity of every city.

The electric railway man is constructive because he has a permanent investment and intends to stay on the job in his home city. His opponents usually are people who have no investments to speak of and are concerned only in their own personal welfare. They are perfectly willing to destroy every other business in the city if there is any opportunity that they may be able to vault into prosperity over the remains of legitimate business.

If you doubt this, consider for a moment the three chief forces that work against the prosperity of street railways.

Forces Opposed to Electric Railways

One of the primary forces is the demagogic politician. His stock in trade always is attack. You never hear him talking about building up street railway service. He concerns himself solely with a discussion of lowering the fare, which, as everyone knows, naturally must result in decreased efficiency of service. Fortunately, owing to the protection thrown about utilities by commissions and the courts, he seldom is able to wreck service entirely but by his blatherings he can frighten away investors and thus retard the improvement of service greatly. Every politician knows that a city cannot be built up under less than a fair fare, but he doesn't take this into consideration when he makes his anti-utility campaigns. The one object he has in mind is to get into office.

Another great force in opposition to electric railways is the sensational newspaper. Anyone who knows the least thing about the newspaper business—and I speak from more than fifteen years' experience in it—is aware that the only reason our yellow press has for fighting honestly conducted electric railways is that they want to gain circulation. They realize that their class of readers are not grounded in the fundamentals of economics and that it always is easy to please them by attacking businesses representing large investments. Therefore they continually seek to wreck electric railways by advocating less than a living fare and they always will, of course, unless by advertising and publicity electric railways expose the insincerity of these muckrakers. The fare never can be made low enough to suit such newspapers because the minute they quit advocating a lower fare their circulation will drop.

The third party to attack electric railway rates usually is the citizen who sincerely believes that it is possible for any electric railway to prosper on a lower fare than it is getting. He agitates the question because he is not informed.

It is easy to see that none of these three forces represents a constructive interest and that if permitted to proceed rampant they soon would wreck not only the electric railways but the general business of any community. For indeed, as experience has shown in Des Moines and elsewhere when electric railway service is wrecked, all other businesses suffer greatly.

Therefore I say it is the duty of every electric railway man as a good citizen, regardless of his personal or financial interest, to stand up and tell his story. Unless he does tell it in every possible way, the people will never know the truth and they cannot be blamed for accepting the biased, half-baked or wholly untruthful statements of politicians, sensational newspapers and sincere but uninformed citizens.

Advertising Necessary

No more sympathy is due the electric railway man who doesn't tell his story to the public and then gets in wrong with it than is due the merchant who goes bankrupt through failure to advertise his wares. Both are in exactly the same category. The merchant fails because he permits other merchants who are engaged in the same business to out-advertise him. The electric railway manager fails because he is out-advertised by his opponents. They sell more bad will for him than he sells good will and the result is that he goes out of business.

If you want to know the force of advertising and publicity in the electric railway business, all you have to do is to take a list of companies that are telling their stories to the public and those that are not and compare their financial and public relations situations. By this I do not mean that every company which is telling its story is enjoying prosperity, but I will assert that a greater percentage of those that are being frank with the public and carrying on continuous advertising campaigns are more prosperous than those that are sitting back and doing nothing. Furthermore, even the company which advertises and is not financially prosperous is storing up a supply of good will to be drawn on in the future. And good will inevitably will translate itself into prosperity.

About 80 per cent of the mileage of the electric railway industry now is represented by companies which advertise. Not enough of them, however, advertise continuously and use all medi-

*Abstract of address delivered at annual convention of Oklahoma Public Utilities Association, Oklahoma City, March 12-14.

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ums in their possession. This is a great mistake because the public very quickly forgets.

If you don't believe this, think back fifteen years and try to recall what particular tooth wash was most in the public mind. It was Rubifoam, was it not? Yes, it was. Rubifoam in those days literally was on every tongue. Yet today you never hear of Rubifoam. Do you know the reason? It is simply this: The company making Rubifoam quit advertising. The same is true of any number of other articles which formerly were widely advertised in this country but are not advertised now. If the public mind will forget a commercial article when all it has to remember is simply a name, because there is a let-up in advertising, how much more quickly will it forget the detailed and, perhaps, somewhat complicated story of an electric railway?

Those, in brief, are the reasons why electric railway companies should advertise. Now let us turn for a moment to how to advertise.

How to Advertise

No industry or business in the world has such wonderful channels through which advertising may be moved cheaply as an electric railway. By virtue of having a vast force of salesmen on moving cars and excellent window space, racks and other facilities through which to display and move advertising matter, the electric railways have a decided advantage over any other business in the world. Of course, they can and should, in common with all other businesses, also use the newspapers. I am a strong advocate of paid newspaper advertising, but in addition to newspaper space they have unparalleled space of their own which they can use at a very small cost.

It is decidedly advantageous, if you can afford it, to have an advertising man, but if you cannot afford one, do not despair. There is not an electric railway executive in the United States who cannot write advertising if he will just sit down and do it.

It is useless, however, to begin advertising or publicity work until you are absolutely certain that you are rendering the best possible service under the circumstances and are willing to court legitimate inquiry into your operation. To determine whether this situation exists or not, it behooves every management to ask itself these questions.

Am I courteous toward and accessible to the public and my employees?

Do I really hear what the public is thinking about my management, or am I simply being told the things I like to hear?

Are all of my employees and I making the most of every opportunity to create good will surplus, or are we just "getting by"?

Until these questions can be answered in the affirmative, without mental or other reservation, it is virtually useless for any management to enter upon printed advertising.

A company may advertise until the cows come home, emphasizing its desire to serve, but if this friendly and cordial attitude is not reflected in the actions and voices of the organization from the manager down to the lowest paid employee, its advertising cannot net maximum returns.

The easiest and best way to prepare advertising copy is to write your story just as you would tell it if you had your friend Bill Jones across the table from you and were trying to sell him the proposition which you want to sell the general public. Once you have gotten Bill Jones facing you, theoretically, and have begun to prepare your proposition for the public in the same clear, simple, honest fashion that you would present it to Bill, you are on the way to success.

After that your chief problem will be to select the best mediums through which to present your message to the public.

Indicate to the advertising solicitor or the printer with whom you do business that you welcome suggestion and advice on the preparation of your material and you will find that he can be of a great deal of help to you. It is his business to know how to effect the best possible typographical display of your message.

Base your advertising plea on service to the car rider. Don't weep. Don't try to excite pity for your company. Sell your goods on merit.

Above all, build on and with facts. From start to finish, hammer home the truth. If your opponent lies about you, don't say he lies; show by facts that he lies. Don't get huffy and explode. You can't lay bricks and throw mud at the same time. If the truth is on your side, you will win in the end, but you wouldn't hasten the end by any method but that of giving facts. And don't merely buy advertising; invest in advertising, because advertising correctly used pays big dividends in good will.

U. S. Chamber of Commerce

THE program of the annual meeting of the Chamber of Commerce, of the United States to be held in New York on May 7-10, has been made public. As already announced, the general subject will be transportation. On Monday, May 7, there will be meetings of the national councillors and the general meetings will be held on the following day, as follows:

Tuesday May 8

11:00 a. m. General meeting. President's address.

1:00 p. m. Luncheons and meetings of the following groups: Civic Development, Domestic Distribution, Fabricated Production, Finance, Transportation and Communication.

8:00 p. m. General meeting—Topic: "European Conditions from the American Viewpoint."

Wednesday, May 9

10:00 a.m. General meeting. Topic: "Developing a National System of Rail, Water and Highway Transportation." Consideration of resolutions.

1:00 p.m. Luncheons and Meetings of the following groups: Foreign Commerce, Insurance, Natural Resources Production, Transportation and Communication.

6:00 p.m. Dinner of the National Association of Commercial Organization Secretaries.

6:00 p.m. Dinner of the American Trade Association Executives.

8:00 p.m. Representatives and members will be guests of the New York committee at the Hippodrome.

Thursday, May 10

10:00 a.m. General meeting. Topics: "The Farmers' Interest in Transportation," "Financial Support for the Railroad," and "The Re-establishment of Railroad Credit."

2:30 p.m. General meeting. Topic: "Railroads and the Government." Report of the committee on the nomination and election of officers and directors. Final action on resolutions.

8:30 p.m. General meeting at the Hippodrome, to be addressed by an outstanding leader of world affairs.

On Friday, May 11, there will be a trip to West Point.

For the general sessions held on Tuesday and Wednesday morning, Thursday morning and afternoon, and Tuesday and Thursday evenings the most prominent authorities of the country upon transportation questions will be secured, including at least one representative from the President's Cabinet. President Barnes will himself open the subject of discussion in his annual address.

In addition to the annual meeting the chamber has appointed five special committees to take up a study of different phases of the transportation problem. They will report to a general committee representative of all interests. By the time the annual meeting is held it is expected that the investigations will have advanced to a point where important announcements of progress can be submitted.

Oklahoma Association Meets

THE Oklahoma Utilities Association held its fifth annual convention at Oklahoma City on March 12, 13 and 14. A paper presented by Labert St. Clair on the subject of informing the public appears elsewhere in this issue. B. Hilburn, manager Tulsa Street Railway, presented an interesting paper on the experience which the railway company in Tulsa has had in going into the bus business. He was unable as yet to draw definite conclusions about the outcome of the plan. This paper will be published in an early issue of *Bus Transportation*. D. C. Green, vice-president and general manager, Fort Smith Light & Traction Company, Fort Smith, Ark., presented a paper on "The Merits of the Weekly Pass," which will be treated in a later issue of this paper.

E. F. McKay of the Oklahoma Corporation Commission, called attention

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to the fact that utility commission powers are exclusive and not inclusive, since these powers are fixed by law and any case with which the commission is allowed to deal must possess a definite interest for the public. He pointed out that commissions have no arbitrary powers.

Martin J. Insull emphasized the primary importance of the public relations work of the utility companies. Without disparagement of the technical and operating forces in the utility field, he said that confidence in utilities on the part of the public is necessary before the technical and operating talent can have full play in establishing the service the public wants.

Charles B. Scott, Chicago Safety Bureau, urged that the utilities in any community should not only participate, but take the initiative in community safety work. The first essential in making safety work a success is the interest of the company management; the second most important thing is the interest of the supervisory forces, and the third, a definite plan and organization.

General George H. Harries in an address expressed the belief that ill-considered utility regulation is largely a thing of the past, and that regulatory commissions are now on the same plane as courts of justice and realize their obligation to see that both the public and the utilities receive just treatment.

The officers of the association for last year were re-elected for the coming year as follows: President, Fred W. Insull; first vice-president, Sherman Mooter; second vice-president, J. C. Chestnut; treasurer, William Mee. O. D. Hall, who has been acting secretary, was appointed manager.

New England Club Banquet Attended by 600

AT ITS twenty-third annual banquet, which was held at the Copley-Plaza Hotel on the evening of March 22, the New England Street Railway Club had an attendance of about 600. President Potter reported the year had been successful and referred particularly to the February meeting as most helpful. He reported that there are now 805 members, or seventeen more than last year. Speaking of competition, he said the bus is here to stay but it can be operated more economically by the railway companies than by outside interests. He suggested as a topic for an early meeting, stock ownership of electric railway companies by employees. He explained that the newly-elected president, R. D. Hood, was prevented by illness from attending the meeting but predicted a successful year under his guidance.

Under the leadership of Alonzo R. Williams, Providence, three cheers were given for Mr. Potter and repeated for Mr. Hood.

George W. Gardiner was then introduced as toastmaster and officiated most acceptably during the evening.

Governor Channing H. Cox was not able to be present but was represented by Frederick Cook, Secretary of State of Massachusetts. Mr. Cook declared the Governor was greatly interested in the subject of transportation. He referred to the recent report and recommendations of the Massachusetts Department of Public Utilities and to the constructive work of Matthew Brush, former president of the Boston Elevated, in helping to bring about the present trustee plan. He also declared industries were absolutely dependent upon the proper functioning of the utilities.

Mayor James M. Curley, the next speaker, commended the administration of the Boston Elevated by the public trustees, and said the public understood the need for co-operation with utilities better than ever before. He said Boston industrially was in good condition but hampered by unfair freight differentials imposed by the Interstate Commerce Commission. Dr. William H. P. Faunce spoke along the lines of a broader national vision. Science, he declared, has brought all parts of the world near in the physical sense. America's work is to help toward a better international understanding and so advance civilization. Robert H. Newcomb, the final speaker, declared that many of the problems of steam and electric roads were alike, such as increased costs, retarded fare increases, and liability to attacks for political purposes. These could be overcome only through better public relations brought about by education. He considered the transportation department the headquarters for disseminating this information, and gave examples of commendations which followed the proper kind of action by station agents. This policy is winning out on the Boston & Maine Railroad.

At the annual meeting in the afternoon the ticket submitted by the nominating committee was elected as follows:

President: Ralph D. Hood, Haverhill, Mass.

Vice-presidents: L. D. Pellissier, Holyoke, Mass.; N. J. Scott, Hartford, Conn.; T. H. Kendrigan, Manchester, N. H.; T. B. Jones, Burlington, Vt.; Fred D. Gordon, Portland, Me.; Edward A. Brown, Newport, R. I.

Secretary: John W. Belling, Boston, Mass.

Treasurer: Fred F. Stockwell, Cambridge, Mass.

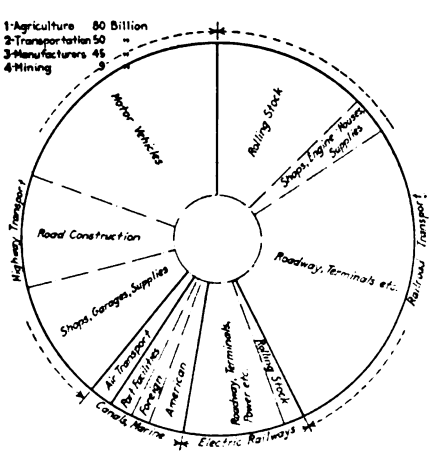
Executive committee: A. E. Potter, Charles H. Wood, W. W. Field, Howard F. Fritch, George H. Martin, George H. McFee and H. M. Flander.

Finance committee: R. D. Hood, W. C. Bolt and H. B. Potter.

Fifty Billions in Transportation

Investment in Highway Transport Almost Equals That in Railroads—Growth of Investment in Various Transport Facilities Compared

IN A paper presented before the New York Railroad Club on March 17 J. Rowland Bibbins, consulting engineer, Washington, D. C., made a very interesting comparison of the present investment in the transportation facilities of the nation and laid great stress upon the need for a proper co-ordination of the whole transport mechanism, including rail, shipping, barge, trolley, motor and airplane. He showed that the transportation industry now represents an investment of $50,000,000,000. This is divided approximately as follows: Railroads, two-fifths; highways and motor transport, two-fifths; electric railways, one-tenth; merchant marine, canals and port facilities, one-tenth. Using the basic rail tonnage as the best index of growth, Mr. Bibbins pointed out that the tonnage has increased at the rate of the 2.6 power of the population. He said that if it were possible to press a magic button and double the present facilities for handling rail tonnage, these facilities would last perhaps only fifteen years.



Component parts of the $50,000,000,000 transportation industry

The speaker called particular attention to the fact that in the last decade motor transport has commanded nearly four times as much new capital input as the railroads, nearly sixteen billion dollars, while during the preceding decade ending 1910, the reverse was practically true—two billion for highways as against six and one-half billion for railroads. During the last decade motor transport has called for over two-thirds of the new capital input of the whole transport system. The total transport investment today amounts to over $1,200 for each of the 41,000,000 wage earners of the United States. This tremendous growth in the last decade has brought transportation up to the point in investment that it is second only to agriculture, which represents $80,000,000,000. It exceeds manufacturing, which is a $45,000,000,000 industry.

Emphasis was laid upon the need of a new broad study of ways and means for welding all of the transportation

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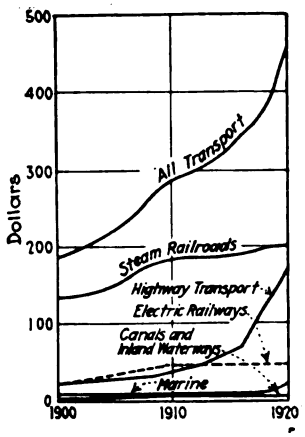
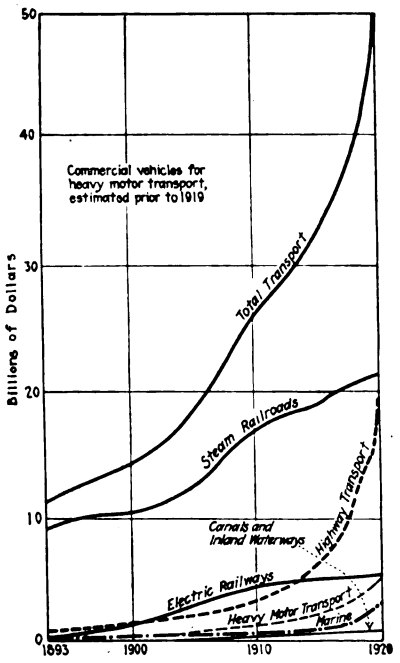
services into a unit operation, i.e., through transport from producer to consumer. It costs as much to handle our tonnage to and from a railroad as it



Growth of Various Transportation Facilities Since the Chicago World's Fair

does to haul it between stations. Moreover half of the railroad investment, or $10,000,000,000, has been spent in providing other than main line facilities. The terminal problem is thus the most important problem before the country, perhaps second only to line consolidation. Mr. Bibbins said that collection and delivery in our cities are the most important details. The public does not realize that practically all railroad freight other than coal, ores, etc., handled by carload direct has to pass over streets and highways one or more times, according to the number of fabrications involved in the manufacture and sale. The great question is whether it should be handled by vast fleets of unorganized, unstandardized, unregulated and partly loaded vehicles, or by a more scientific delivery system, efficiently financed, operated and scheduled.



Per Capita Investment in Transportation

American Association News

Letter Describes Conditions of Coffin Award

THE committee of the American Electric Railway Association, composed of C. D. Emmons, Britton I. Budd, James H. McGraw, J. G. Barry and A. H. Jackson, which has charge of the Charles A. Coffin Foundation award in the electric railway field has sent out a letter to all electric railway companies informing them of the conditions of the contest and urging them to participate.

The letter follows:

AMERICAN ELECTRIC RAILWAY ASSOCIATION

Office of the President

MARCH 19, 1923.

To Electric Railway Companies in the United States:

The General Electric Company has created and announced the Charles A. Coffin Foundation, the income from which will be devoted to the annual award of prizes for encouragement and in recognition of special services in the electric field.

Detailed information as to prizes under this Foundation is presented in the attached pamphlet entitled Charles A. Coffin Foundation, issued by the General Electric Company.

The announcement, in so far as it refers to the electric railway industry, provides for an annual award of the Charles A. Coffin Medal to that electric railway company within the United States which during the year has made the greatest contribution toward increasing the advantages of electric transportation for the convenience and well-being of the public and for the benefit of the industry.

The company receiving the medal will also receive $1,000 for its Employees' Benefit or a similar fund.

Every electric railway company in the United States is invited to participate and urged to send to the committee a representation of its activities and accomplishments covered by the field of the award.

The committee suggests that among the factors which will be considered in making the award are the following:

1. The particular initiative, skill and enterprise manifested in popularizing electric railway service—more riders and more revenue.
2. Outstanding success in gaining public good will.
3. Economies which have been introduced in operation resulting from original ideas.
4. Economies in operation viewed as a measure of the extent to which the company has taken advantage of new developments in operating and maintenance practice and equipment originating with others.
5. Improvements in construction practice which have resulted in reduced first cost, reduced maintenance, or greater reliability of service.
6. Particular success in conducting a safety program and actually reducing the number and seriousness of accidents.
7. Outstanding accomplishment in development of good relations between management and employees.
8. Special accomplishment, aside from good management, tending to reduce the cost of new capital.

The first award of both the medal and the $1,000 for employees' benefit or other similar fund will be made for the year commencing Aug. 15, 1922, and ending Aug. 15, 1923. The announcement of this award will be made at the annual convention of the American Electric Railway Association, at can Electric Railway Association, which will be held at Atlantic City in October, 1923.

All statements must be in the hands of the committee by Aug. 15, 1923.

Kindly address these to Charles A. Coffin Prize Committee of the American Electric Railway Association, 8 West Fortieth Street, New York City.

Very truly yours,

C. D. EMMONS,
Chairman.

Equipment Committee Holds Busy Session

THE equipment committee of the Engineering Association held a two-day session at the association headquarters in New York City on March 19 and 20. Those present were F. H. Miller, Louisville, Ky., chairman; Daniel Durie, Connellsville, Pa., sponsor; Walter S. Adams, Philadelphia, Pa.; Charles Gordon, Chicago, Ill.; J. L. Gould, Wilmington, Del.; George Hazlewood, Philadelphia, Pa.; J. M. Hipple, Pittsburgh, Pa.; P. V. C. See, Akron, Ohio, and C. W. Squier, New York, N. Y. In addition, G. L. Schemerhorn represented E. D. Priest, Schenectady, N. Y., and H. G. Ross represented E. S. Sawtelle, Cincinnati, Ohio.

Most of the time was taken up by meetings and discussions of the several sub-committees, which went over the work already accomplished, made recommendations as far as possible and outlined work which was still to be taken care of. Subcommittee No. 1, on motor gearing, has sent out a questionnaire and received some replies. The replies received were tabulated for detailed consideration. The standardization of web holes in gears is to be undertaken by this committee.

Sub-committee No. 2, which is making a study of various devices for trolley contact, outlined a questionnaire which will be sent to operating officials to collect additional information. All the existing standards on equipment were gone over by sub-committee No. 3, and definite recommendations were made for revision as was found necessary.

This subject has developed into a very broad one, which will require much attention by the members of the committee during the rest of the year. Sub-committee No. 4, which is making a study of spring supports for railway motors, reported the results and information so far obtained and outlined additional work which will be undertaken before the final report is made. Suggested designs for dust guards were presented by sub-committee No. 5, and drawings of these will be made for including in the final report.

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Maintenance of Equipment

Reconstruction of Sacramento Cars for One-Man Operation

THE recent reconstruction of nine two-man cars at Sacramento, Calif., into a type safely and effectively operable by one man has been wholly successful, according to company reports. These cars are operated by two men during the rush hours and when the traffic thins out the rear end is closed up and the car is operated by one man on the pay-as-you-enter plan.

The Sacramento system, which is owned and operated by the Pacific Gas & Electric Company of San Francisco, bought four Birney safety cars in 1916. These proved so useful that six more of the same general type were purchased in November, 1920. Success with these cars led to the decision to reconstruct a few of the double-truck cars from the open, double-end type to a type that could be operated either by one or two men. This would give the equipment more flexibility, and would enable the company more accurately to serve local transportation needs.

Accordingly, nine cars have been reconstructed in the Sacramento shops of the company and equipped with all the safety devices in use on the one-man cars. As a part of this change modern pneumatic brakes were substituted for the unique type of hand brake previously used. (See ELECTRIC RAILWAY JOURNAL, August 19, 1916, page 325).

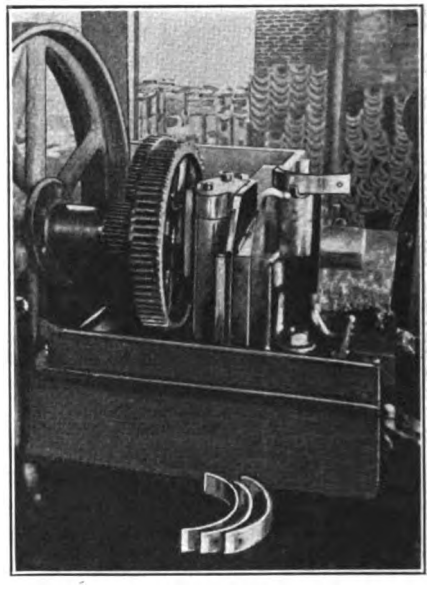
When the reconstructed cars are operated by one man the rear ends will be closed so that entrance and exit can be made only at the forward end where the operator is stationed. Separate passageways are provided to allow passengers to enter and leave the cars at the same time. When the cars are in operation all doors are locked and, as in the Birney car, at any time in the operation of the car that the controller handle is released, the brakes are applied, the track is sanded and the doors are opened. Illuminated destination signs of local design are provided on both ends of the new cars.

Claims which the company makes for the advantages of the reconstructed cars are as follows:

1. Elimination of public criticism through replacing rope brakes with air brakes.
2. Absolute safety to passengers through installation of safety devices.
3. Rounded ends instead of square, resulting in improved appearance and more comfort to motormen in cold weather.
4. Double doors in front, allowing passengers to get off and on at the same time when the car is operated by one man, thus saving time.
5. When operated with one man all doors are locked and cannot be opened until car is stopped.
6. Illuminated destination sign on top of car which is plainly visible day or night; view cannot be obstructed by any kind of vehicular traffic.
7. Steps folded, except when doors are open, resulting in easier operation through congested traffic and reduction of step collisions, generally quite common.

Double-Truck Car as Reconstructed for One-Man Operation at Sacramento

Curving Controller Segments



This Machine Bends Controller Segment Copper With Speed and Accuracy

AN EFFECTIVE scheme which is used in the shops of the United Electric Railways, Providence, R. I., for curving copper strips for controller segments is as follows:

A heavy spindle, mounted in substantial bearings, carries a short knurled cylinder which revolves, with clearance slightly less than the thickness of the segment copper, above a smooth cylindrical die or shoe. The latter is between a third and a half of a complete circumference in circumferential length. The operation of curving the copper consists in feeding it into the space between the knurled cylinder and the die as the spindle revolves slowly. Stout stationary guides confine the strip to its proper position along the spindle. The machine and samples of the

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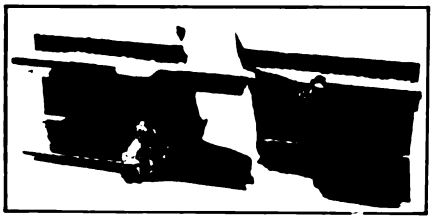
work are shown in the accompanying illustration. It will be noted that the spindle is back-geared to reduce the speed and increase the torque.

Bending Test Breaks Rail Outside of Weld



View of Broken Rail

THE accompanying illustration shows the result of a rail bending test made last fall on Thermit welded rail by the Washington Railway & Electric Company, Washington, D. C. During the test, pressure was applied directly against the side of the weld. As shown, the rail broke entirely outside of the weld.

Making It Easy to Keep Trolley Poles Painted

IN ITS shops at Fall River the Eastern Massachusetts Street Railway uses the following plan to encourage maintenance men to keep trolley poles painted: A couple of paint pots are mounted on a column at a height and in a position convenient of access to a man on the roof of a car. Thus when an inspector is examining the poles, wheels, trolley bases, etc., he can easily give the pole a coat of paint if it needs it.

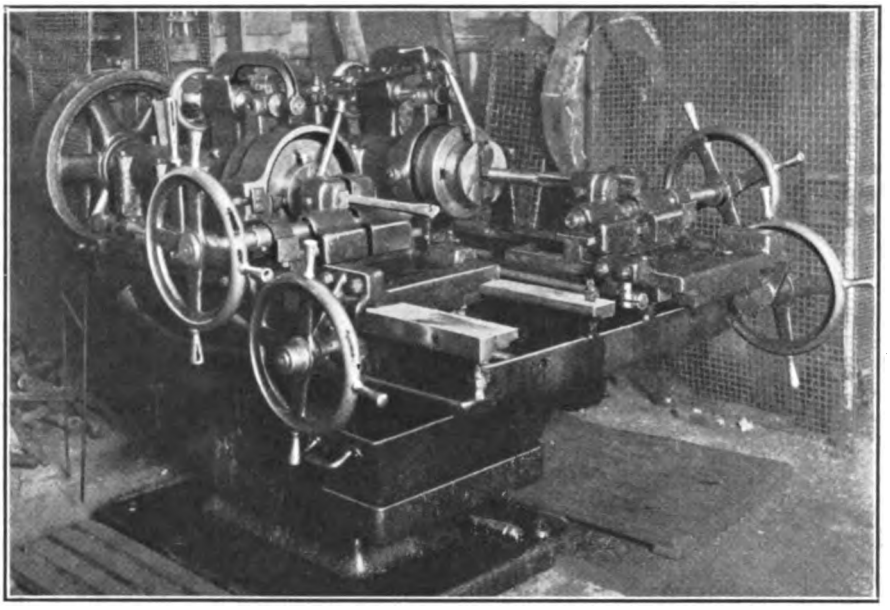
Gains from Power-Saving Recorders

IN JULY, 1919, the Springfield Street Railway was equipped with Arthur power-saving recorders on all cars except service cars, and in October, 1920, the Worcester Consolidated Street Railway was equipped with the same device. In the Oct. 15, 1921, issue of this paper C. Verner Wood, the supervisor of power saving for both companies, gave an estimate of net savings for these recorders. Figures up to Dec. 1, 1922, as estimated by Mr. Wood follow:

	Springfield	Worcester	Total
Number of recorders	282	388	670
All costs of operation, including interest and depreciation	$32,607.13	$16,202.62	$48,809.75
Gross saving	60,398.31	36,043.86	96,442.17
Net saving	$27,791.18	$19,841.24	$47,632.42

Machine for Threading Rods Is a Great Convenience

IN SPEAKING of the usefulness of various machine tools, C. P. Westlake, supervisor of equipment of the Eighth Avenue Railroad, New York, N. Y., considers his Acme bolt machine as one of the greatest conveniences he has in the machine shop. The accompanying illustration shows the machine in operation threading some rods for door operating equipment. The modern electric railway car contains a large number of rods of various character which have to be threaded, and the use of such a machine speeds up maintenance repairs and results in considerable economy.



Bolt Cutter in Use by Eighth Avenue Railroad

Emergency Light for Door-Inclosed Ramp

THE overhauling shop of the New York & Harlem Railroad, New York, N. Y., is on the second floor of the shop building, and in order to bring cars into the shop they must be operated up a long 12 per cent ramp. In order to keep the shop heated both ends of this ramp are closed by curtain type doors, which are moved up and down by a small motor as required. Difficulty was experienced from motormen starting up this ramp while the doors at the upper end were closed or partly closed. Also the proper clearance for cars requires that the doors be fully raised, and if they were left otherwise there was danger of interference.

To provide a danger signal to indicate whenever the doors were partly closed circuits of lights have been installed around the opening and the current to these lights is controlled through a switch which is operated by the movement of the doors. The lamps are red, to indicate danger, and a slight movement of the door downward causes them to light at both ends of the incline, so that the motorman can be certain before he starts up the incline that the doors at the other end are in proper position so that no interference will occur.

Car Record Board Keeps Mileages for Mechanical Department

A RECORD board kept by the mechanical department at the Geary Street carhouse of the San Francisco Municipal Railway shows each day's car-hour record and, for the convenience of platform men, indicates the track on which the individual cars are stored awaiting their runs. The board is therefore consulted by each platform man as he comes on duty.

Records are taken off the board daily by an inspector in the mechanical department, who enters in his record book the number of car-hours each car was in service. Each car-hour is taken as the equivalent of 10 miles of travel and in order thoroughly to wash and inspect the rolling stock every 2,000 miles it is only necessary to schedule the cars for this attention after each 200 hours of service.

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The record board is laid off in sections of five columns each. These columns are devoted successively to route, time of departure from carhouse, time of return to carhouse, number of car, track where car is stored. The two columns last named are ordinarily the only records changed from day to day. About 5 p.m. daily, when the last outbound car of the day has left, the records for the day are entered in the record book and these last two columns are erased. The car locations and assignments for the next day's program are filled in by the night carhouse foreman. When any change is made in the time allotted for each run, or in the exact routing specified, the mechanical department is notified and the listing on the board is changed at the time that the new schedule is put into effect.

Although the plan was developed by the mechanical department for its own records, the method of posting has proved so convenient to the operating department that the board is now the official bulletin for all daily car operating records.

A Corner of One of the 4x8-Ft. Schedule Boards

Three boards are ordinarily used, one for Monday to Friday, inclusive, and one each for Saturdays and Sundays. An extra board serves for holidays or special occasions. All three are common blackboards, 4 x 8 ft. in size, and are hung on the carhouse walls in a convenient location near the front entrance.

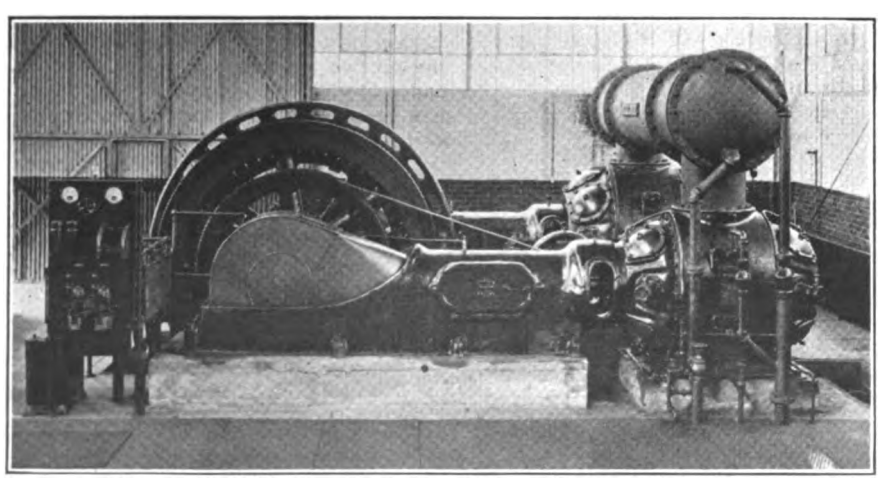
The London Underground Railways is now installing automatic railway ticket machines in theaters and department stores adjacent to the Underground stations.

New Equipment Available

Improvements in Shop Compressors

NUMEROUS improvements have been made in Ingersoll-Rand shop compressors during the past year. The new line of small air compressors known as "Type Fifteen" deliver "oil free" air and have overcome the lubrication troubles encountered in the smaller single-acting vertical compressors employing the crank-case splash lubrication system. These may be used in any of the standard types of drives, also, if desired, with constant speed unloaders which maintain the reservoir pressure within a definite range.

Duplex compressors of medium size arranged for either belt or direct connected motor drive have been equipped with the patented five-step clearance control system of regulation which has been so satisfactory on large direct-connected motor-driven units.



Recent Shop Compressor Installation

This application of clearance control presents for the first time an efficient and graduating capacity for medium size belt-driven compressors. With the five-step clearance control the unloading is entirely automatic, a compressor operating at full, ¾, ½, ¼ or no load as required in order to maintain the desired air pressure in the system.

Reduction in power secured with this method of control is practically in direct proportion to the quantity of air delivered to the compressor. Inasmuch as there is nothing more important in compressor operation than its system of regulation, this improvement marks one of the most distinct advances in compressor practice. It makes possible the operation of compressors with efficiency at full as well as partial loads, in contrast to the older types of regulation where the air load is either all off or all on.

This past year has also witnessed the introduction of a new and distinct type of direct-connected oil-engine-driven two-stage compressors known as the Price type POC oil engine compressors.

The unit of which the 100-hp. engine forms the prime mover has the air cylinder in line with the power cylinder but on the opposite side of the crankshaft. For 100-lb. pressure, a two-stage air cylinder is offered. The air intercooler is mounted below the air cylinder and forms a support therefor.

The general impression which is given by the unit is one of symmetry, compactness and durability. For air pressures less than 100 lb., a single stage air cylinder is offered, which is connected to the oil engine frame by a distance piece. For both single and two-stage work the air cylinder is double-acting, which has contributed to the exceptional balance of the machine.

In the 50-hp. size, the air cylinder is vertical and is mounted on top of the engine, immediately above the crankshaft. By so doing, it has been made possible to mount the unit on a flat car or truck for use in portable work. It is interesting to note that this construction has not resulted in excessive height, this having been kept less than 8½ ft.

Still another improvement is the building of steam-driven compressors equipped with piston steam valves and automatic cut-off governor for capacities up to 5,000 cu.ft. of free air per minute on compressors of two stages with 100 lb. of discharge pressure.

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The News of the Industry

See Promise in Accomplishments

Both Detroit Candidates Alive to City's Transportation Needs—City Council Unanimously Votes Bond Resubmission

Frank E. Doremus and Dr. James Inches were nominated at the March primaries as candidates for Mayor of Detroit. Both see promises in the achievements to date of the Detroit Municipal Railway. Mr. Doremus has represented the Detroit district in Congress for ten years. If the municipal railway is to be a success, according to Mr. Doremus, two things are necessary, horse sense and patience. The surface railway, rapid transit, sanitation and other municipal problems can be met, he believes, with the co-operation of citizens.

Mr. Doremus in reviewing the history of the city's transactions emphasized the fact that the D. U. R.'s system taken over by the city is to be paid for in ten years—the sum being $19,850,000. This he believes is a big undertaking for such a short time, where the sum is to be paid out of the earnings. He thinks the city has made a most creditable showing in paying out of earnings, the $500,000 which was due in December, 1922, $500,000 which was not due until June, 1923, and $200,000 not due until December, 1923, and at the same time paying pro rata shares to the sinking fund to retire the $19,000,000 bond issues. The people are urged, no matter how they may have stood originally on the question of municipal ownership, to put their shoulders to the wheel and to co-operate in making the system a success.

Both candidates see the need of rapid transit eventually but no definite measures are recommended at the present time. Under the existing laws, rapid transit would have to be paid for out of earnings, which is considered practically impossible. The Culver bill now pending before the State Legislature is cited as providing for the construction of a rapid transit system through bond issue to be retired out of taxation. In either course caution is urged.

The City Council has unanimously resolved to resubmit to the voters the question of authorizing the $5,000,000 bonds for the purpose of making extensions and betterments. This will be done at the April 2 election.

Indiana Hard Hit by Storm

City and interurban railways in Indiana are trying to estimate their losses from the recent wind and rain storm which swept over the State. The losses were particularly severe in southern Indiana. At times the velocity of the wind was as high as 66 m.p.h., and seldom did the wind die down to 50 miles. The Indianapolis Street Railway was compelled to suspend service on several lines for hours while debris was cleared from the streets and the wire re-strung. Service was suspended on the Shelbyville division of the Indianapolis & Cincinnati Traction Company most of one day. More than 3 miles of poles and trolley wires were down in one section of the Interstate Public Service Company's lines south of Indianapolis. The Lafayette and the Crawfordsville divisions of the Terre Haute, Indianapolis & Eastern Traction Company had to suspend service into Indianapolis. Street car and interurban traffic about Muncie was paralyzed because of a breakdown in the Anderson power plant of the Union Traction Company. Electric railway service in South Bend was crippled.

Orders Separate Cars

Ordinance Requires Birmingham Railway to Equip Cars After Jim Crow Law—Will Cost Company Large Sum of Money

SEPARATE cars or compartments with separate entrances for white and negro passengers must be provided upon every electric railway operated in the city of Birmingham, Ala., according to the terms of an ordinance adopted by the City Commission on March 13. Thirty days before the ordinance takes effect. The ordinance is modeled after the Jim Crow laws, which it is stated, have been sustained in the courts.

Compliance with the terms of the ordinance will cost the Birmingham Railway Light & Power Company approximately $750,000 and will affect practically every car in service on the various lines in Birmingham, according to the statement of J. S. Pevear, president and co-receiver of the company. He also declared that it would take approximately ten months to put the equipment of the company in condition to conform to the ordinance and give service.

If the ordinance is enforced sixty cars of the one-man safety type will have to be taken off of the lines in Birmingham and forty of them cannot be rebuilt to meet the terms of the ordinance, according to a statement of Mr. Pevear made immediately following the adoption of the ordinance. Loss of seating capacity amounting to from 15 to 20 per cent on other cars due to the installation of the partitions required by the ordinance will result, according to Mr. Pevear's statement. He declared that the purchase of fifty-five to sixty new cars of the larger type will be made necessary if the ordinance is enforced.

Members of the City Commission have declared that the ordinance is to be enforced. However, some of them have indicated that if necessary the company may be given more time than is provided in the ordinance as adopted.

Action by the commission followed a fight which has been in progress at intervals for several months for the elimination of the one-man cars and pay-as-you-enter cars on several lines in the city. Vigorous protests were filed by numbers of citizens against the intermingling of the races in entering and leaving the single-entrance cars.

Introduction of the ordinance followed quickly after an opinion of Assistant Attorney General Hugh White holding that the Alabama Public Service Commission, with which petitions had been filed by a number of citizens, did not have jurisdiction over the separation of the races on street cars, but that this jurisdiction was left in the hands of the state and cities of the state under the police powers.

In discussions of the matter it has been indicated that complete enforcement of the ordinance will be felt more keenly on the lines on which one-man cars have been operated. It was indicated that the company may take the attitude that it should not take large cars off its long lines, which have little jitney competition, to place them on the short lines where the one-man cars, in most cases, have been operating in competition with jitneys. However, no official statement on this point has been forthcoming.

The controversy over the pay-as-you-enter or single-entrance cars in Birmingham dates back a number of years. One or two previous efforts have been made by the company to introduce such cars on its lines but met with opposition from the public and earlier efforts were abandoned. One-man cars were introduced for the first time just at the close of the war, when the system was threatened with a complete breakdown in transportation, and at the same time the City Commission agreed to an increase in the fare.

Following a try-out of one-man cars on the Lakeview and Highland Avenue lines with an improvement in service they were introduced on the Loop lines and later on other lines. Shortly after this pay-as-you-enter cars were put in operation on several lines.

A number of years ago most of the

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cars operated in Birmingham had separate compartments for white and colored passengers or separate trailers for negroes. Later there was a movable partition and for several years past white and colored passengers in the cars have been separated by movable boards fixed to the top of the seat backs at the division point in the car.

The first fight against the pay-as-you-enter cars, which finally developed into the fight for the Jim Crow law just adopted, came from the North Birmingham line. The Acipco line was quickly involved. Both these lines serve an industrial territory and at times carry large numbers of negroes. There were several conferences between city officials and officials of the company, while citizens held some mass meetings. The negotiations finally resulted in the abandonment of the pay-as-you-enter system on these two lines about eight months ago.

CITY INFORMED OF COST TO RAILWAY

A few weeks ago a petition signed by 250 patrons of the Norwood line, which operates one-man cars, was filed with the Commissioner of Public Utilities. The following day a petition was filed with 200 signers from the Fountain Heights line, also a one-man car line. A conference between company officials and the Commissioner of Public Utilities was held and the matter was taken up with Judge W. I. Grubb, of the United States District Court, and the city was informed that the company could not abandon its safety cars on these two lines as it would cost a considerable sum to replace them with larger cars provided with separate entrances.

Petitions, which had been filed with the Commissioner of Public Utilities, were forwarded to Montgomery and filed with the Alabama Public Service Commission and an early ruling was asked. The matter was referred to the attorney general's department for an opinion. A few days ago Assistant Attorney General White rendered the opinion that the question involved is not one of service but of the segregation of races on the cars. He held that the Public Service Commission did not have jurisdiction, but that the jurisdiction was with the city of Birmingham and other cities of the state.

During the negotiations over the change in the system on the North Birmingham and Acipco lines the Jim Crow ordinance had been prepared by the city legal department but was not introduced, the settlement having been effected before it came up for action before the commission.

CHAMBER OF COMMERCE OPPOSES THE ORDINANCE

Following the opinion of Mr. White that the city has full control of the situation, the ordinance was introduced at the regular meeting of the Commission Tuesday, March 13, and was unanimously adopted. There was a strong fight against the ordinance at the meeting by a large committee of the Chamber of Commerce, which opposed putting any additional burden on the street railway company, which has been in the hands of a receiver since the war period. A fight in favor of the ordinance was waged by a delegation of citizens.

A bill is now pending before the Alabama Legislature amending the state Jim Crow law to make it apply to all street railway lines in the state. The bill was introduced before the Senate at its session a few weeks ago and is now pending before committees in both the house and senate. The Legislature will reconvene about the middle of July, and it is stated that there probably will be a lobby in Montgomery in the interest of this bill.

Pacific Electric Buses Being Delivered

Delivery is being made by the White Company, Cleveland, Ohio, on the order of seventy-one buses for the Pacific Electric Railway and ten for the Los Angeles Railway, referred to in the ELECTRIC RAILWAY JOURNAL for Feb. 24, page 345. Both orders call for Model 50 chassis, designed solely for passenger transportation. Some of the new buses, the railways have announced, will be jointly operated by the two street railway companies and others individually, but all will be used to supplement the street car and interurban service furnished by the two corporations in Southern California. The purchase price of the consignment of buses was about $550,000.

Incorporation of Company Not Opposed

A hearing was held in Providence, R. I., on March 20 before the Senate committee on corporations on a bill to incorporate the Westerly & Atlantic Traction Company. There was no opposition to the bill. The incorporators named in the bill are Robert W. Perkins, Norwich, Edward M. Day, Hartford, Charles B. Whittlesey, New London and Herbert W. Rathbun, Westerly.

The act authorizes the company to purchase or otherwise acquire all of the present line of railway in Washington county, now owned by the Shore Line Electric Railway including lines from Westerly to Watch Hill, to Ashaway in Hopkinton and to Pleasant View. Capital stock is fixed at $100,000 with the right of increasing this amount to not more than $500,000. The act provides further for the management of the property by not less than three nor more than nine directors, who must be stockholders.

Under the terms of the act all franchises, privileges etc., extended, or granted to the Norwich & Westerly Traction Company, the Ashaway & Westerly Railway or their successor, the Shore Line Electric Railway would be extended and granted to the Westerly & Atlantic Traction Company wherever such franchises and privileges remain in force.

Agreement Reached on Paving Terms

A fifty-year franchise has been granted to the Aurora, Plainfield & Joliet Railway through Plainfield by the village board. This ends a controversy which has extended more than a year with the paving program as its main issue. Under the terms of the new franchise the electric line is to complete the paving of Lockport Street along its right-of-way this season.

Whether the company does the remainder of the paving required by the village is contingent upon its gross income. Sixty per cent of all the gross income in excess of $137,500 is to be devoted to street improvement work until it is completed, but if the railroad's income falls below that figure it is automatically relieved from the responsibility and the village will be compelled to pay for such work as is done.

The controversy between the village and the railway began in July, 1921, when the company requested that it be allowed to use a substitute for brick or concrete in paving its tracks through Plainfield, as was required by the franchise then in force.

The village officials refused to grant the request, despite the plea of the electric line officials that the road was in financial difficulties and unable to pave with brick or concrete without incurring a deficit, as the cost of the work was estimated at $15,000.

In 1922 the railway flatly refused to do any paving at all because of its financial position, and in July the village council revoked its franchise and ordered the company to cease operating its cars. The railway refused to heed the order and several months later the village took legal action, citing officials of the road to appear in the circuit court to show by what authority it continued to operate its cars.

Preliminary proceedings were held, but the village council, apparently not desirous of destroying Plainfield's only means of railroad transportation, allowed the case to drop by not pressing the action. The case will now be dismissed.

R. A. Moore, general manager of the company, said:

> The new franchise is fair to us and very fair to the village, and we are glad to have reached a settlement. Work will be started on Lockport Street as soon as the weather gets settled. The paving will then be rushed to completion, costing us approximately $1,500.

Arbitration Board Appointed

A board of arbitration to determine whether or not Cleveland street car men are to receive 15 cents an hour increase in their pay, has been appointed. The street railway men's union is represented on the Board by Common Pleas Judge Frederick P. Walther, while the company's arbiter is Thomas P. Schmidt, a director in the railway company. Judge Walther and Mr. Schmidt have selected Fielder Sanders, formerly Cleveland's city street railway commissioner, to be the third arbitrator. Hearings on the men's demand for higher wages will be started next week.

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Hearing on Bills Concluded

Legislative Committee of New York Body Concludes Sessions on Utility Measures Now Pending—Large Delegation of Representatives of Utilities Attends and Voices Opposition

The last of the big hearings on public utility regulatory legislation now before the Legislature of New York State took place at Albany on March 21. The hearing was presided over by Senator Jeremiah F. Twomey, chairman of the Senate committee on public service. The measures under discussion were:

The Twomey-McKee bill, (Senate Print No. 833) amending the general city law, in relation to ownership of public utilities.

The Twomey-O'Connor bill (Senate Print No. 834) amending the public service commission law in regard to membership and powers of the commission.

The Twomey-Bloch bill (Senate Print No. 835) amending the public service commission law generally, to conform with the other proposed measures.

The Walker-Rourke bill (Senate Print No. 881) the so called five-cent trolley fare bill.

The Walker-Cashmore bill (Senate Print No. 912) amending the stock corporation law by bringing holding traction companies under the provision of the public service commission law.

The Walker-Donohue bill (Senate Print No. 986) amending the public commission law, providing for municipal or city public utility or service commissions.

The opposition was heard first. It was presided over by Harry B. Weatherwax of the United Traction Company, Albany, ex-Democratic Senator T. Harvey Ferris of Utica, representing the New York Telephone Company, and Judge Daniel Kenefick of Buffalo, representing light and power interests.

The principal discussion centered around the municipal ownership, the 5-cent fare and the city public utility commission bills.

The first speaker, Lewis E. Carr, attorney for the United Traction Company, Albany, emphasized the fact that the real purpose of the three feature measures was to bring about municipal ownership; that the tendency of the State for thirty years up until 1907 had been drawing toward state regulatory measures by a central body and that regulation by fifty-nine cities of the State would result in fifty-nine different standards of regulation with no centralized governing body and that none of the measures embody any provision to promote a spirit of harmony among the various proposed city regulatory bodies. Local regulation of public utilities must result in throwing the utility into politics.

Mr. Carr emphasized the fact that in the 5-cent fare measure the clause which has been in the law since 1886 providing that the "legislature expressly reserves the right to regulate and reduce the rate of fare on any railroad constructed and operated wholly or in part under such chapter or under the provisions of this article, and the public service commission shall possess the same power to be exercised as prescribed in the public service commission law" is eliminated and in its place is substituted the language that "The public service commission is hereby divested of all power to increase the rate of fare specified in this section, and every order or regulation of the public service commission in force at the time this act takes effect permitting or prescribing a rate of fare in excess of that specified in this section is hereby abrogated and annulled."

Henry Killeen, Buffalo, representing the International Railway, made a bitter attack upon the incompetency of the present Buffalo city administration to regulate any utilities and specified a number of ordinances which the Common Council had passed which the courts had declared to be out of order. He called attention to the Milburn contract regarding street car fare made in Buffalo in 1892 and charged that the legislature at Albany had been the first to break contract conditions, which had lead investors to place their money in public utility corporations. In closing Mr. Killeen seriously questioned the sincerity of the legislators who were advocating the present public utility measures.

Municipal Ownership Measure Iniquitors

T. Harvey Ferris, Utica, former State Senator, brought out the fact that the pending legislation is a departure from the avowed purpose of the Democratic state platform, in so far as public utilities of state wide service are concerned.

William P. Gannon, representing the New York State Railways, dwelt upon the injustice of a 5-cent fare bill. He said a committee of nine disinterested Syracuse citizens had agreed that a 5-cent fare in Syracuse was confiscatory. With the privilege of city regulation optional, the city could refuse to regulate, then if the state regulated a utility in a manner considered unsatisfactory to the people, the Common Council by resolution could take over the regulation and compel the utility to yield up the rights granted by the decision of the commission.

Judge Daniel Kenefick, representing the gas and electrical interests of Buffalo, was the star speaker for the opposition. The judge attacked the municipal ownership bill as being especially vicious, in that it allowed the city to engage in every public utility. He urged if the measure was to be passed that it contain a provision that a municipality in order to engage in the business of a utility corporation should either obtain a certificate of convenience and necessity from the state regulatory body, the public service commission, or else it should be made mandatory that the city should purchase the existing utility instead of engaging in ruinous competition with it. He insisted that the bill should be amended so as to compel a referendum to the people before any regulatory body could commit the citizenry of a community to any expenditure for municipalization of a utility.

Henry R. Hayes, representing the Investment Bankers' Association of America, spoke of the danger of diversion of capital from public utility investments if the proposed measures prevail.

Warnick Kernan, attorney of Utica, representing the New York State Railways, deplored the situation of a municipality acting as judge, jury and prosecutor against a public utility corporation.

W. P. Capes, secretary to the New York State Conference of Mayors, headed the proponents of the measures. Mr. Capes objected to the provision that the municipality should apply to the state public service commission for the right to regulate utilities, instead of having the power thrust bodily upon them. This brought forth the statement from Senator Walker that this had been done purposely, to put the responsibility for rates, fares and charges where it belonged. The Senator stated that scarcely a rate, fare or charge had been increased by the Public Service Commission except on the recommendation of the local authorities to it. Senator Walker said: "They come down here under cover and ask for increased fare and then condemn the state for granting it."

The principal points brought out in the hearing were that fifty-nine local public service commissions will result in a perfect hodge-podge of regulation with no centralized body to which to refer; that the local body will act as judge, prosecutor and defender of the local service corporation; that the system will be unduly expensive; that no one really wants it; that such of it as was in the Democratic platform was written into it for Hearst to run and that the policy if pursued would mean confiscation of vested interests in general.

The proponents of the measure mustered as their principal argument that the Legislature had for years been taking away and interfering with local contracts and franchises; that the people of the cities were capable of arriving at values and regulating rates and charges to better advantage than a state body; that trolley fare, gas and electric prices and service had not been adequately policed by the state regulatory bodies, which had too often been themselves creatures of the corporations they proposed to regulate and that their system of valuations was established upon a wrongful basis.

The measures will probably be amended in the Senate, especially those which have to deal with municipal ownership and regulation of utilities in cities. The speaker of the Assembly has said that the Assembly will fight each and every measure on the program of the administration, if strict party lines be maintained in the lower house, even if the bills pass the Senate in toto. In view of this pronunciamento the fate of the measures in the Assembly appears extremely doubtful.

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Seeks Injunction Against Company

A petition was filed in the Common Pleas Court by a number of residents of sections of Marietta, Ohio, where service has been discontinued, against the Monongahela-West Penn Public Service Corporation, owner of the local traction system. The petitioners seek a mandatory injunction requiring the company to operate its disused lines and give some kind of service in some degree of conformity with its still "valid and subsisting franchises." In default of this the plaintiffs ask that a mandatory injunction be issued requiring the company to remove its tracks, poles and trolley wires from the streets upon which service has been discontinued and place the streets in good repair. The petitioners further seek an injunction restraining the defendant corporation from collecting a fare in excess of 5 cents and from operating all of its lines for which it has no valid and subsisting franchise until such time as a franchise shall be obtained from the city of Marietta.

Pass Expert in Rochester

The Rochester *Times-Union*, an evening newspaper, has recently retained the services of Walter Jackson, consultant, of Mount Vernon, N. Y. As stated by that paper the purpose is "to give the people of Rochester a clearer insight into the pros and cons of the local traffic situation." Mr. Jackson's observations are appearing as a series of articles in the *Times-Union*. In his first article he gives passenger statistics and other figures to show a decline in trolley traffic. He says the present fare system is not best for the city, and that neither a street railway nor any other business concern can remain a success with a declining number of customers, even if it is making money now. The pass is talked of in interviews with Mr. Jackson published simultaneously with his articles.

In his second article Mr. Jackson compares Rochester with Cleveland and Toledo to show that the former carries the heavier burden in investment charges per car-mile. He says the Cleveland system is unable to expand because capital cannot be secured at the rate of 6 per cent permitted in the service-at-cost contract.

Mr. Jackson in his third article favors the one-man car as the most practical way to give more service at a lower cost, but condemns the one-man car used in Rochester on account of the turnstiles and slowness of operation. In an interview Mr. Jackson is quoted as saying that he proved to J. F. Hamilton, president of the Rochester lines, that the type of one-man car used in that city is impractical, and that the weekly pass is the only way that lower fares can be given without impairing the revenues. Actually Mr. Hamilton saw Mr. Jackson but a few minutes and gave no basis for this statement.

The fourth article quotes figures to show that actual operating costs are not excessive. He states that a return to the 5-cent fare would add 10 per cent more riders during the most crowded period, and would bring the earnings to an average of 40 cents per car-mile. This, he states, is too little at the present cost of conducting service in Rochester.

In his next article he continues his discussion of operating costs, showing operating revenues for the year ended July 31, 1922, as $5,093,883, or 54.01 cents per car-mile; operating expenses, including renewals and depreciation, were $3,725,625, or 39.50 cents per car-mile. Gross income available toward return on investment is given as $1,062,097. Mr. Jackson says the full 6 per cent return on the investment would be $1,156,098, so that a deficit of $94,001 remained.

Railway Moves Against Jitneys—Mayor Upheld in Emergency Measure

The International Railway, Buffalo, N. Y., has started a new move to kill off jitney competition. Since the streets have been cleared of snow and the weather has become more springlike hundreds of jitneys have started operating again over all regular car routes. The International started John Doe proceedings in the City Court to ascertain what connection, if any, there is between jitney drivers and starters, who are stationed at terminals or starting points in the downtown business district.

Chief Judge George Woltz in the City Court already has acted on affidavits submitted by Herbert G. Tulley, president of the International, setting forth that starting points and terminals have been maintained by jitneys and jitneys have been operating over lines paralleling the routes of the International on Broadway, Genesee, South Park and other lines. These routes, it is further alleged, are advertised by the starters, who are claimed by the International to be in the pay of owners and drivers of jitneys to solicit passengers.

"All of these acts are in violation of the transportation law of the state," the International explains, inasmuch as no consents or certificates of convenience and necessity have been obtained by the jitney drivers from the Public Service Commission. Arrests of jitney drivers again are being made by special agents of the International and city police.

Mayor Frank X Schwab and the City Council of Buffalo were supported by the New York State Court of Appeals in their action to provide transportation facilities in Buffalo during the strike of platform employees which started on June 1, 1922. A decision handed down by the court dismisses the appeal taken by the International Railway in the matter of the application of the company for a writ of mandamus against Mayor Schwab. The decision of the court sustains the findings of the Appellate Division, Fourth Department, which reversed the order of Supreme Court Justice Pooley, and approves the stand taken by Mayor Schwab that the court had no power to compel him to remove jitneys from Buffalo's streets.

The decision of the Court of Appeals establishes the right of the Mayor to issue permits to jitneys if a similar emergency should arise again. Mr. Justice Krause upheld the Mayor's jitney action only in so far as it was taken to provide emergency transportation while the railway lines were paralyzed by the strike.

News Notes

Bill Enables Railway to Buy Bus Projects.—Assemblyman Barkman of Morris has introduced a bill in the New Jersey Legislature providing for the entrance of railway companies into the jitney and bus business.

Election Will Decide Transportation Issue.—The City Council of Jacksonville, Fla., recently passed an ordinance providing for a bond election to be held on April 10 to decide on the establishment of a bus line or an electric railway line for the southside. The approximate cost of the bus line will be $30,000 and the car line not more than $100,000.

Franchise Rights Threatened.—City Commissioners of Portland, Ore., are threatening the Oregon Electric Railway with loss of its franchise on the Macadam Road if it does not improve paving adjacent to its tracks. Repeated demands on the part of the Public Works Department that the work be done have been met with request for delay, Commissioner A. L. Barbur reports.

Strike Not Discussed at Meeting.—The annual meeting of the stockholders of the Steubenville, East Liverpool & Beaver Valley Traction Company, East Liverpool, Ohio, was held recently at Midland, Pa. All officers and directors were re-elected. It is said that the strike of the employees was not discussed and that there were no new developments in the strike situation. As related previously in the ELECTRIC RAILWAY JOURNAL the men on one of the divisions have been out for months and service suspended.

People Will Give Opinion.—Questionnaires will be submitted to the taxpayers of Brunswick, Ga., soliciting their views on the subject of the city's taking over the Brunswick & Interurban Railway. Last December the management of the railway indicated that abandonment of railway service would be inevitable unless the City Commissioners took over the property and operated it. The commissioners replying to the petition stated that the city of Brunswick could not under its present charter undertake municipal ownership of any public utility unless there were certain charter amendments passed by the Legislature. It is understood that this measure will be introduced at the next meeting of the General Assembly.

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Financial and Corporate

Slight Increase in Net

Duluth Company Does Better—Interesting Review of Rate Case Before State Commission

The gross revenues of the Duluth-Superior Traction Company, Duluth, Minn., for the year 1922 show a decrease of $18,819, or 1.04 per cent, compared with the year 1921. The net income transferred to profit and loss for the year shows a net increase of $63,515. The decrease in operating expenses is attributed by A. M. Robertson, president, to most rigid economy and operation of cars in the city of Duluth under a standard of service fixed by resolution of the City Council.

In addition to $113,333 expended for renewals and charged against depreciation reserve, a sum of $173,463 was expended during the year for additions to the property. An unusually large amount of track construction and reconstruction was undertaken and completed during the year. The management believes that any deferred maintenance caused by the war and labor shortage during the past year is fully provided for in the accounts. Five dividends of $1 per share for each of the quarters ended June 30, 1921, Sept. 30, 1921, Dec. 31, 1921, March 31, 1922, and June 30, 1922, were paid upon the 4 per cent cumulative preferred stock, but no dividends were declared or paid on the common capital stock.

Mr. Robertson has reviewed for the benefit of the stockholders the history of the case before the Railroad & Warehouse Commission affecting fares in Duluth. It will be recalled that under date of July 13, the commission filed its order and decision fixing the value of the company's property in Duluth as of Dec. 31, 1921, at $4,599,978, allowing an annual rate of return of 7½ per cent on this value and fixing the rate of fare at 6 cents cash, with five tickets or tokens, each good for one ride, to be sold for 25 cents. Convinced that the order and decision of the commission would not yield a reasonable return upon the fair value of the property, an action was immediately brought in the United States District Court by the railway to enjoin the enforcement of the commission's order. The company alleged confiscation of its property.

INCOME STATEMENT OF THE DULUTH SUPERIOR TRACTION COMPANY

	1922	1921
Total railway operating revenues	$1,759,046	$1,777,330
Total railway operating expenses	1,405,366	1,493,305
Net revenue railway operation	$353,680	$284,026
Taxes assignable to railway operation	113,273	107,410
Operating income	$240,408	$176,615
Total non-operating income	26,973	27,509
Gross income	$267,381	$204,125
Interest on funded debt and miscellaneous debits	175,278	175,537
Net income transferred to profit and loss	$92,103	$28,587
General mortgage sinking fund payment	$20,615	$27,296

A temporary injunction, effective Aug. 1, 1922, was granted by the court restraining the commission and the city of Duluth from interfering with the company collecting a 6-cent cash fare until the case could be heard on its merits in the United States court. Later upon application of the city the injunction was amended so as to require the company to sell five tickets for 30 cents with a coupon attached redeemable by the company for 5 cents, if on final decree the court should sustain the commission's order requiring the sale of five tickets or tokens for 25 cents.

The city has appealed to the United States Supreme Court from the order of the lower court granting this temporary injunction as amended. This appeal is now pending. The management believes its right to collect at least a 6-cent fare will be sustained by the court in its final decree.

Mr. Robertson expressed his appreciation of the voluntary action of the Duluth Chamber of Commerce in appointing in November, 1922, a special committee with instructions to negotiate with the City Council and the company for the settlement by compromise of all litigation now pending between the company and the city and for an agreement upon certain extensions of lines to be made in 1923.

Under date of Oct. 23, 1922, application was filed by the company with the Railroad Commission of Wisconsin for a revaluation of the company's properties in the city of Superior and a readjustment of the rate of fare there. A hearing on this application was held in the city of Superior. Evidence on behalf of the company was introduced and the hearing continued to Feb. 6, 1923, in Madison, Wis.

Maturities Total $22,928,500

Electric railway maturities for April 1923 total $22,928,500. Among these are the Tri-City Railway & Light Company, $6,696,000 5 per cent bonds, the Detroit United Railway $4,500,000 7 per cent bonds and the $4,500,000 of the St. Louis & Suburban Railway general 5s.

New Officers Named

The new officers of the Menominee & Marinette Light & Traction Company, Menominee, Mich., are as follows: President, Clement C. Smith; vice-presidents, J. P. Pulliam, C. R. Phenicie; secretary, Howard Greene; treasurer, H. C. Mackay; general manager, A. J. Goedjen, and superintendent, James I. Searles.

Toledo Surplus $126,106

Operating Results for 1922 Under Service-at-Cost Grant Show Satisfactory Improvement

The result of operation of the Community Traction Company at Toledo, Ohio, during the fiscal year 1922 was a surplus of $126,106. This sum was credited to the fare stabilizing fund, according to the report made to the City Council by Wilfred E. Cann, Street Railway Commissioner.

The gain of $126,106 in the stabilizing fund compares with a deficit of $325,035 for the preceding eleven months under the Milner service-at-cost ordinance.

Marked improvement in general industrial and business conditions at Toledo, regulation of bus competition and economies in operation are largely responsible for the change.

The improvement in business conditions is shown by the fact that in December, 1922, the average number of revenue passengers a day was 176,614, an increase of 27,956 passengers per day over the low period of August, 1921. Railway travel in December, 1922, was, however, still 16,000 passengers a day less than in February, 1921, the first month of operations under the new ordinance.

During the year $212,500 was credited to the sinking fund. This sum was used in purchasing bonds of the company for retirement. At retirement of the bonds a corresponding par value of common stock is issued the city upon which the regular 6 per cent rate is earned for the benefit of the fund. At the end of the year the city had purchased $255,000 of the bonds and an additional $109,000 had been ordered delivered on Feb. 1, 1923. There remained in the fund then a cash balance of more than $36,000, to which $17,708 is added each month out of operating revenues. The city is now earning $1,820 a month on its present holdings of $364,000 of common stock in the company.

The municipal purchase feature of the Toledo ordinance, while it is admirably thought out as a purchase proposition, has placed a burden on the car rider. The commissioner has shown in his report that each passenger paying full fare contributed 0.44 cents to the sinking fund every time he paid fare. Had there been no sinking fund provision the $407,291 which has been contributed to the sinking fund by car riders would have insured a reduction to a 6¼-cent fare last September and would have held out hope of another drop in fare this year.

Actual running speeds have been increased by abolition of skip-stops and no alteration in schedules. Increased industrial prosperity has, however, brought more and longer freight trains to contend with at the many grade crossings in the city.

For maintenance of tracks, cars and trolley $497,835 was spent during the year. This is at the rate of 6.526 cents per car-mile. During 1923 it is proposed to spend $640,000 on maintenance.

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This will increase the rate per car-mile for this item about 1.4 cents.

Revenue per car-mile increased 3.038 cents in 1922. This was due in some measure to the higher rate of fare. The expense of operation and maintenance decreased 3.232 cents per car-mile. Savings came from lower rate for power, lower maintenance expenditures and minor operating economies.

The commissioner reported that he still "believes that one-man cars can be operated on certain lines" so as to permit of improvement in service and savings to the end that lower fares may be attained. Studies he has made tend to discourage any attempt to put the weekly pass into effect in Toledo. He recommends the double-tracking of single-track lines and grade crossing elimination. Mr. Cann said:

The Community Traction Company is being operated on a sound business basis, is meeting all of its obligations and each month is decreasing the deficit incurred in the early months of operation.

With the whole-hearted support of every one the Toledo railway can attain the high place in public opinion reached by the Cleveland and Rochester railways under the same form of operation.

The statement printed below shows the income and expenses for 1922 compared with results obtained in 1921.

Railway Securities at Auction

Electric railway securities sold at auction by A. H. Muller & Sons, New York, on March 21 were as follows:

$4,000 Manhattan Railway 4 per cent consolidated bonds, due 1990, interest April and October, 61⅛ per cent.

$2,000 New York Westchester & Boston Railway first mortgage 4½ per cent bonds, due 1946, interest January and July, 44½ per cent.

$2,000 St. Paul City Railway Cable consld. 5 per cent bonds, due 1937, interest January and July, 93¼ per cent.

$3,000 Western New York & Pennsylvania Railway general mortgage 4 per cent bonds, due 1943, interest April and October, 75⅜ per cent.

Consolidation of El Paso Companies Proposed

The management of the El Paso (Tex.) Electric Railway has asked permission of the City Council to merge the three Stone & Webster companies which are now operating in El Paso into one general utility concern.

Under the proposed plan the El Paso & Juarez Traction Company and the Rio Grande Traction Company will be merged with the El Paso Electric Railway. The authority to combine the three companies is sought to enable the company to obtain funds on better terms for needed improvements.

The El Paso & Juarez Traction Company is capitalized for $146,000 and operates the railway and power plant in Juarez. The Rio Grande Valley Traction Company operates the interurban lines between El Paso and Ysleta. It is capitalized for $500,000.

STATEMENT OF INCOME AND EXPENSES OF THE COMMUNITY TRACTION COMPANY, TOLEDO, OHIO

INCOME AND EXPENSE

	1922		1921		Per Cent of Revenue 1922	Per Cent of Revenue 1921	Cents per Car-Mile 1922	Cents per Car-Mile 1921
Passenger revenue								
Cash fares	$2,224,284		$2,040,301		60.857	64.79		
Token fares	1,069,254		821,117		29.255	26.08		
Transfers and children	117,447		99,548		3.213	3.16		
Total passenger revenue		$3,410,986		$2,960,966	93.325	94.03	44.716	42.198
Other revenue								
Special cars	1,655		1,272		.04	.04		
Station and car privileges	19,848		18,440		.54	.58		
Rent of track and terminals	184,097		149,615		5.04	4.75		
Rent of equipment	17,418		14,753		.48	.47		
Miscellaneous	20,959		3,843		.57	.13		
Total other revenue		243,977		187,923	6.68	5.97	3.198	2.678
Gross income from all sources		$3,654,963		$3,148,889	100.00	100.00	47.914	44.876
Operating expense								
Car operation								
Motormen and conductors	930,403		946,799		25.46	30.07		
Carhouse employees	101,918		98,096		2.79	3.11		
Superintendence cars	102,243		100,307		2.80	3.18		
Balance car operation	133,173		112,422		3.64	3.57		
Total car operation		$1,267,737		1,257,624	34.68	39.93	16.619	17.923
Power								
For cars	441,450		456,727					
Other purposes	58,012		48,396					
Total power		$499,462		505,123	13.66	16.04	6.548	7.198
General expense								
Commissioner's office	25,059		22,762		.68	.72		
General salaries and law	53,176		48,902		1.45	1.55		
Insurance	12,242		18,475		.34	.59		
Injury and damages	116,553		79,905		3.19	2.54		
Rent buildings and property	29,193		21,323		.80	.68		
General and stores expense	59,606		67,754		1.63	2.15		
Total general expense		295,829		259,122	8.09	8.23	3.878	3.693
Total operating expense		$2,063,029		$2,021,869	56.44	64.21	27.045	28.814
Maintenance and repairs								
Ways and structures								
Roadway and tracks	129,319		167,395					
Paving	51,864		65,128					
Buildings and structures	7,887		7,093					
Superintendence ways and structures	32,939		32,597					
Miscellaneous	3,726		4,645					
Totals ways and structures	225,735		276,858		6.18	8.79	2.959	3.945
Equipment								
Car maintenance	183,465		195,609					
Other equipment maintenance	26,332		17,330					
Superintendence maintenance equipment	26,705		34,895					
Total equipment maintenance	236,502			247,834	6.47	7.87	3.100	3.532
Trolley maintenance	35,597		35,935		.97	1.41	.467	.512
Total maintenance and repairs		497,835		560,629	13.62	17.80	6.526	7.989
Total operation and maintenance		$2,560,865		$2,582,498	70.06	82.01	33.571	36.803
Depreciation	42,500		109,794		1.16	3.48	.557	1.565
Sinking fund	212,500		194,791		5.81	6.20	2.786	2.776
Taxes	191,116		110,094		5.23	3.49	2.505	1.569
Interest floating debt	1,876		82		05		.025	
Bond interest and dividends	520,000		476,666		14.23	15.14	6.817	6.794
		967,992		891,427	26.48	28.31	12.690	12.704
Total deductions from income		$3,528,857		$3,473,925	96.54	110.32	46.261	49.508
Stabilizing fund		126,106		*325,035	3.45	*10.32	1.653	*4.632
Interest earned on fund		3,637						
Net addition to stabilizing fund		$129,743		*$325,035				

Note—Figures for 1921 are for eleven months only. * Deficit.

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$4,107,514 Strike Cost in Buffalo in Six Months

Thomas E. Mitten, chairman of the executive committee of the International Railway, Buffalo, N. Y., and head of Mitten Management, Inc., which operates the local and interurban lines of the company, has sent out a statement to stockholders of the company in which he says that while the market value of the company's securities has been adversely affected by the strike, "the inherent value of the property is today actually greater, in spite of the millions lost in revenue, than it was before the strike, and certain it is, looking ahead through a course of years, that the permanent financial success of the International Railway could never be assured until labor had undertaken, as it now has, to co-operate with management and recognize an obligation to the public and to the capital invested in the property."

The letter says the company's income account for the twelve months ended June 30, 1922, shows net income of $284,893. The strike loss, he says, was $4,107,514 for the six months to Dec. 31, 1922. The statement says:

The outcome of the strike was a complete victory for the company. Jitney competition is being eliminated and earnings are now approaching normal. While the contest was long and costly, Mitten Management realized when undertaking the responsibility for the management of the property, following the default of the old International Traction bonds, that it would probably be necessary to go through this experience before permanent peace and the best operation of the property could be accomplished.

The reorganization committee, at the conclusion of its work in 1920, set aside in the hands of trustees for the International Railway a special fund available for use in financing a strike, it being clearly recognized that the bankruptcy of 1918 would surely be re-enacted in a few years if the company did not shake off the uneconomic operating conditions resulting from union domination. This special fund was used to provide cash necessary to carry on operation during the strike period.

The Mitten co-operative plan, under which the employees have a free and independent vote for representatives for proper collective bargaining, is now in full force and effect. Experienced management and effective men will, now that the road has been cleared, co-operate for the same satisfactory solution in Buffalo as they have already accomplished in Philadelphia, and will effectively carry out the contract of accomplishment entered into with Mitten Management:

1. To render adequate service to the public.
2. To promote, among the employees, efficiency and co-operation, essential to successful operation and a betterment of their own conditions.
3. To protect the owners' investment in the property and to assure the earning and payment of a reasonable return.

Dividends to Be Paid in Louisville

A dividend of 2½ per cent will be paid on April 1 to stockholders of the Louisville (Ky.) Railway on an issue of $3,500,000 cumulative preferred stock to stockholders of record March 15. This announcement was made recently, following a conference of the company's directors.

It was stated by President Barnes at the annual meeting of the stockholders that arrangements were being made to resume paying dividends. Mention was made of this in the ELECTRIC RAILWAY JOURNAL, issue of March 3.

The dividend is the first authorized by the company on any of its stock since 1918. In October, 1918, a dividend of 1¼ per cent was paid on preferred stock, while in July of the same year a common stock dividend was paid.

The preferred stock of the company carries a 5 per cent rate, and when the dividend just authorized is paid, the accumulated unpaid arrears will be reduced to 20 per cent.

New Company Will Operate Branch

George Bayly, vice-president of the First National Bank of Lima, has been made president of the new Lima & Defiance Railway. This branch of the Indiana, Columbus & Eastern has been bought by patrons along the line, to insure continued car service. Directors of the company, besides Mr. Bayly, are E. A. Evans, Lima; Joseph A. Murray, Kalida; D. F. Operlander, president of the Defiance Chamber of Commerce, and A. D. Bowen, Elyria, inventor of the type of gasoline cars which will be used on the line. C. S. Carl, for fifteen years auditor of the Ohio Electric Company, will serve in that capacity with the new company. Cars will be operated at two-hour intervals and a plan has been worked out whereby the company will use motor trucks for the assembly and distribution of freight hauled by gasoline cars.

Changes Suggested in P. S. Stock Structure

The board of directors of Public Service Corporation of New Jersey has called special stockholders' meeting for April 2, to authorize an increase in capitalization and substitution of non-par value common stock for present $100 par shares. The present common shares are to be exchanged for two new shares of no-par value.

The present authorized capital is $100,000,000, divided into 500,000 shares of common, 250,000 shares 8 per cent preferred, and 250,000 shares of 7 per cent preferred stock, all $100 par value. Plan provides for authorized new capitalization of 2,000,000 shares of no par common, and 1,000,000 shares of preferred stock, $100 par.

Of the 1,000,000 preferred shares to be authorized, 250,000 shares will remain 8 per cent, 500,000 shares will be 7 per cent and 250,000 shares 6 per cent preferred stock.

T. N. McCarter, president, explaining proposed changes in a letter to stockholders, says that he believes the best interests of the stockholders will be served by having the common stock of no par value, making it more favorable for the small investor, also that increased capitalization is desirable as providing means of future financing to take care of rapid growth of operating companies.

Making Headway Under Receivership

The receivers of the Peoria Railway Terminal Company, Chicago, Ill., have made some headway in keeping the property in shape to serve the public and to pay off the creditors having priority claims. It is said the receivers hope that such claims can be disposed of during 1923.

The Peoria Railway Terminal Company passed into the hands of receivers on Aug. 3, 1922. The company was not operating at the time of the receivership, but later on, after adjusting its labor matters, it was able to resume both freight and passenger operation and has since been doing a fairly good business.

Conspectus of Indexes for March, 1923

Compiled for Publication in this Paper by

Albert S. Richey
Electric Railway Engineer
Worcester, Mass.

	Latest	Month Ago	Year Ago	Since War High	Since War Low
Street Railway Fares* 1913 = 4.84	Mar. 1923 **6.89**	Feb 1923 **6.94**	Mar. 1922 **7.14**	May 1921 **7.24**	Mar. 1923 **6.89**
Street Railway Materials* 1913 = 100	Feb. 1923 **174**	Jan. 1923 **175**	Feb. 1922 **156**	Sept. 1920 **247**	Sept. 1921 **156**
Street Railway Wages* 1913 = 100	Mar. 1923 **207**	Feb. 1923 **207**	Mar. 1922 **212**	Sept. 1920 **232**	Jan. 1923 **207**
Steel—Unfilled Orders (Million Tons) 1913 = 5.91	Feb. 28 1923 **7.28**	Jan. 31 1923 **6.91**	Feb. 28 1922 **4.14**	Apr. 30 1917 **12.18**	Feb. 28 1922 **4.14**
U.S. Bank Clearings Outside N. Y. City (Billions)	Feb. 1923 **13.22**	Jan. 1923 **16.56**	Feb. 1922 **10.65**	March 1920 **18.54**	Feb. 1922 **10.65**
Business Failures Number	Feb. 1923 **1,570**	Jan. 1923 **2,165**	Feb. 1922 **2,072**	Jan. 1922 **2,722**	Sept. 1922 **1,469**
Liabilities (millions)	**36.46**	**53.43**	**66.92**	**185.7**	**31.92**

	Latest	Month Ago	Year Ago	Since War High	Since War Low
Eng. News-Record Construction costs 1913 = 100	Mar. 1923 **205.2**	Feb. 1923 **197.4**	Mar. 1922 **162.0**	June 1920 **273.8**	Mar. 1922 **162.0**
U.S. Bur. Lab. Stat. Wholesale Commodities 1913 = 100	Feb. 1923 **157**	Jan. 1923 **156**	Feb. 1922 **141**	May 1920 **247**	Jan. 1922 **138**
Bradstreet's Wholesale Commodities 1913=9.21	Mar. 1 1923 **13.93**	Feb. 1 1923 **13.72**	Mar. 1 1922 **11.60**	Feb. 1 1920 **20.87**	June 1 1921 **10.62**
Dun's—Wholesale Commodities 1913 = 120.9	Mar. 1 1923 **191.2**	Feb. 1 1923 **186.2**	Mar. 1 1922 **169.7**	May 1 1920 **263.3**	July 1 1921 **159.8**
U.S. Bur. Lab. Stat. Retail food 1913 = 100	Feb. 1923 **142**	Jan. 1923 **144**	Feb. 1922 **142**	June 1920 **219**	Mar. 1922 **139**
Nat. Ind. Conf. Bd. Cost of living 1914 = 100	Feb. 1923 **157.5**	Jan. 1923 **158.1**	Feb. 1922 **157.7**	July 1920 **204.5**	Aug. 1922 **154.5**

*The three index numbers marked with an asterisk are computed by Mr. Richey, as follows: Fares index is average street railway fare in all United States cities with a population of 50,000 or over except New York City, and weighted according to population.

Street Railway Materials index is relative average price of materials (including fuel) used in street railway operation and maintenance, weighted according to average use of such materials.

Wages index is relative average maximum hourly wage of motormen and conductors on 105 street and interurban railways in the United States, operating more than 100 passenger cars each, and weighted according to number of cars.

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B.R.T. Reorganization Plan Formally Announced

A definite plan for the reorganization of the Brooklyn Rapid Transit Company has been evolved and approved by committees representing the several groups of security holders, it was announced on March 21. The reorganization plan paves the way for the lifting of the receivership instituted on Dec. 31, 1918.

With the plan is appended the first statement of Receiver Lindley M. Garrison, showing in detail the work accomplished under his supervision. This report indicated that the Brooklyn Rapid Transit Company, with its subsidiary surface lines, has steadily been moving toward a profitable basis and, combined with substantial reductions in operating costs, there has been a continued growth in passenger traffic with increasing gross revenues. During the receivership, it was shown, approximately $10,000,000 had been spent on new car equipment and 35 miles of new roadway had been opened, in addition to the expansion of power house facilities which, Mr. Garrison stated, are now ample to provide for all the company's lines.

Albert Wiggin acting for the committee representing the stockholders issued a statement which he concluded as follows:

> The foregoing improvement in conditions indicates that, upon completion of the reorganization, the properties will be self-supporting and their development and expansion so as to keep pace with the growth of traffic and the performance of their public functions will be reasonably safeguarded and assured. The plan is not intended to conflict with the consummation of any plans which the Transit Commission or other public authorities may have under consideration for the readjustment and development of the transit facilities of the city. On the contrary, it is believed that the termination of the receivership and the substitution of a solvent company with which the public authorities may deal will promote and assist in the successful solution of such problems in so far as they relate to or affect the properties of the Brooklyn Rapid Transit system.

The details of the tentative terms of the reorganization were published in the ELECTRIC RAILWAY JOURNAL for Feb. 17, page 304.

Net Income Lower in February

The city of Detroit, Department of Street Railways, reports a total operating revenue of $1,619,266 for the twenty-eight days ended February, 1923, against $1,712,228 for the month preceding. Of the total operating revenue $1,528,539 was realized in February from transportation. In January this figure was $1,620,210. Operating expenses show a decrease amounting to $1,185,779 in February and $1,221,492 in January. The net revenue shows a falling off from January. In that month the net revenue from railway operations was $490,736 and in February it was $433,487. The net income in February was $40,834, against $70,558 in January. The total number of passengers carried in February was 37,707,665, against 40,167,868 in January. The three days less in the month of February as compared to January largely account for these reductions.

Abandonment Approved.—The New York Transit Commission some weeks ago approved the declaration of abandonment of four routes and franchises of the Twenty-third Street Railway.

Defeat Purchase Proposal.—The ratepayers of London, Ont., have defeated a by-law to purchase and rehabilitate the London Street Railway. The price was set at $2,600,000.

Surplus Increases.—The gross earnings of the Bangor Railway & Electric Company, Bangor, Me., for the year ended Dec. 30, 1922, were $1,488,936, against $1,420,471 for the year ended December, 1921. The surplus for 1922 was $198,552, against $152,798 in 1921.

$44,000 Note Issue Proposed.—The Madison (Wis.) Railways has received authority from the Railroad Commission to issue $44,000 of notes, $37,000 of which will be used to provide funds with which to pay for overhead equipment, ties, rails, wire, etc., following its plan to double track on East Johnson Street.

Traffic Shows Decrease.—The Savannah Electric & Power Company, Savannah, Ga., carried 14,908,278 passengers in 1922, including cash and transfer passengers. This figure represents a decrease of 7.5 per cent in comparison with the number carried during 1921. During the past year the company paid $552,000 in wages and salaries.

Officers Named.—The officers of the Five-Mile Beach Electric Railway, Wildwood, N. J., are as follows: President, R. E. Breed; vice-president, George N. Tidd; secretary and treasurer, Frank B. Ball; purchasing agent, F. B. Kiel, and master mechanic, M. T. Griffin. Mr. Breed and some of the other officials of the company are associated with the American Gas & Electric Company, which now controls the Five-Mile Beach property.

Loss in 1922 Amounted to $2,933.—Monterey & Pacific Grove Railway, operating in Monterey and Pacific Grove, Calif., reports to the commission for the year 1922 that its operating revenue was $25,712 and operating expenses $26,399, giving a net operating loss of $687. Interest, rent, taxes and other deductions totaled $2,246. The net corporate loss for the year was $2,933. The deficit at the beginning of the year amounted to $7,629 and miscellaneous deductions were $2,642, leaving an accumulated deficit at the end of the year of $13,204.

Stock Issue Approved.—The application of the Cumberland County Traction Company to issue capital stock in the amount of $135 000 has been approved by the New Jersey Board of Public Utility Commissioners. The company asked for permission for an issue of $50,200 cumulative 7 per cent preferred stock, and also an issue of $59,000 common stock to be used for the acquisition of certain property formerly owned by the Bridgeton & Millville Traction Company. The Cumberland company also asked permission to make an additional $25,000 issue of stock to provide funds for improvements.

Gold Bonds on Sale.—Bodell & Company, Providence, R. I., are offering at 100 and interest, yielding 7 per cent, $2,500,000 of thirty-year convertible debenture gold bonds, series A, of the Federal Light & Traction Company, New York, N. Y. The bonds are dated March 1, 1923, and are due March 1, 1953. The proceeds from the sale of these bonds will be used in large part to retire bonds and ten-year notes of the company maturing in July and December, 1923.

Traffic Increases in February.—During February the total number of passengers carried by the Public Service Railway was 30,205,821, or 272,584 more than the number carried in February, 1922. During the month of January last the company carried 33,992,663. The number of passengers paying the base fare of 8 cents last month was 10,426,648, as compared with 11,133,840 during February, 1922, and 11,905,283 during last January. The company sold last month 12,977,824 tokens at the rate of four for 30 cents. This compares with 12,201,298 sold during February, 1922, and 14,453,000 during January of this year. These statistics are shown in the monthly statement filed with the United States District Court at Trenton.

Seeks Bond Payment Extension.—The Denver (Colo.) Tramway has informed the holders of the first mortgage improvement 5 per cent gold bonds of the Denver Tramway Power Company, which it owns, that it wishes to extend the payment on these bonds. The bonds are due April 1, 1923, but the tramway offers to extend $788,000 face value of the bonds, being all now outstanding and unpaid, for a period of one year so that they will mature on April 1, 1924. The notice states that under existing conditions, with the company in receivership, it is unable to finance the payment of the bonds at the present time, either by the sale of its first and refunding sinking fund mortgage 5 per cent bonds, which are reserved to refund this issue, or by the sale of other securities.

Bonds Will Be Redeemed.—All of the outstanding first mortgage 5 per cent gold bonds of the Kokomo, Marion & Western Traction Company, amounting to $622,000, due July 1, 1933, will, it is announced, be redeemed on July 1 at 105 and interest. The Kokomo, Marion & Western Traction Company was included by consolidation in the system of the Indiana Railways & Light Company. The bonds are secured by a first closed mortgage on the property of the former Kokomo, Marion & Western Traction Company, including the power station at Kokomo, 9 miles of city railway in Kokomo, the electric lighting plants at Kokomo, Swayzee and Greentown and 28 miles of interurban railway between Kokomo and Marion. The bonds underlie $1,254,000 of the Indiana Railways & Light Company first refunding 5s of 1943, the indenture for which contained a provision for the retirement on the Kokomo, Marion & Western Traction Company bonds.

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Traffic and Transportation

Matter of Warrants Up Again

Five-Cent Fare Complicates Difficulties in Seattle—One Solution Calls for Longer Period to Pay for Lines

The 5-cent fare now being charged on the Seattle (Wash.) Municipal Railway has further complicated the railway situation. This is indicated by the announcement by the Seattle Clearing House Association that the Municipal Railway warrants covering wages to trainmen and purchases of supplies will not be cashed by the local banks. The warrants are due March 27, and will exceed $225,000. J. A. Swalwell, vice-president of the association, stated that the street car system would be so imbedded in debt by the end of the year that the banks would be called upon to carry more than $1,000,000 in warrants, which they did not believe would be good business.

An increase of 3 per cent has been noted in the patronage since restoration of the 5-cent fare, but a 45 per cent increase is necessary in order to break even. Receipts for eleven days in March average $12,380 a day. This amount is slightly less than sufficient to pay actual operating and maintenance expenses, which total $12,500 a day. The next semi-annual interest payment on the $15,000,000 purchase price is due to be set aside Aug. 1, for payment one month later. Bond redemption amounts to $843,000 annually.

Operating under a fare of 8½ cents during the year 1922, the railway system fell short $132,916 of taking care of all expenses and bond redemption requirements, according to the annual report recently made public. The report shows also a net profit of $710,084, gross revenue $6,216,569 and gross operating expenses $4,631,508. The net profit shown on the books of the department takes no account of the annual bond redemption of $843,000.

City Council members are making various suggestions for solving the railway problem. There is some sentiment in favor of forcing a rewriting of the Stone & Webster purchase contract, permitting a longer period to pay for the lines and reducing the purchase price. There is a general feeling against charging the general fund of the city with any of the railway expenses. This is impossible under recent court rulings, unless the matter is placed on the city ballot and receives the sanction of the voters.

Springfield Starts Weekly Pass to Show Missouri

Shortly after Albert E. Reynolds became vice-president and general manager of the Springfield (Mo.) Traction Company he made an analysis of the riding in that city and concluded that the unlimited-ride, transferable weekly pass offered the best opportunity to build up riding and revenue during the off-peak hours. His idea was heartily indorsed by E. N. Sanderson, president of the Federal Light & Traction Company, who had become intimately acquainted with pass possibilities through his observations of pass riding at St. John, N. B. Following a conference with Walter Jackson, consultant to the Springfield company, Mr. Reynolds made application to the Missouri Public Service Commission, which gave its consent unanimously for the first installation in the State.

The fares in Springfield have been 7 cents cash and four tickets for 25 cents on the cars with free transfers to the company's cars and buses. The fares on the buses are 5 cents straight and 2 cents for a transfer to either car or bus. The pass will be sold at $1, No. 1 going into effect on Monday morning, March 26. Vice-president Reynolds has arranged for daily articles, advertisements and talks during the week preceding the installation.

Mayor's Promise Can't Be Fulfilled

Chairman McAneny of the New York Transit Commission has pointed out that nothing could be clearer than the fact that there will be no funds whatever available for subways under the Mayor's program unless the city's needs for schools, docks and other necessaries are set aside or starved down, and that if they were there would hardly be enough available to make more than a feeble start upon subway building.

Mr. McAneny says that these facts are pointed out not with any controversial intent but because the people should have the truth, so they may understand that the promises of the Mayor are impossible of fulfillment.

City Comptroller Craig had reported that the total unreserved borrowing margin within the debt limit available for specific authorization for any municipal purpose on Dec. 31 last was $128,514,871. He has previously estimated that the additional borrowing capacity accruing the present year will be about $44,000,000.

Mr. McAneny says that the first outstanding fact is that against the total of these two figures there must be charged before anything else the following commitments of the city, to which the comptroller also makes reference, and for which the Board of Estimate is bound to make provision:

School sites, ferryboats and other specific items	$15,640,000
Staten Island freight and passenger tunnel	61,000,000
Additional school requirements	64,205,000
Unfinished construction on the dual subway system	35,600,000
Total	$176,445,000

Mr. McAneny says:

The Comptroller, in the absence of definite information, as he put it, did not include in his figures the remaining cost of the dual subway work. The figures given here, which are official, are those of the commission's engineers. It would appear that these four items alone not only offset the city's entire borrowing capacity of Dec. 31, but all that will be added to it for a year ahead.

Detroit Comptroller Advocates Six-Cent Fare

Henry J. Steffens, City Comptroller of Detroit, has incurred the displeasure of Senator James Couzens, former Detroit Mayor. Mr. Steffens, it seems, has been growing uneasy over the outlook for the operation of the municipal railway. In consequence he suggested —mind you, not advocated—merely suggested a 6-cent fare as a means of meeting the cost of street railway extensions.

Mr. Steffens denied wanting to get into a wrangle with Mr. Couzens or any one else over the question of whether one-third of the people now have to pay 6 cents—a 5-cent fare and 1 cent for a transfer—to get downtown. He was, however, apparently willing to go the limit in defence of his own suggestion, for he was quoted by the Free Press:

I handle the finances of the street railway department and know that the road is making money and is paying for itself. I also know that this road, or any other, cannot make extensions to the sum of $4,000,000 a year on a 5-cent fare.

Every man familiar with the growth of Detroit knows that extensions must be made to the present street railway system. It is just a question of whether these extensions are to be made with money raised by bond issue, or by increased revenue derived from the increase in fare. This question must be determined, and I believe that the mayoralty candidates could thresh it out. That was my reason for suggesting it.

I realize that a 6-cent fare is rather hard to make the people like. It is a difficult thing to place before the people, and that seems to be the reason that it is considered bad politics to discuss it. But the facts will come out, and sometime we will realize that possibly it is just as well to increase the fare and make the lines pay for necessary extensions, rather than issue more bonds for that purpose.

Auto Buses Presented to Board of Education

The Board of Education of Baltimore furnishes transportation to and from public schools to crippled children, but as the board owns no vehicles to give this service except police patrol wagons, the children have had to travel in wagons of this kind.

This defect in the plan was recently brought to the attention of the United Railways & Electric Company, Baltimore, and H. B. Flowers, general manager of the company, wrote to the president of the board saying that that company would be very glad to present to the board two buses which had been withdrawn from service.

The new offer was gratefully accepted by the board. The two buses were then sent to the paint shop of the company and painted to the order of the board, and have just been put in service. Several letters have been received by C. D. Emmons, president of the company, from the teachers and children expressing their appreciation of the generosity of the company.

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Conferences Held on Transportation Problem

The Los Angeles Board of Public Utilities has held a series of conferences on the subject of transportation. At the meetings bus service proposals and the increase of present electric railway facilities received special consideration. The Los Angeles Railway has submitted a proposal for the operation of three bus lines. G. J. Kuhrts, general manager, said with reference to the subject of buses that if the people of Los Angeles desired bus transportation in addition to railway service and were willing to pay the rates his company would even go so far as to parallel its own lines. He first suggested that the matter receive careful study and that a service such as has been suggested be tried out first in connection with a few of his company's lines.

Advocates Extension for Five-Cent Fare Benefit

Extension of the Mount Baker Street line of the Municipal Railway into the Rainier Valley district to compete with the privately owned Seattle & Rainier Valley Railway has been advocated by Mayor E. J. Brown of Seattle as an attempt to give residents of that district improved service and to supply them with a 5-cent fare, as compared with the 8½-cent rate which the private line has continued charging. By authority of a new law passed by the recent Legislature, residents of any community may form a local improvement district for the purpose of extending the municipal railway. Assessment for the improvement would be made and spread out over the district according to the benefits derived, the same as for other forms of improvements, such as sewers, paving and grading.

Weekly Pass Discontinued in Youngstown

The weekly pass will be discontinued in Youngstown, Ohio, after April 1. The City Council has adopted legislation which has been approved by Mayor Reese providing for a readjustment of the rates of fare and of the street railway service of the Youngstown Municipal Railway.

The new rate of fare, which is adopted for a trial period and becomes effective April 2, provides for 7 cents cash, three tickets for 20 cents, and 1 cent for a transfer. The rate which has been in effect is 9 cents cash, six tickets for 50 cents, 1 cent for a transfer and an unlimited ride weekly pass for $1.25.

Legislation adopted at the same time upon recommendation of Street Railway Commissioner Harry Engle provides for curtailment of the all-night "owl" service, the rearrangement of service on one line to make a material reduction in the car-miles being operated and the suspension of service on two short lines where service heretofore has been given on a half-hour basis.

The suspension of service on the two short lines became effective March 18, coincident with the starting by the railway company of two new motor bus lines which traverse the more important parts of the railway lines on which service has been suspended and are operated at closer headways, effecting an improvement in the service to these sections.

The two new bus lines, making four such lines operated by the company, serve the southern section of the city, and, in addition to serving the sections in which railway service is suspended, open up large sections of the city not heretofore directly served by the company. With this new service the Youngstown Municipal Railway is operating sixteen buses on four lines.

Plans to Start Bus Operation.—The British Columbia Electric Railway, Vancouver, B. C., is planning to start the operation of buses in the Grandview district of the city by April 1. This is in accordance with a recent agreement between the company and the city.

Returns to Higher Fare.—The Calgary (Alta.) Street Railway has returned to the old rate of fare, namely, four tickets for 25 cents. The 5-cent fare was given a two months tryout and failed to increase the patronage. The railway system is owned by the city.

Will Operate Third Bus Line.—A subsidiary of the Johnstown (Pa.) Traction Company, known as the Traction Bus Company, will operate a third bus line in Johnstown. The railway now operates four buses as "feeders" traversing the Dale district and Lorain Borough.

Threatens Abandonment. — The Lehigh Valley Transit Company recently announced to the Common Council of Quakertown, Pa., that the line between Quakertown and Richlandtown was producing no revenue and might be abandoned. The trolley road was laid in Quakertown twenty-five years ago.

Overnight Express Service Started.—Overnight electric express service between Reading and Philadelphia was started recently by the Reading Transit & Light Company. It has proved popular with shippers along the company's lines chiefly because it saves a whole business day in the delivery of shipments.

Buses Running in Schenectady. — Seven new bus routes are being operated in Schenectady, N. Y., following the Council's recent vote in favor of bus lines running in competition with the Schenectady Railway during the emergency period. The Council at the same time gave its unanimous approval to the return of the 5-cent fare on the trolley lines.

Fare Increased.—By agreement between the Dallas (Tex.) Railway and the city authorities of Highland Park, a suburb of Dallas, fares between Dallas and Highland Park and the Southern Methodist University, in the latter city, have been increased to 8 cents. Heretofore the fare has been 6 cents. Under the terms of the agreement the railway will do some construction work.

One-Man Cars to Be Used. — One-man cars will be installed on the St. Joseph (Mo.) Railway, Light, Heat & Power Company's system during the present year, according to a recent announcement of B. C. Adams, general manager. The change in operation is being made to cut down the railway's losses. Last year in the railway department there was a loss of $36,000. This year, Mr. Adams said, the company would probably break even with the one-man cars in operation.

Seek Old Jitney Regulations.—Petitions bearing the signatures of 3,000 residents and railway patrons of Houston, Tex., have been presented to the City Council asking that the old regulations governing the operation of jitneys in the city be restored. These regulations permitted the operation of 250 buses under city supervision at a fare of 5 cents. On application of the Houston Electric Company this number was cut to 150 and restricted to eleven lines about a year ago as a compromise between the city and the company.

Bus Permit Granted.—The City Council of Wheeling, W. Va., has granted the Bus Transportation Company the one permit issued for the operation of bus lines in the east and north ends of the city. This company is owned by the controlling stockholders of the City Railway. The Bus Transportation Company won the permit over the Ultimate Bus Company and the National Transportation Company on the contention that it proposed to give work to the employees who would lose their positions as a result of the abandonment of the North Wheeling division and the East End loop of the City Railway.

Health Service Requirement.—Attention of the members of the Central Electric Railway Association is being called to the fact that the Bureau of Public Health Service of the United States, Treasury Department, requires that water used by common carriers for drinking and culinary purposes on cars shall be cooled in such a manner that the ice cannot come in contact with the water. The bureau requests that the regulations be strictly enforced in the case of new equipment placed in use by common carriers. In regard to present equipment this requirement will be strictly enforced after July 1, 1924.

Authorizes Filing Reduced Fare Tariffs.—The Pacific Northwest Traction Company, Bellingham, Wash., has received authority from the Department of Public Works to file on less than statutory notice a tariff making approximately 20 per cent reduction in round trip fares between Seattle and Bellingham. The reduction does not apply between Seattle and Everett. Between Seattle and Bellingham, the reduction will be from the present fare of $5.80 to $4.65. The Seattle-Mount Vernon reduction is from $4.10 to $3.30, and the Seattle-Stanwood reduction from $3.30 to $2.80. The Everett-Bellingham fare is cut from $4.40 to $3.25.

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Personal Items

Mr. Flowers in New Orleans

Vice-President and General Manager of Baltimore Heads Reorganized Company in Crescent City

Herbert Baker Flowers has resigned as vice-president and general manager of the United Railways & Electric Company, Baltimore, Md., to become president of the New Orleans Public Service Company, the successor under reorganization to the New Orleans Railway & Light Company. The announcement was made by C. D. Emmons, president of the company at Baltimore. For the present Mr. Flowers' duties will be performed by the assistant general managers.

Mr. Flowers became general manager of the United in 1919, when he was promoted from assistant general manager to succeed James R. Pratt, who was made vice-president and placed at the head of the claims department, Mr. Pratt later leaving the company to go into business for himself.

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H. B. Flowers

In Baltimore Ten Years

Graduating from the law school of the University of Michigan in 1903 and from the engineering school of that university in 1905, Mr. Flowers went into the operating department of the Detroit United Railway, taking a position in the office of Sir Albert Stanley, the general superintendent, now head of the London Underground Railways.

About ten years ago Mr. Flowers went to Baltimore to take a position with the United as assistant superintendent of transportation. In 1917 he became assistant general manager.

On Jan. 21 last, W. Frank Roberts, president of the Baltimore Alliance of Charitable Agencies, appointed Mr. Flowers to direct the 1923 financial campaign of the Alliance. Since that time he had been working with the directors of the charitable organization in perfecting plans for the campaign.

Mr. Flowers is representative of the American Electric Railway Association on the sectional committee of the American Engineering Standards Committee appointed to formulate a uniform code of colors for traffic signals. He was chairman of the committee on traffic regulations of the American Electric Railway Traffic & Transportation Association from 1919 to 1922, and is now chairman of the special committee on trackless transportation. He was a member of the one-man car committee in 1921.

The Baltimore *News* said editorially of the appointment of Mr. Flowers:

> Herbert Baker Flowers made so excellent a record as vice-president and general manager of the United Railways of Baltimore that it is not surprising that he was called to the presidency of the New Orleans company. At the same time it is much to be regretted that Baltimore is to lose him. It was inevitable that a man of his ability and experience would be in demand, but it would have been more satisfactory if the higher place had been found in Baltimore. When a city gets hold of a Herbert Baker Flowers it wants to keep him.
>
> Mr. Flowers represents the effective type of the modern executive. Trained both in law and engineering and experienced in the practical schools, he brought to his task not only efficiency, but vision. His ten years in Baltimore were useful and productive. He contributed much to the development and improvement of the street railways. He found time for community work, as, for instance, his appointment to direct the financial campaign of the Baltimore Alliance of Charitable Agencies. He had many friends. Baltimore is sorry to lose Mr. Flowers and it congratulates New Orleans.

Halcott J. Shumaker, assistant superintendent of time tables of the Philadelphia (Pa.) Rapid Transit Company, has been appointed superintendent of time tables, and George A. Dash, senior timetable maker of the Philadelphia Rapid Transit Company, has been appointed assistant superintendent of time tables. Mr. Dash has been with the company since 1903, when he entered the train service as a conductor on Feb. 11.

Thomas D. Kiniry has been appointed general superintendent of transportation of the local and interurban lines of the International Railway, Buffalo, N. Y., to succeed William M. Casey, who has accepted a similar position with the Georgia Railway & Power Company, Atlanta, Ga. Mr. Kiniry comes to Buffalo from the Philadelphia (Pa.) Rapid Transit Company, where he had been superintendent of supervision since April 1, 1922.

J. Rowland Bibbins, recently manager Department of Transportation, United States Chamber of Commerce, and previously supervising engineer of the Arnold Company of Chicago, has opened an office as consulting engineer at 921 Fifteenth Street, Washington, D. C. Mr. Bibbins will make a specialty of transportation developments and is prepared to make complete surveys and economic studies of city transit systems, roads and port terminals or motor transport undertakings, and to conduct valuation investigations. Mr. Bibbins has had an extended experience in all of these lines in many cities of the country.

C. V. Wood, Jr., at Providence

Springfield Official Appointed Assistant to R. R. Anderson, Superintendent of Transportation

Clark Vernon Wood, Jr., on March 15 assumed the duties of assistant to R. R. Anderson, superintendent of transportation of the United Electric Railways, Providence, R. I. Mr. Wood had been for several years in charge of the power-saving departments of the Worcester (Mass.) Consolidated and the Springfield (Mass.) Street Railways, which work he organized and successfully developed. On leaving Worcester Mr. Wood was entertained at luncheon by heads of departments of the Worcester Street Railway, on behalf of whom Henry C. Page general manager presented to him a traveling bag.

Mr. Wood is the son of Clark V. Wood, president of the Worcester and the Springfield companies. He was born in Beaver, a suburb of Pittsburgh, Pa., March 22, 1899. For several years the family lived in Canton, Ohio, and Boston, Mass., during which time Mr. Wood attended the public schools. Some time after removing to Springfield he entered Worcester Academy, but left in the middle of his course for the purpose of engaging in war work. A slight disability barred him from admission to the Navy and he took up wireless telegraphy. He began his electric railway work with the freight department of the Connecticut Company in Hartford. Later he became assistant to W. L. Harwood, engineer of power and equipment of the Springfield Street Railway. In this work his duties related to car shops, tools, inspection, etc. From this he went to the head of the power-saving department, which work he continued up to the time he was asked to assume the Providence post.

C. V. Wood, Jr.

B. D. Smith, who until Feb. 1 was with the engineering department of the Westinghouse Electric & Manufacturing Company, has accepted the position of eastern manager for the Sterling Varnish Company and after April 1 will take up his duties at the company's eastern office, Arlington, N. J.

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C. H. Quereau, superintendent of electrical equipment of the New York Central Railroad, New York, N. Y., retired from the company on Feb. 1 on a pension because of failing health. Mr. Quereau was born in East Greenwich, Conn., on May 30, 1856, and was graduated from the Northwestern University at Evanston, Ill. He entered steam railroad work almost immediately becoming connected with the Chicago, Burlington & Quincy Railroad, Aurora, Ill., from 1888 to 1894 as chemist and engineer of tests. He served with the same company from 1894 to 1897 as assistant superintendent of motive power for the lines west of the Missouri River. He then left the service of the Chicago, Burlington & Quincy and went into the employ of the Denver & Rio Grande as master mechanic and assistant superintendent of motive power at Denver, Col. He resigned this job to return East and from November, 1902, to 1905 was superintendent of shops of the New York Central Railroad at West Albany. From 1905 to the present time Mr. Quereau has been superintendent of electrical equipment in charge of the lines operated out of the Grand Central Terminal, New York. His successor with the New York Central Railroad has not yet been appointed.

Obituary

W. W. Gurley

William Wirt Gurley, one of the most prominent members of the Chicago bar, died suddenly at his home March 11. He had been identified with Chicago transportation for more than a quarter century. His services as an expert in corporation law were of the utmost value to the original South Side Elevated Company and later to the Metropolitan Elevated, but his reputation largely rests upon his activities as counsel for the receiver of the Union Traction Company in 1906. Subsequently with the formation of the Chicago Railways he became its general counsel and in 1914, upon the passage of the unification ordinance, providing for the unified operation of all surface companies under the designation of the Chicago Surface Lines, he was named as its general counsel.

Mr. Gurley was recognized in the legal profession as the only man who was familiar with all of the intricate phases of the reorganization plan which resulted in the acquisition of the Union Traction properties by the Chicago Railways and with the ordinances under which present corporations are operating. In addition to his activities in traction matters he was general counsel for a number of other important companies.

Mr. Gurley was born in Mount Gilead, Ohio, in 1851 and was graduated from Ohio Wesleyan University in 1870, and for two years was superintendent of public schools at Seville, Ohio. He went to Chicago in 1874. He is survived by his wife and one daughter.

Andrew Sylvester Littlefield

Andrew Sylvester Littlefield, for many years Western agent of the Lorain Steel Company, died suddenly at his residence in Chicago on March 4, 1923. His death was due to heart trouble, which had developed very recently.

Mr. Littlefield was born on Oct. 4, 1859, in Baltimore, Md. He went to Chicago in 1886 with O. W. Meysenburg, with whom he was associated until 1898. In addition to being representative of the Lorain Steel Company he was active in the construction of cable, elevated and electric railways in Chicago and throughout the Central West. Mr. Littlefield became identified with the American Railway Construction Company and was instrumental in the early construction of the surface lines of North and West Chicago. He later became president of the North American Railway Construction Company, which office, in addition to the Lorain Steel Company work, he retained until his death.

A. S. Littlefield

Mr. Littlefield undertook and completed the deck and track work of the Northwestern Elevated, the third tracking of the South Side Elevated and the extension of the Englewood Branch. During his residence in Chicago the company with which he was connected constructed more than 150 miles of surface lines in that city. He was at one time vice-president of the Lake Street Elevated, now part of the Chicago Elevated System.

Mr. Littlefield was a member of the Union League Club, Chicago Athletic Club, South Shore Country Club, Exmoor Country Club and Lake Shore Athletic Club of Chicago. He was also a member of the Art Club of Philadelphia and Chicago Chamber of Commerce. He is survived by four sons, Arthur S. Littlefield, Raymond S. Littlefield, Calvin Goodrich Littlefield and Worthington Littlefield.

Services were held at his late residence on March 7 and interment was in the family mausoleum, Rosehill Cemetery.

Among the electric railway men who acted as honorary pallbearers were B. J. Arnold, C. V. Weston, Harvey B. Fleming, J. V. Sullivan, J. Z. Murphy and B. J. Fallon.

Fred H. Goff

Fred H. Goff, a Cleveland banker, died on March 15, at the age of sixty-four. He was well known to the electric railway industry because of the conspicuous part he played in the settlement of Cleveland's ten-year railway war.

For the last fifteen years Mr. Goff had been president of the Cleveland Trust Company. He represented the Cleveland Railway in 1907 as an arbitrator in fixing the valuation under the present service-at-cost franchise. The late Tom L. Johnson, then Mayor, was the arbitrator representing the city.

As a result of that arbitration, conducted under the supervision of the late Federal Judge Tayler, after whom the Cleveland operating grant is named, there was a 45 per cent reduction in the value of the Cleveland Railway property as claimed by the company, but a settlement was effected.

Ever since the conclusion of his work in connection with the settlement of the railway dispute Mr. Goff had been a conspicuous figure in the civic life of the city. He was a tireless worker and ready at all times to act in the rôle of peacemaker in controversies affecting the public interest. Because he had the confidence of the people his services were of extremely high value.

Mr. Goff started out in life as a lawyer, but entered the banking field in 1908 as president of the Cleveland Trust Company, building up that institution's deposits from $25,000,000 to $167,000,000, its depositors from 72,000 to 396,000, its number of offices from ten to fifty-two and its total assets from $30,000,000 to $180,000,000. Moreover, at no time, not even during the war, were loans made by the Cleveland Trust Company at a rate of interest to exceed 6 per cent.

In 1914 Mr. Goff gained nation-wide distinction by founding what is known as the Cleveland Foundation, a community trust fund to which wealthy Clevelanders leave part of their estates, the income from which is devoted to serving Cleveland's community needs. Foundations patterned after Mr. Goff's ideas have since been established in many other cities.

In 1921 Mr. Goff was designated by President Harding to act as an official mediator in promoting a settlement of then outstanding railroad claims against the Government, as a result of Federal control of the railroads during the war.

Besides being head of the Cleveland Trust Company at the time of his death, Mr. Goff was also an active director in a large number of railroad and industrial enterprises. He was vice-president of the Cleveland Terminal Valley Railroad, chairman of the board of the Chicago, Lake Shore & South Bend Railroad, a director of the Baltimore & Ohio Railroad and vice-president of the Cleveland, Lorain & Wheeling Railroad.

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Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Referendum on Trade Association Activities

Trade associations are the subject of a referendum submitted by the Chamber of Commerce of the United States to its membership. The activities of trade associations have been carefully gone into by a special committee of which Philip H. Gadsden, formerly president of the American Electric Railway Association, is a member. This committee has now presented a report containing recommendations. The report and its recommendations are the basis for the propositions submitted to a referendum vote.

It is pointed out in the committee's report that "there is a long list of functions which trade associations perform in the interest of their members and of the community at large. These functions are illustrated by the standardizing and safeguarding of the quality of goods, the reducing of waste in manufacture and distribution, the promotion of trade, both domestic and foreign, and the upbuilding in scores of other ways of industry and commerce."

Rules Formulated

In considering statistical activities of trade associations and the value of statistics to business enterprise and the public, the committee has formulated several rules which it submits as recommendations:

Reports of members to their association should be accurate and sufficiently complete to prevent misconstruction.

As distributed to the membership, the statistics should not be accompanied with any interpretation or other comment which could induce or facilitate concerted action on the part of members.

All statistics regarding prices should be confined to closed transactions, and should not refer to pending transactions or future transactions.

The committee says that it is no part of the function of a trade association to attempt to obtain concerted action by advising members how to conduct their own businesses. Price statistics for closed transactions show facts; the function of collecting and distributing these is consequently reportorial. As to the contention in some quarters that summaries, average prices on typical lines or figures grouped together according to territorial districts are sufficient, the committee believes that for the use of the members of most trade associations more detailed information is necessary and can see no objection to the distribution of such information to the members and to the public.

The committee recommends that every trade association that collects statistics should, immediately upon issuing the statistics to the membership, furnish them to the public press and to the Department of Commerce, the Federal Trade Commission, the Department of Justice and such other government agencies as may have use for them.

Summarizing the preceding discussion, the committee believes that trustworthy information concerning capacity, production, stocks, sales and prices is essential to the effective operation of industry and trade under competitive conditions. The voluntary reporting of such information to trade associations and the subsequent publication or dissemination of such information in a manner which makes it available not only to contributors but also to consumers and to the public generally are beneficial alike to the field of business and the public and do not constitute a restraint of trade.

Latest Railway Directory Has New Features

The February edition of the McGraw Electric Railway Directory, recently off the press, contains, in addition to the usual data as to number of cars owned, miles of track, gage, powerhouse and substation details, and various other data included for some time past, the further new data covering the number of miles of track in paved streets as distinguished from open tracks, the rate of fare prevailing on each property as the directory went to press, the number of one-man cars operated, and the number of motor buses owned by each railway company. The additional data amplify the usefulness of the directory. It now contains practically all of the common data needed about any company in addition to an authentic and up-to-date listing of all officials and department heads.

Comments on Business in Steam Turbines

E. H. Sniffin, manager power sales department of the Westinghouse Electric & Manufacturing Company, recently commented on the large amount of business in steam turbine-generators. This company has received during the last few months orders aggregating nearly 600,000 kw. Mr. Sniffin stated that the amount of such business this year could only be limited by the manufacturing capacity. Sections of the Westinghouse plant in which these machines are built have been working at full capacity since last summer. According to Mr. Sniffin, previous to that time there was a dearth of new business covering a period of eighteen months. It follows then, in the opinion of the power sales manager, that steam turbines are purchased when the money market is easy and finances can be obtained to build new plants and add new equipment to existing stations.

Auction of Car Plant Set for April 2

Though the Barney & Smith Car Company's plant, which at one time was valued at more than $3,250,000, could have been purchased for approximately $666,000, two-thirds of the latest appraisment, there were no bidders on March 15, when Sheriff Howard Webster of Montgomery County offered the works for sale at Dayton for the fourth time. Another postponement resulted, with April 2 set for the next auction. The plant was offered on foreclosure proceedings brought by the bondholders, who hold a $2,000,000 mortgage.

Authorizations and Proposals for Reconstruction

The Bradford Town Council has been authorized to borrow £63,000 for forty-six new cars, and £104,925 for track reconstruction. The Yarmouth Town Council has adopted proposals for a scheme of permanent way reconstruction to cost £55,000. The Newcastle-on-Tyne Town Council proposes to apply for permission to borrow £179,000 for extensions and renewals of tramways.

After years of talk and negotiations the proposed Dearne Valley light electric railway is going to be constructed. A tender has just been accepted for the construction of the line, about 15 miles long, starting from Barnsley and connecting a number of small towns and villages. The cost is to be £200,000. The rolling stock and electric plant will be provided by the English Electric Company at a price of £37,000. Over the greater part of its length the railway will be laid on existing highways. The scheme is a joint one in the hands of a number of local authorities concerned.

Council Approves Car Leasing Plan

Final approval of the plan to lease 100 new cars, with option to purchase after a period of years, has been voted unanimously by the City Council of Seattle, Wash. The board of public works will immediately proceed to call for bids from manufacturers willing to furnish cars under the plan proposed.

Metal, Coal and Material Prices

Metals—New York	March 20, 1923
Copper, electrolytic, cents per lb	17.25
Copper wire base, cents per lb	19.375
Lead, cents per lb	8.25
Zinc, cents per lb	8.175
Tin, Straits, cents per lb	49.25
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	7.125
Somerset mine run, Boston, net tons	3.375
Pittsburgh mine run, Pittsburgh, net tons	2.375
Franklin, Ill., screenings, Chicago, net tons	2.375
Central, Ill., screenings, Chicago, net tons	1.625
Kansas screenings, Kansas City, net tons	2.625
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft	7.50
Weatherproof wire base, N. Y., cents per lb.	19.50
Cement, Chicago net prices, without bags	$2.20
Linseed oil (5-bbl. lots), N. Y., per gal	$1.01
White lead, (100-lb. keg), N.Y., cents per lb	13.375
Turpentine, (bbl. lots), N.Y., per gal	$1.53

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Rolling Stock

Connecticut Company, New Haven, Conn., is said to be considering the purchase of fifty new cars.

Lewiston & Reedsville Electric Railway, Lewiston, Pa., a Day & Zimmermann property, is planning the purchase of four cars, but no decision has been made about the equipment.

Citizens' Traction Company, Oil City, Pa., has not yet placed the order for the six new cars which it contemplates purchasing. It is likely the order will be placed shortly.

Grand Rapids (Mich.) Railway proposes to remodel this year twenty-eight cars to a more modern type of rolling equipment. These will be fitted with standard safety devices for operation as one-man cars. It is also proposed to purchase eight new cars of this type.

Birmingham Railway, Light & Power Company, Birmingham, Ala., will, according to J. S. Pevear, president and co-receiver, have to purchase from fifty-five to sixty new cars of the larger type, if the ordinance is enforced requiring separate cars for white and negro passengers.

Houston (Tex.) Electric Company has made application to the City Council to purchase ten new double-truck Birney safety cars. The order for these cars will be placed as soon as the City Council approves the application. The company is now operating ten cars of the same type which were purchased in 1922.

Eastern Massachusetts Street Railway, Boston, Mass., has placed an order with the J. G. Brill Company of Philadelphia for fifty new double-truck cars of the one-man type at a cost of $580,000. Deliveries will be made in October and November and the cars will be distributed among several of the fifteen operating districts.

St. Joseph (Mo.) Railway, Light, Heat & Power Company, to meet its new program providing for one-man car installation is having built twelve new cars by the American Car Company, St. Louis, and four old cars are being remodeled to meet the requirements of the company. The new cars that are being built in St. Louis will cost about $70,000, according to General Manager Adams, and the company is financing the purchase of them through the sale of trust certificates on the St. Joseph market. Arrangements for their sale have just been completed. The new surface cars will seat about thirty-five passengers.

Track and Roadway

Dallas (Tex.) Railway will rebuild certain portions of its tracks in Highland Park and do some street paving.

Nashville Railway & Light Company, Nashville, Tenn., through a Senate resolution, has been requested to extend the Jefferson Street line to the State Agriculture and Normal School for negroes.

Los Angeles (Calif.) Railway has laid a single track in the Third Street extension being made from Third and Larchmont along Larchmont to La Brea. The work has been carried to Mulford.

Tuscaloosa (Ala.) Railway & Utilities Company has been reconstructing its loop line and the suburban line to Holt. The company has already received 3,000 new ties. About $15,000 will be spent on these improvements.

Buffalo & Lake Erie Traction Company, Erie, Pa., will likely construct a double-track line with connecting curves in Twenty-first Street from State to Peach Streets. An ordinance to this effect is to be introduced in the City Council.

New York, N. Y.—The Board of Estimate having failed to act upon the bid of the Phoenix Bridge Company for the construction of part of the Flushing extension of the Queensboro subway and the bid having been withdrawn, as permitted by law, the Transit Commission has readvertised the contract and will receive new bids on April 2.

Indiana Service Corporation, Fort Wayne, Ind., is planning extensive improvements to the city lines of Fort Wayne, during the present year. These improvements include the double-tracking of the South Calhoun Street line, the double-tracking and extension of the Pontiac Street line and the establishment of a new car line on Lafayette Street. Petitions have already been placed with the Board of Public Works asking authority to start this work. The Lafayette and Pontiac projects were taken under advisement by the board, but the resolution for the South Calhoun Street improvement was immediately adopted.

Power Houses, Shops and Buildings

Bangor Railway & Electric Company, Bangor, Me., has purchased a four-story brick building in Bangor to be used as a waiting room.

Chicago (Ill.) Surface Lines will move its offices from the Borland Building to the new Illinois-Merchants Building, Clark and Jackson Streets, on May 1.

Connecticut Company, New Haven, Conn., has awarded a contract to the Sperry Engineering Company, New Haven, to enlarge the power plant of the company on Grand Avenue, New Haven. The addition will be of brick and steel, one story high, 36 x 72 ft., and will cost $25,000. New equipment will also be added.

Los Angeles (Calif.) Railway will build a fifth automatic power substation. The order for a 1,000-kw. converter has been placed with the General Electric Company. Plans and specifications are being prepared for the building, which will measure 40 x 46 ft. The southwest section of the city will be served by this new station.

Trade Notes

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has appointed G. B. Kirker manager of the railway division of its Los Angeles office and has changed the name of that division to transportation division.

Walter A. Zelnicker Supply Company, St. Louis, Mo., moved its offices on March 1 from 325 Locust Street to the Chamber of Commerce Building, 511 Locust Street. The company's plant and yards in East St. Louis now cover fourteen acres.

Metal & Thermit Corporation, New York, N. Y., will move its Pittsburgh branch on May 1 from 801-807 Hillsboro Street, Corliss Station, to 1514 Fayette Street, N. S. In order to take care of the increasing business in the Pittsburgh territory a modern welding shop is now being constructed.

Russell Company, Kenosha, Wis., has received a contract from the Oneida Motor Truck Company for the building of gas-propelled railroad coaches. The Oneida works have started production on six trains for the Russell Company which have already been sold to several Eastern steam railroad lines. The engines for these coaches are 6-cylinder, 70-hp. Wisconsins.

Cleveland (Ohio) Fare Box Company—Canadian Cleveland Fare Box Company, Ltd., Preston, Ont., announce their appointment as manufacturer's distributors to electric railways for the C. L. Downey Company, Cincinnati. The products of this company embrace hand and motor driven coin counting machines, coin sorting machines, coin wrappers, coin trays and manual coin counters. The coin counting machines will handle all sizes of tokens and coins of all denominations up to and including the 50-cent piece. It will also handle foreign coins of all sizes up to and including the dimensions of the United States 50-cent piece.

Haskelite Manufacturing Corporation, Chicago, Ill., recently received orders for forty-five Haskelite roofs for the Type 4,200 trailers, which will be built in the shops of the Detroit Municipal Railway. Among other recent installations of Haskelite roofs are the forty-five used by the Chicago Surface Lines, in construction of their model lightweight safety cars. A similar car, equipped with center-door entrance, was built for the Municipal Railway of San Francisco. Twenty of these cars, constructed at the American car shops, were fitted with Haskelite roofs as well as twenty additional cars built at the Bethlehem shipbuilding plant. The company has also received an order for Haskelite head linings for fifty-five Pittsburgh cars to be reconstructed at the St. Louis Car Company plant. Haskelite head linings were specified by the Pittsburgh Railway for these. Similar cars recently built by Pressed Steel Car Company were also fitted with Haskelite linings. These items show growing interest in this material.

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New Light Weight Interurban Car on Western Ohio Railway

Profitable Operation

By the introduction of new Light-Weight Cars, weighing only 33,000 lb., the Western Ohio Railway Company was changed from an unprofitable to a profitable enterprise. The last three months of 1922, after these new light-weight cars had been placed in service, it is reported demonstrated that economies can be effected in the operation of interurban lines which will reduce expenses to a point below the income and enable them to complete successfully with other means of transportation.

Mounted on Brill No. 77-E Low-Level Trucks the most comfortable riding action is provided under these Western Ohio Cars, which is essential to all classes of interurban service. Their light weight enables them to maintain schedules much better than the heavier types of rolling stock and their operation has been most satisfactory in every way.

THE J. G. BRILL COMPANY
PHILADELPHIA, PA.
AMERICAN CAR CO. ST. LOUIS MO. — G.C. KUHLMAN CAR CO. CLEVELAND, OHIO. — WASON MANF'G CO. SPRINGFIELD, MASS.

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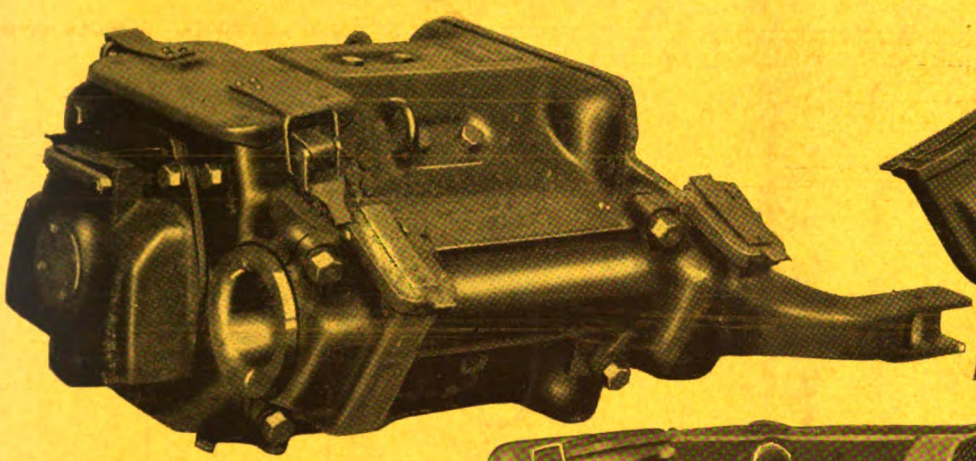
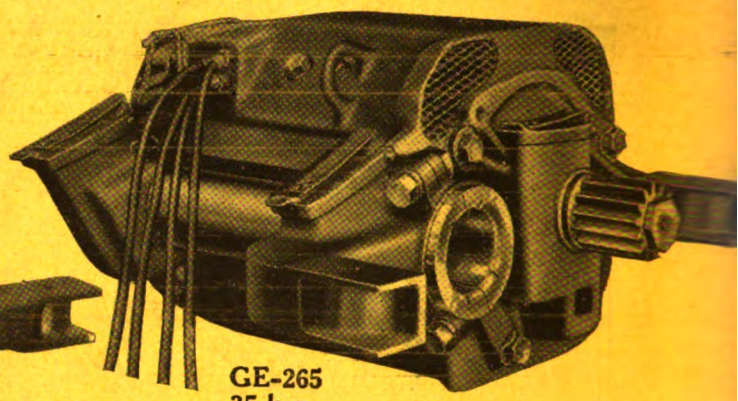
G-E Modern Railway Motors



GE-264
25 h.p.



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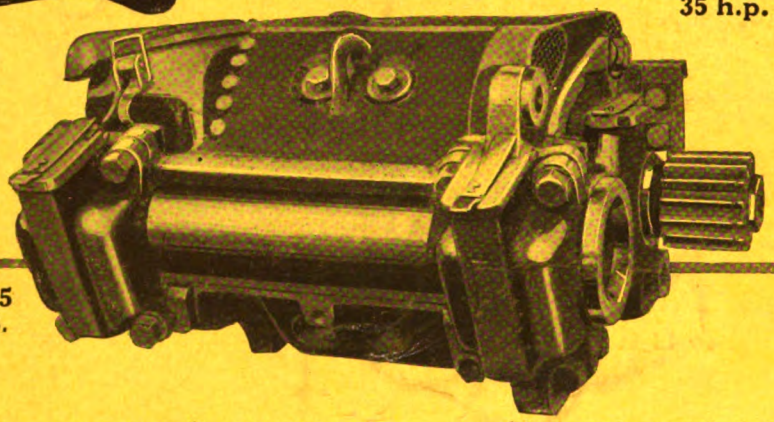
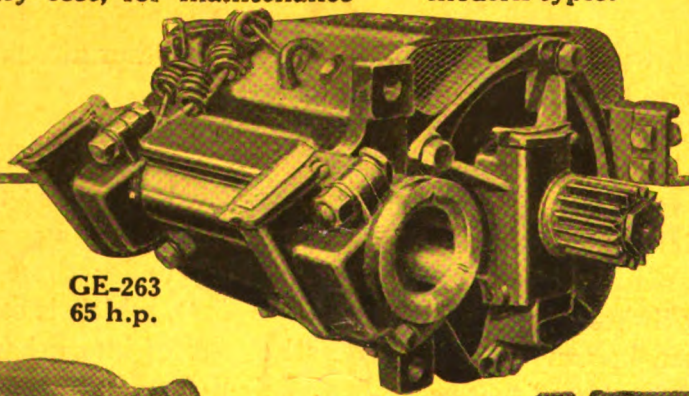


GE-275
50 h.p.

These six standard G-E Motors will meet the motive power requirements of any city, suburban or interurban service. On an average they cost, for maintenance and inspection, only $35 per motor per year. Consider the economy accruing from replacement of your old motors by one of these modern types.



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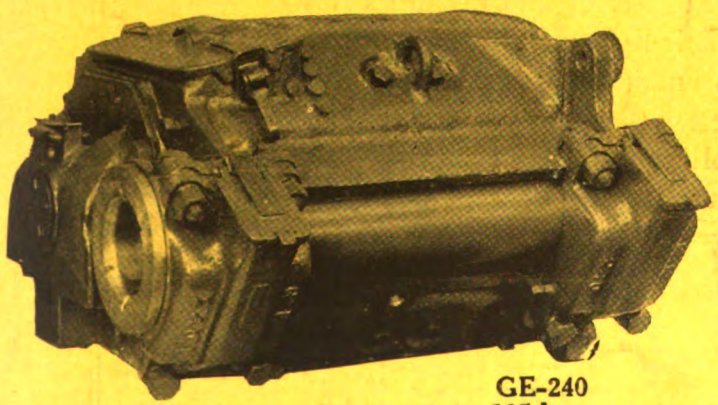

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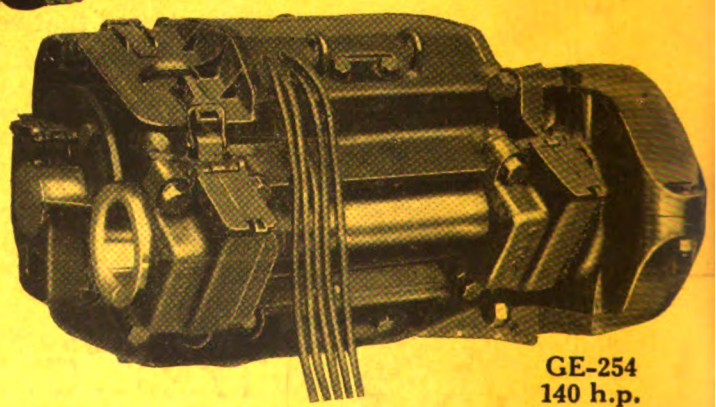

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General Electric Company

General Office
Schenectady, N.Y.

Sales Offices in all large cities

25-170

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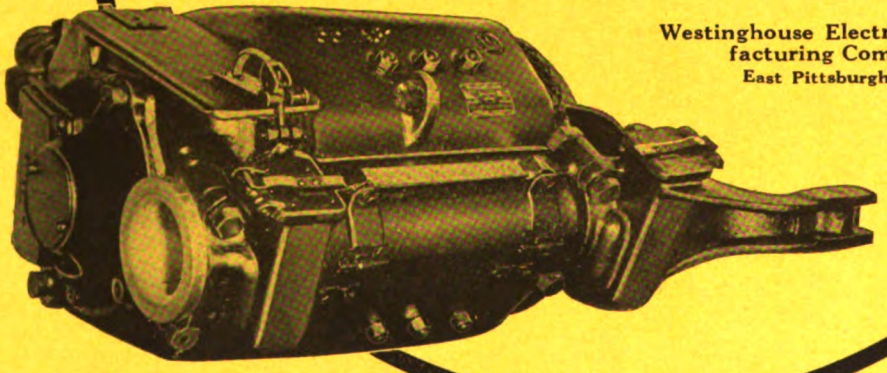
Economic Mass Transportation

Cincinnati Car Equipped With Westinghouse No. 510-A Motors

The inevitable march of progress demanding efficient street transportation for large cities has been met in Cincinnati with the Westinghouse No. 510 motors and HL control providing for train operation. Many prominent railway engineers have concluded that the present-day problem of street vehicular congestion may be best solved by the use of train operation. Among the cities which have adopted train operation for mass transportation are Kansas City, Los Angeles, Boston and Milwaukee.

The type 510, 35 horsepower motor is admirably suited to use on low-floor cars in city service, with control adapted for train operation.



Westinghouse No. 510-A 35 H.P. Motor

Westinghouse Electric & Manufacturing Company
East Pittsburgh, Pa.

MEMBER AMERICAN ELECTRIC RAILWAY ASSOCIATION AERA

W WESTINGHOUSE ELECTRIC

Westinghouse

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ELECTRIC RAILWAY JOURNAL

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Company, Inc.

HENRY W. BLAKE and HARRY L. BROWN, *Editors*

Volume 61 New York, Saturday, March 31, 1923 *Number* 13

Snow Stimulates Traffic by Putting Autos in Storage

LAST winter was a record breaker for snow in New England and Central New York and most of the electric railway properties in that district show a greatly increased expense for snow removal. But for every drawback there is nearly always some compensating advantage, and in this case it lies in the fact that the snow interfered with the operation of private automobiles to a greater extent even than with the trolley cars. The result was that whenever an automobile was put up for the winter, the former users of it had to use the trolley system of transportation, and this meant an increase in revenue.

To quote the figures for one property, on the Eastern Massachusetts Street Railway the railway revenue for January and February, 1923, was 7½ per cent higher than during the corresponding months in 1922. How much of this increase was due to the temporary discontinuance of private automobiles because of the unusually severe winter and how much to other causes it is, of course, difficult to say, but the condition suggests a query as to whether, at least for some of the roads in the snow belt, the peak of the business in the future may come in the winter when the autos are largely in storage rather than in summer when they are active.

If such a condition is brought about it will mean a number of changes in operating conditions. One of these is that if there is also less of a lighting or power load on the central power station in summer than in winter the two cannot supplement each other as the peak of both will come in the winter. This, for some power installations, may mean extra equipment. Effects of equal import may occur in other departments.

"Human Talent Is the Most Precious Thing in the World"

RICHARD T. ELY has written an article for the February issue of *Administration* on "Competition in the New Era." Like all other economic subjects about which Mr. Ely has written, he has touched this one with a shaft of lightness that is most alluring. He says that the business man should seek to confer favors rather than secure them. Further, he says that the business man should turn away from the allurements of special privilege, for they are more likely to land him in the ditch than to bring him fortune. Railway men particularly will agree with him in this, having formerly operated under monopoly conditions.

On the other hand, in an open field with keen competition there are the outstanding records of such men as Wanamaker, Marshall Field, Woolworth and others. However much one may disagree with the ideas of Mr. Ford, there is no question but that in his case and in the case of others competition has brought close together merit and reward.

But the question will be asked, what has all this to do with the railway operator? A great deal. There are many cases of unfair competition between bus and railway, but there have also been some cases of unwarranted complaining. Now complaining won't get anybody very far. In the face of competitive conditions, Ford, Field, Woolworth and others didn't holler. It would have done them no good. Neither did Garrett Seely out in Youngstown, when he found that the need existed for motor bus service connecting the towns served by the railway of which he is the head. He may or may not have been conscious of the new era of competition about which Mr. Ely writes, but he did recognize a public demand and set about to satisfy it. What was the result? Just this. He has all the business on the electric railway that he had before and, in addition, as told in ELECTRIC RAILWAY JOURNAL for Jan. 27, 1923, page 169, he has created an entirely new business by supplying a public demand. Other railway managers would do well to take a leaf out of Mr. Seely's book. His case proves, as Mr. Ely has pointed out, that after all "human talent is the most precious thing in the world."

Why College Men Do Not Stay in the Transportation Department

COMMENT has been made on this page concerning the opportunity for college men in the transportation department of electric railways and the difficulty of interesting them in that phase of the business. Another and perhaps greater difficulty is to keep them satisfied once they are in that department. There are reasons for this which will bear consideration.

Under the usual conditions, a transportation man is expected to be on call twenty-four hours a day and 365 days a year. He has no time for family or play. His whereabouts at all times must be known at the office, and any personal engagement he may make is subject to the proviso "if business permits." He can call no part of his time really his own. Such a life does not appeal to the college graduate. His education has given him a wide mental horizon and a variety of interests. He appreciates the value of music, art and literature, as well as science and economics. He knows that some mental relaxation and physical exercise are essential to good work.

When the young engineer enters the transportation department he is required to give up all outside interests. If he revolts against such conditions, the old timers in the railway business mistakenly think he is lazy and contemptuously recall how hard they used to work when they were his age. It is not because he is less willing than they to work hard that the college

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graduate objects to this routine, but because he has a different point of view. He knows that "perpetual devotion to what a man calls his business is only to be sustained by perpetual neglect of many other things," and he is disinclined to give up everything else. All this reference to unremitting responsibility applies as well to other men now occupying positions in the transportation department. It is as unfair to them as to the young man entering the work, but they are less free to break away from the job.

A rearrangement of duties is needed so that continuous responsibility shall not have to be borne by any one man. For example, on a large railway an operating division might perhaps be handled by two assistant superintendents, one being responsible during the day and the other during the night, with the change in shifts occurring so as to have a heavy day responsibility and a light night force, or so as to have one of the rush periods in each shift. Both assistants would report to the superintendent, but either would handle any situation, except a very great emergency, without calling on the other. In other words, each assistant superintendent and his staff would be subject to call twelve hours a day and only twelve.

On a smaller property the superintendent might take one shift himself, with his one assistant superintendent handling the other. Such an arrangement would give the supervisory transportation men some time they could really call their own. If that were done the railways would not only get better men in the transportation departments, but also better work from everybody, for there would be time to think beyond the immediate job of keeping the cars moving.

Combustion Engineering Is Making Rapid Advances These Days

THE sudden increase in the price of coal during the last few years is one of the compelling reasons for the present renaissance of boiler-plant development. Possibly another reason for this was the realization on the part of power engineers that the turbine room was outdistancing the boiler room in the race for efficiency.

Most remarkable is the way in which some responsible designing engineers have seized upon pulverized fuel burning as a remedy for some of their difficulties. It is true that as yet there are few utility power plants operating with powdered coal, but many of the plants now in contemplation or under construction will be so equipped. The reputed success of the Lakeside plant of the Milwaukee Electric Railway & Light Company, a description of which was covered in the issue of this paper for April 15, 1922, page 633, has brought countrywide attention to the subject.

One of the utilities which has been convinced is the United Electric Railways of Providence, R. I. This company has ripped out approximately 30 per cent of its present boiler capacity and is now putting in new, larger, higher pressure boilers with pulverized coal furnaces.

One factor which has been influential in this development is, of course, the possibility of using coal of poor grades in pulverized form. However, it appears that good coal can be advantageously burned in this form also. In Providence provision is being made, through arrangement of design and selection of types of equipment, to obtain a completed plant which will lend itself to investigation, on a broad scale, of different kinds of coals under regular operating conditions.

All of this does not signify that the day of the stoker is past. Far from it. Improvements in the stoker are constantly being made, and competition with this new rival will stimulate further improvements. In the meantime oil burning is on the increase, also. Boiler design is making rapid strides. Devices for the more intelligent operation of the boiler plant are constantly being developed. All of this points to the fact that combustion engineering is a vigorous art, and science as well. If the boiler room efficiencies which are now promised materialize in regular practice, the boiler will soon rank with the turbine, the electric generator and the electric transformer as an energy transforming device, if in fact it does not do so already.

Relations with Employees Should Be Based on a Spirit of Mutual Helpfulness

IT IS common to attribute to the present large size of many industrial organizations much of the lack of understanding which is often observed between employer and employee. In the day of the small undertaking, it is said, the proprietor knew every employee by name, and each of them had a greater interest and pride in the product than now, when he is engaged in a small repetitive part only in either production or merchandising. This argument against lack of co-operation loses its force, however, when one studies the work of some of the largest companies in the country which have made an effort to foster the right kind of relationship between men and management.

One of these companies is the American Bell telephone system, which, under the leadership of the late Theodore N. Vail, did pioneer work in the department of public relations. For many years its practice in this respect was far in advance of most of the other utilities of that time. Now it is doing equally important work in the department of management. In a recent statement, Vice-President Hall attributed much of the trouble with the laboring man at present to the theory that industry has become so big he has no recognized place in it except as one in a division or group, and that condition hurts his pride. Continuing, Mr. Hall said, in effect, that his company believes in making every man feel that he is an important member of the family, and that it should help each employee to get interested in his job, know what the policies of the company are, why they are adopted, and appreciate the part that he plays in the whole organization. To say that the president's door is always open for an employee is not sufficient. Means must be provided by which he can get there and back easily. This connection can well be supplied through some form of employees' organization, provided that organization is one based on the principle of co-operation and mutual confidence rather than on antagonism and mutual distrust.

The telephone company, of course, is not the only one to have progressed in this direction. The United States Steel Company has done considerable along this line, and there are of course certain railways which have accomplished much. An able plea for further progress by electric railway companies was made at the last meeting of the New England Street Railway Club by George E. Pellissier. Altogether the subject is one which could properly be considered as ranking, in importance, with public relations.

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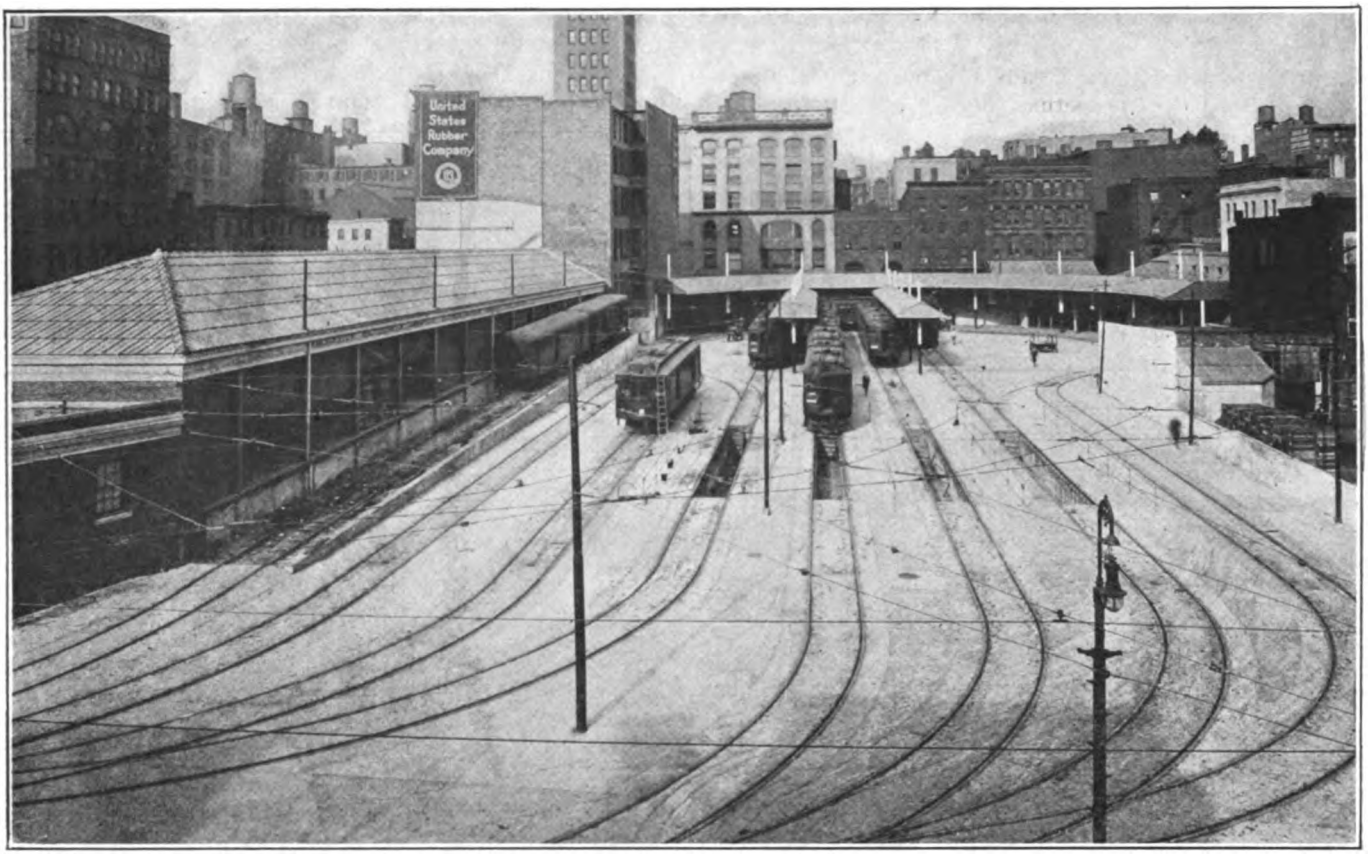

This Train Yard Has a Concrete Floor, so That the Passengers Can Board the Cars Easily at Any Point in the Yard

New Terminal in Baltimore

The Washington, Baltimore & Annapolis Electric Railroad Installs a Model Interurban Terminal for Freight and Passenger Service

ABOUT a year ago the Washington, Baltimore & Annapolis Electric Railroad completed its terminal station in Baltimore at the corner of Howard and Lombard Streets. The station is in the heart of the downtown district of the city.

The new station for both passenger and freight was planned several years ago, and the real estate has been owned for some time, but, owing to conditions brought about by the war, construction was delayed until the summer of 1921. Ground was broken on April 1, and the building was occupied for the first time on Nov. 1 of that year. The trackwork was started about June 1, 1921. Altogether, the yards and buildings occupy a total area of 78,094.40 sq.ft. divided as follows:

	Square Feet
Freight house	9,006.23
Driveway	4,320.00
Parking	853.00
Freight office	1,394.47
Freight yard, track incline	2,700.00
Terminal yard	51,389.15
Baggage room	1,196.45
Terminal station	7,234.30
Total	78,094.40

TERMINAL YARD

A feature of the terminal yard is that it is concreted throughout, as shown in the general view above, making a very clean job and one that can be flushed easily. The concrete flooring also enables passengers to board the cars easily at any point in the yard.

The passenger terminal tracks consist of four stub tracks and one loop. The trains to Washington or those on the main line of the company are dispatched from the stub tracks, while the trains to Annapolis are sent from the loop. The four stub tracks are fitted with pits for temporary repairs to cars. Altogether, the passenger tracks in the yard have a capacity for forty-eight cars. This is independent of the freight car track, which is on a slight incline, to conform with the grade on Eutaw Street.

During normal times, the company handles about 8,000 passengers per day from the terminal. This means from fifty to sixty cars per hour during the rush period. The normal week day service to Washington is about every half hour from 6 a.m. to 12 o'clock midnight, with additional local trains starting at 5 a.m. and running about every two hours, except between 5 and 8.30 p.m., when they are run more frequently. The Annapolis trains operate over the South Shore division on an hourly schedule from 6.35 a.m. to 3.35 p.m. Then they run more frequently until 7.35 p.m., when they go to a longer schedule. On the North Shore division, half-hourly service is maintained from 5.50 a.m. to 7 p.m., then hourly service until midnight, making approximately 100 trains leaving the Baltimore terminal daily. On Sundays and holidays the train service is increased to some considerable extent. The company does no local city business, and its minimum fare is 10 cents.

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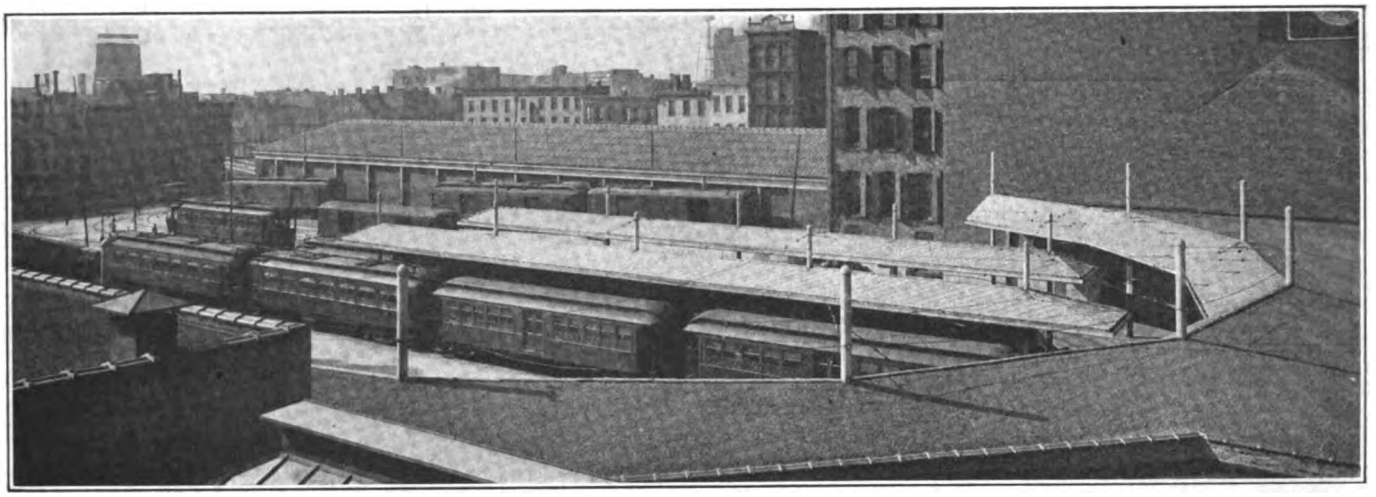
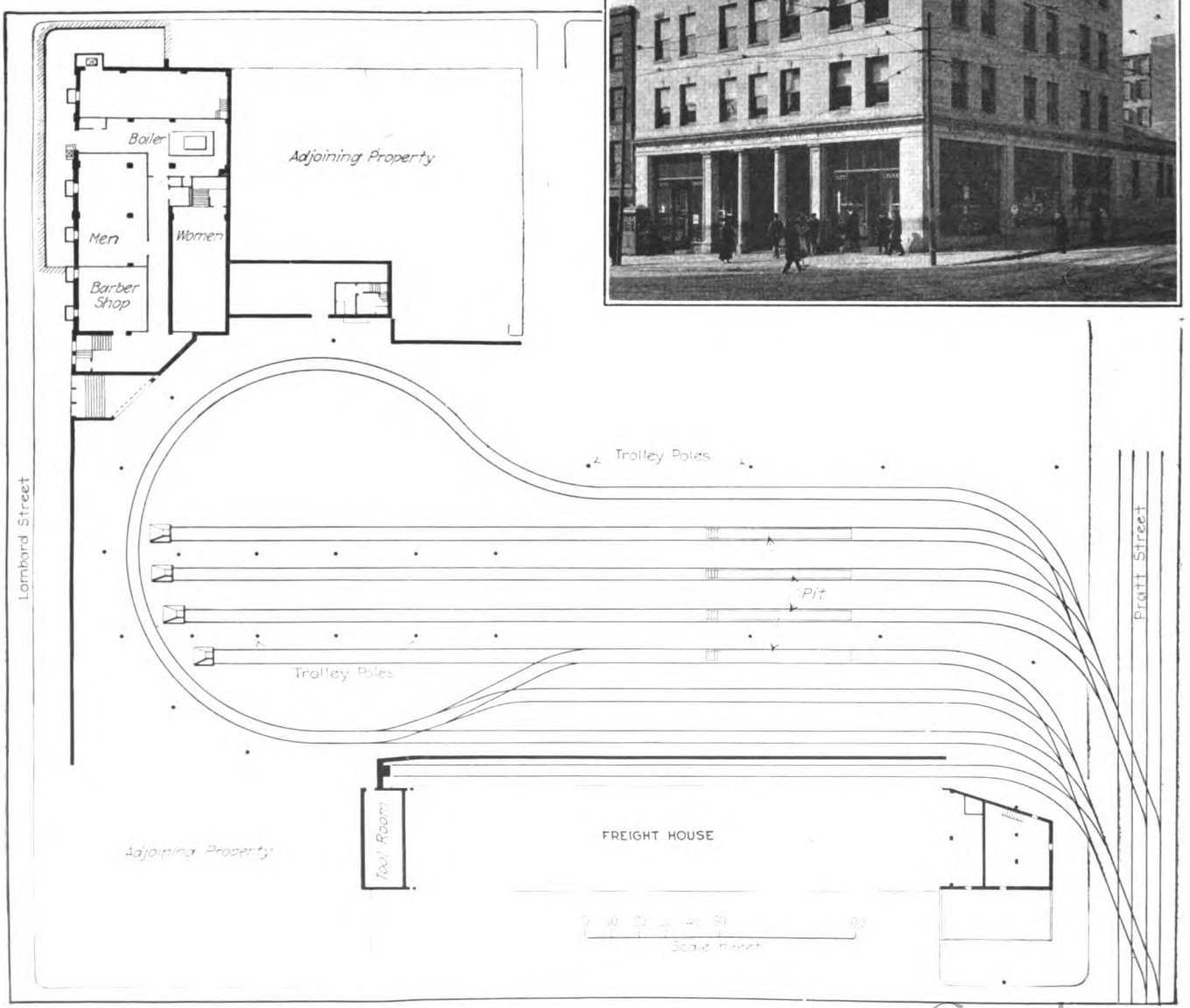


Above—This View of the Train Yard Is Taken from a Fourth Floor Window of the Office Building.

At Right—The Terminal of the W., B. & A. Electric Railroad in Baltimore Is in the Downtown Business Section.

Below—Plan of the Terminal Yard and Basement of the Office Building.



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The overhead construction in the yard is Ohio Brass equipment with steel poles and was all installed by the railroad company. The tracks in the yard are for the most part T-rail, 7 in. high and 98 lb. per yard, with some Lorain steel 141-465 9-in. girder.

Main Terminal and Freight House

The terminal building, the main building in the group, is of reinforced concrete with Indiana limestone finish, with terrazzo or ground marble and cement floors in the waiting room and basement, and Toncan metal roofing. It has four floors besides a basement.

The basement, which is shown in plan in the drawing of the track yard, contains five banks of six toilets each, four banks being pay toilets and two free. There is also a barber shop in the basement.

The ground floor contains the waiting room, lunch room, novelty store, telephone and telegraph booths, ticket office, baggage and parcel checking room and the entrance to the train sheds. The two stores opening into the waiting room are leased. The telegraph service is somewhat unique in so far as it allows a patron to get in direct communication by telephone with the central telegraph office and give his message over the wire. He pays for it in a coin box.

The second floor contains the president's office, general manager's office, conference room, purchasing agent's office and office of the passenger agent and assistant to the president. On the third floor are the freight department for checking way bills, the general freight office, claim agent's office and also the treasurer's office. The fourth floor contains the general auditing office. Each floor has its own vault for files, records and supplies.

The team way for the freight house is on Eutaw Street and the floor follows the grade of this street, which has an incline of 2½ per cent. The freight track in the terminal yard also follows this grade. About twenty cars a day each way represent the average freight and express business done at present. The Southeastern Express Company operates over this line and handles all express business.

The architects for the terminal building, train shed and freight house were Dreher, Churchman, Paul & Ford, Philadelphia. The building contractors were the George A. Fuller Company, New York. The special trackwork was supplied by the Lorain Steel Company and was installed under the direction of E. W. Weinland, engineer maintenance-of-way of the company. J. J. Doyle is vice-president and general manager.

The Waiting Room Is Open and Attractive

City Pays Half of Deficit

THE British Columbia Electric Railway started its first bus route on March 19. It is in the city of Vancouver over a route about 2 miles in length, from the terminal of one of the car lines. One bus gives the service and there is a spare one.

One of the features of the new service is the arrangement with the city of Vancouver whereby the city pays one-half of any deficit. The company pays the other half only up to a maximum of $5,000 a year. This agreement was made last November, when the company obtained a continuance of its 6-cent fares and gave a reduction in its lighting rates. If successful, it will be the basis of other bus routes. The first week's traffic filled the bus to capacity in the rush hours. The city is owner of considerable property along the route.

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Duluth Street Railway Valued

Valuation Estimates Presented by Consulting Engineers Before State Commission—Cost of Power and Bridge Contracts Included as Items of Value

ON FEB. 6 Mr. Drum of A. L. Drum & Company, Chicago, completed his testimony in the rate case of the Superior division of the Duluth Street Railway before the Railroad Commission of Wisconsin at Madison, Wis. An inventory of the property was made as of Oct. 1, 1922, and valuations of the property were prepared and submitted on four bases, namely, pre-war costs, ten-year average cost, post-war cost as of June, 1921, and estimated original cost at prices current as of date of installation. A table showing the summary of the physical property on these four bases is printed herewith, showing the percentage relationship of the latter three bases to the pre-war cost.

It is interesting to note that the valuation based on estimated original cost compares very closely with pre-war cost, being only 3.72 per cent higher than the pre-war cost, while the ten-year average cost shows an increase of 36.20 per cent, and June, 1921, prices show an increase of 76.96 per cent over pre-war costs.

In addition to the valuation of the physical property Mr. Drum submitted valuations showing the developmental cost of the property, value of a bridge contract, which permits of operation over the bridge connecting Superior, Wis., with Duluth, Minn., without additional bridge toll to the passengers of the street railway system, and value of the power contract. The value of the power contract was based on the cost to the company in obtaining this contract and perfecting a satisfactory source of power supply from the hydro-electric plant of the Great Northern Power Company. The power company paid the cost of maintaining the company's steam plant in operating condition from 1908 to 1914, while the power company was demonstrating its ability to furnish all power required, but the railway company was required to pay the insurance, taxes and interest on the plant from 1908 to 1915, when the steam plant was finally abandoned, and also suffer the loss of the investment in the plant equipment (less salvage), and these items were properly submitted as the actual cost to the street railway company in obtaining the power contract. These costs summarize as follows:

Cost of power station, land, building and equipment less salvage	$47,702.79
Interest on amount of salvage Jan. 1, 1908, to Dec. 31, 1915, at 6 per cent	5,015.76
Taxes paid on power station Jan. 1, 1908, to Dec. 31, 1915	5,551.34
Insurance paid on power station Jan. 1, 1908, to Dec. 31, 1915	2,783.59
Total cost of power contract	$61,053.48

To show that this cost in securing and perfecting the power supply was a proper expenditure on the part of the company estimates were made of the resulting saving in cost of power, as given in the table below.

	Investment on Basis of Present-Day Prices	Investment on Basis of Pre-War Prices
Total investment required for 1,500-kw. steam station and 1,500-kw. substation	$273,500	$183,600
Cost of manufacture of power, present-day prices:		
Coal	21,350	21,350
Labor	12,900	12,900
Maintenance, supplies and general	7,500	7,500
Total operating expense	41,750	41,750
Fixed charges, interest, depreciation, taxes and insurance	34,200	22,950
Total cost of power	$75,950	$64,700
Cost of power per kw.-hr., 4,000,000 kw.-hr., a.c.	$0.0190	$0.0162
Cost of power per kw.-hr., 3,720,000 kw.-hr., d.c.	0.0204	0.0174
Cost of power purchased under contract	0.0100	0.0100
Saving per kw.-hr.	$0.0104	$0.0074
Saving per year (3,720,000 kw.-hr.)	$38,688	$27,528
Present value of future saving from Oct. 1, 1922, to Nov. 17, 1931, each annual saving being discounted at 8 per cent from the end of its year to Oct. 1, 1922	$244,972	$174,307

COMPARATIVE SUMMARY OF COST OF REPRODUCING AND DEVELOPING THE PROPERTY OF THE SUPERIOR DIVISION, DULUTH STREET RAILWAY, AS OF OCT. 1, 1922, SHOWING PER CENT RELATIONSHIP OF BASES 2, 3 AND 4 TO THE PRE-WAR COST, BASIS NO. 1.

Physical property	Basis No. 1 Pre-War Cost Current Prices 1915 Amount	Basis No. 2 Ten-Year Average Cost Average Prices 1912–1921 Amount	Basis No. 2 Per Cent of 1915	Basis No. 3 Post-War Cost Prices Current June, 1921 Amount	Basis No. 3 Per Cent of 1915	Basis No. 4 Estimated Original Cost Prices Current Date of Installation Amount	Basis No. 4 Per Cent of 1915
Land	$23,200	$23,200	100.00	$23,200	100.00	$23,200	100.00
Track	560,483	783,423	139.79	1,057,475	188.69	612,425	109.27
Paving	69,472	76,470	110.07	84,468	121.58	71,398	102.77
Electrical distribution system	68,137	89,441	131.27	105,578	154.95	68,137	100.00
Rolling stock	235,125	361,364	153.69	485,207	206.36	235,842	100.31
Shop machinery and tools and miscellaneous equipment	35,339	46,216	130.78	56,235	159.13	35,339	100.00
Buildings	61,329	81,823	133.41	101,627	165.71	49,853	81.29
Furniture and fixtures	7,346	11,602	157.92	16,530	225.00	6,245	85.02
Materials and supplies	38,113	38,113	100.00	38,113	100.00	38,113	100.00
Total inventoried property	$1,098,544	$1,511,652	137.60	$1,968,433	179.19	$1,140,552	103.82
Expenditures not apparent in inventory	204	204	100.00	204	100.00	204	100.00
Total	$1,098,748	$1,511,856	137.60	$1,968,637	179.19	$1,140,756	103.82
Engineering and superintendence	54,937	75,593	137.60	98,432	179.19	57,038	103.82
Total	$1,153,685	$1,587,449	137.60	$2,067,069	179.19	$1,197,794	103.82
General and miscellaneous costs							
Administration, organization and legal expense	$57,684	$79,372	137.60	$103,353	179.17	$59,890	103.83
Taxes during construction	16,842	16,532	98.16	25,630	152.18	16,842	100.00
Interest during construction	73,693	101,001	137.06	131,763	178.80	76,472	103.77
Working capital	31,074	31,074	100.00	31,074	100.00	31,074	100.00
Total general and miscellaneous costs	$179,293	$227,979	127.15	$291,820	162.76	$184,278	102.78
Cost of financing	66,649	90,772	136.19	117,944	176.97	69,103	103.68
Total cost to reproduce the physical property as of Oct. 1, 1922	$1,399,627	$1,906,200	136.20	$2,476,833	176.96	$1,451,175	103.72
Power and bridge contracts							
Cost of power contract	$61,053	$61,053	.....	$61,053	.....	$61,053	.....
Value of bridge contract	78,125	78,125	.....	78,125	.....	78,125	.....
Total power and bridge contracts	$139,178	$139,178	.....	$139,178	.....	$139,178	.....
Developmental costs							
Expenditures for obsolete equipment and construction	$376,656	$376,656	.....	$376,656	.....	$376,656	.....
Cost to unify system	22,905	22,905	.....	22,905	.....	22,905	.....
Loss of interest during operation	111,970	152,496	.....	198,147	.....	116,094	.....
Total developmental costs	$511,531	$552,057	.....	$597,708	.....	$515,655	.....
Total cost of reproducing and developing the property, including value of power and bridge contracts	$2,050,336	$2,597,435	.....	$3,213,719	.....	$2,106,008	.....

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The discussion at the hearing indicated that both the commission and the company were confronted with a difficult problem in determining a reasonable rate of fare on account of the company having been unable to reach an agreement with the city of Superior with respect to the regulation of the jitney traffic and the introduction of one-man cars. The general opinion was that a joint conference between the Wisconsin commission, the city and the company should be had at which reasonable requirements as to the regulation of the jitney traffic and the use of one-man cars could be agreed upon, based on which the commission could determine a new rate of fare. During the hearing the Supreme Court of Wisconsin rendered a decision in the so-called Superior jitney case, removing the control of jitneys from the jurisdiction of the cities of Wisconsin and placing the regulation of jitneys under the Wisconsin Railroad Commission.

Visualizing Schedules

By Means of a Large Board, with Grooves to Hold Sticks Representing Various Runs, a Picture Is Obtained of the Equipment in Operation and the Possibilities for Expansion or Contraction of the Service

PROBABLY the most common method used for showing at a glance the service furnished on a particular line is by a graphic layout of the timetable. In perfecting the timetable, however, frequent changes are necessary, and with the graphic method each change usually requires the replotting of the graphs. A method of visualizing the timetable that is very flexible and which shows at a glance the cars in service, the headway, the layovers, the setbacks, the time at division points, the number of crews required and the time that they are on duty, together with the possibilities of expansion and contraction of service, to meet various traffic requirements, is illustrated herewith. The idea originated with C. E. Chalmers, receiver for the Second Avenue Railroad, New York, N. Y., and was worked out by his engineering and timetable departments.

The apparatus used includes a large board and numerous trip sticks to designate the various runs. The board is 34 in. wide and 18 ft. long. Two boards are used to give the total width and by having offsets at either end the total length is increased and the space at the offset would never be used in the various layouts. The board is ruled with lines crosswise to indicate time intervals, different colored inks being used for convenience. On the Second Avenue Railroad's board time intervals are laid off horizontally, the scale being ½ in. for each minute or 7½ in. to the hour. Longitudinal grooves run the full length of the board. These are made to fit the trip sticks, which are ⅛ in. in diameter. There is a total of eighty-six grooves in the width of the board.

The trip sticks are of wood and their length represents a round trip, the scale for time intervals of course being the same as that for the board, ½ in. to the minute. The trip sticks are marked to indicate division points. On the Second Avenue routes there are seven intermediate time points in addition to the ends, which of course represent the same point since the trip sticks are for round trips. These time points are marked with different colored inks. The same color is used to indicate a particular time point on all trip sticks.

Since the times of layovers at the end of runs vary somewhat, these are not included in the length of the trip sticks, but in laying out the schedule spaces are left between the different trip sticks which indicate the layovers. This method eliminates a large number of different lengths of trip sticks, which of course simplifies the laying out of the timetable.

WEEK DAY PROPERTY OF AND TO BE RETURNED TO
SECOND AVE. R. R. CO., CHARLES E. CHALMERS, Receiver.

NO. 21	TRIPS 1	2	3	4	5	6
98th N	716	848	1020	155	328	504
129th	728	900	1032	207	340	516
98th S	740	912	1044	219	352	528
59th	754	926	1058	233	406	542
34th	804	936	1108	243	416	552
10th	813	945	1117	252	426	602
34th	822	954	1126	301	436	612
59th	832	1004	1136	311	446	622
98th	846	1018	1150	325	500	636

Trip Card Used for Schedules of the Second Avenue Railroad

Laying Out of the Timetable

With the board and trip sticks constructed the timetable may be laid out to visualize several different factors as desired. First, it may be laid out by crews. This shows both the regular and extra runs and shows how the swing runs must be laid out to take care of the extra service during peak hours and to provide for lunch periods for the various crews. In the accompanying illustration of the board the bottom part is laid out by this method. The regular runs are at the bottom and the swing runs just above these. By referring to this illustration, it will be seen that starting with the regular runs in the morning four round trips are made

Test Board Used for Checking Timetables of the Second Avenue Railroad

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and then the regular crews are allowed time off for lunch. The first swing runs which occur are those for the morning rush hour. After this the swing runs fit in as the various crews leave for their lunch period. By this method each groove is taken up by a single crew. This of course shows the layovers, setbacks and headway at the various time points. The headway can be scaled directly by measuring the distance between the same colored line on the trip stick in adjacent grooves. This method of laying out a timetable is of particular advantage for showing the slack in the schedules and how this can be taken out by careful rearrangement. When this board was first used by the Second Avenue Railroad for checking its schedules it was able to take out 15 per cent of the slack, which of course reduced operating expenses considerably.

A second method of laying out the timetable is by cars in service. Public service commissions and the patrons of the railway are most interested in the service furnished, and this method of laying out the timetable indicates at a glance the number of cars that are in service, the headway, etc. With this method operation of the same car is laid out in the same horizontal groove. Layovers are indicated by the time between trip sticks, but of course the service is continuous as long as the car is operated regardless of what crew has it. On the board shown in the accompanying illustration the top of the board is laid out to show the cars in service on the Second Avenue line after 11 a.m. For convenience in checking the various information desired, a T-square is used which fits to the board, and by following along the edge of the square the number of cars in service, the number of crews and like information is shown at any time desired.

A third method of laying out the timetable is by intervals. When this method is used, the cars follow in their regular order regardless of whether they are on swing runs or regular runs.

After the final timetable had been adopted by the Second Avenue Railroad run cards were made out to show the time at the various division points. A sample of one of these cards is shown herewith. Runs on the Second Avenue line start at Ninety-sixth Street and go north to 129th Street; they then return south to Tenth Street, where again they turn north to Ninety-sixth Street, making the round trip. The time for the various points is entered in black and red. Black figures show time for runs in a northerly direction and red indicates time for southbound trips. When a crew takes out a car it is supplied with a run card for the particular run which it is to operate, and in checking operations inspectors check at the various time points and the crews are expected to maintain the schedule unless unavoidable delays occur. For convenience in checking the operation each car carries a run number in the right-hand front vestibule window. Inspectors are supplied with books containing all the various runs, so that they can turn immediately to the time when a car should be at a certain time point and thus check its operation.

This arrangement is also of particular use to other officials in getting in touch with crews or locating cars. Thus, if it is desired to get in touch with a particular crew, all that is necessary is to call up the dispatcher and find out the run that this crew has. Then by referring to the book it can be seen at a glance just where this crew is at a particular time. The same of course applies to cars. The location of a car at any particular time can be checked from the timetable card.

"Wired Wireless" Tried

New Duplex Current Used for Two-Way Conversation —Experiments Indicate Practicability of Using High-Frequency Current Communication

ON MARCH 26 the Third Avenue Railway, New York, in conjunction with the General Electric Company, demonstrated to a party of men the practicability of using "wired wireless" for establishing communication between any two points on the system. A laboratory set-up of a radio transmitting and radio receiving set was installed on a street car, with corresponding apparatus in the substation which supplied energy to the line over which this car was operated. Perfectly audible communication was conducted between the car and the substation from various points on the line, with the car either standing or moving.

The particular feature of this demonstration was the use of a duplex current whereby conversation could be carried on in either direction, just as it is done over the telephone. This was accomplished by utilizing two different frequencies. The transmitting set at one end and the receiving set at the opposite end were tuned for a frequency of 73,000, while the other pair of sets were tuned for 49,000 cycles. Currents of the two frequencies were thus conducted over the same wires, the trolley and feeder, without interference. By putting on the head phones of the receiving set and talking into a transmitter connected with the transmitting set, it was possible to receive and transmit without the use of any changeover switch.

The set-up in the street car consisted of an ordinary simple radio receiving set with one three-electrode vacuum tube, connected as a detector and another as an amplifier. The transmitting set made use of three type UV 203 tubes of 50 watts capacity. These three tubes were used as an audio frequency amplifier, an oscillator and a modulator. The power for the sending set was supplied by a 1,000-volt motor-generator set with the energy to operate it supplied by twelve cells of storage battery supplying approximately 24 volts. A similar set-up was used in the substation, except that in the receiving set only a single tube was used as detector and amplifier. In the substation, and in the car, the sets were connected to the trolley circuit through a condenser of low voltage drop.

The General Electric Company has been engaged in experimental work on the Third Avenue Railway for several weeks, to determine the constants of such a system, looking toward the development of suitable apparatus for utilizing high frequency carrier current for communication work. While it is possible to establish communication between any point on the system and any car suitably equipped with apparatus, the idea will be primarily to devise plans for communication between some central emergency office and line and trouble crews, construction and repair gangs, and perhaps such transportation men as starters and inspectors out on the system. The principal advantage of the wired wireless as compared to radio communication is that it requires much less input of power, and that while the current probably spreads over the entire overhead and feeder system, the radiation into the ether is very small so that it introduces practically no interference with any radio communication. The test was in charge of W. J. Quinn, electrical engineer of the railway company, and Edward Austin of the G. E. Co.

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Tests of Welded Joints by the Boston Elevated Railway

Results of Compression and Bending Observations at Massachusetts Institute of Technology—Different Applications of Seam Welding

WIDESPREAD interest among electric railways and manufacturing companies is developing throughout the country in regard to the properties of welded joints. References have been made in this journal at various times during the past year to the organized investigation of this subject, which is being conducted under the auspices of the American Electric Railway Association, the American Electric Railway Engineering Association and the American Bureau of Welding in co-operation with the National Research Council and the United States Bureau of Standards. This investigation is proceeding along comprehensive lines, and in connection with it studies are being made of all available local data and information. At the request of the ELECTRIC RAILWAY JOURNAL H. M. Steward, superintendent of maintenance, Boston (Mass.) Elevated Railway, has consented to allow this paper to make public as information on this subject the results of a series of tests made by that company on arc-welded joints during the past year.

As a member of the executive committee of the joint committee on welded joints of the American Electric

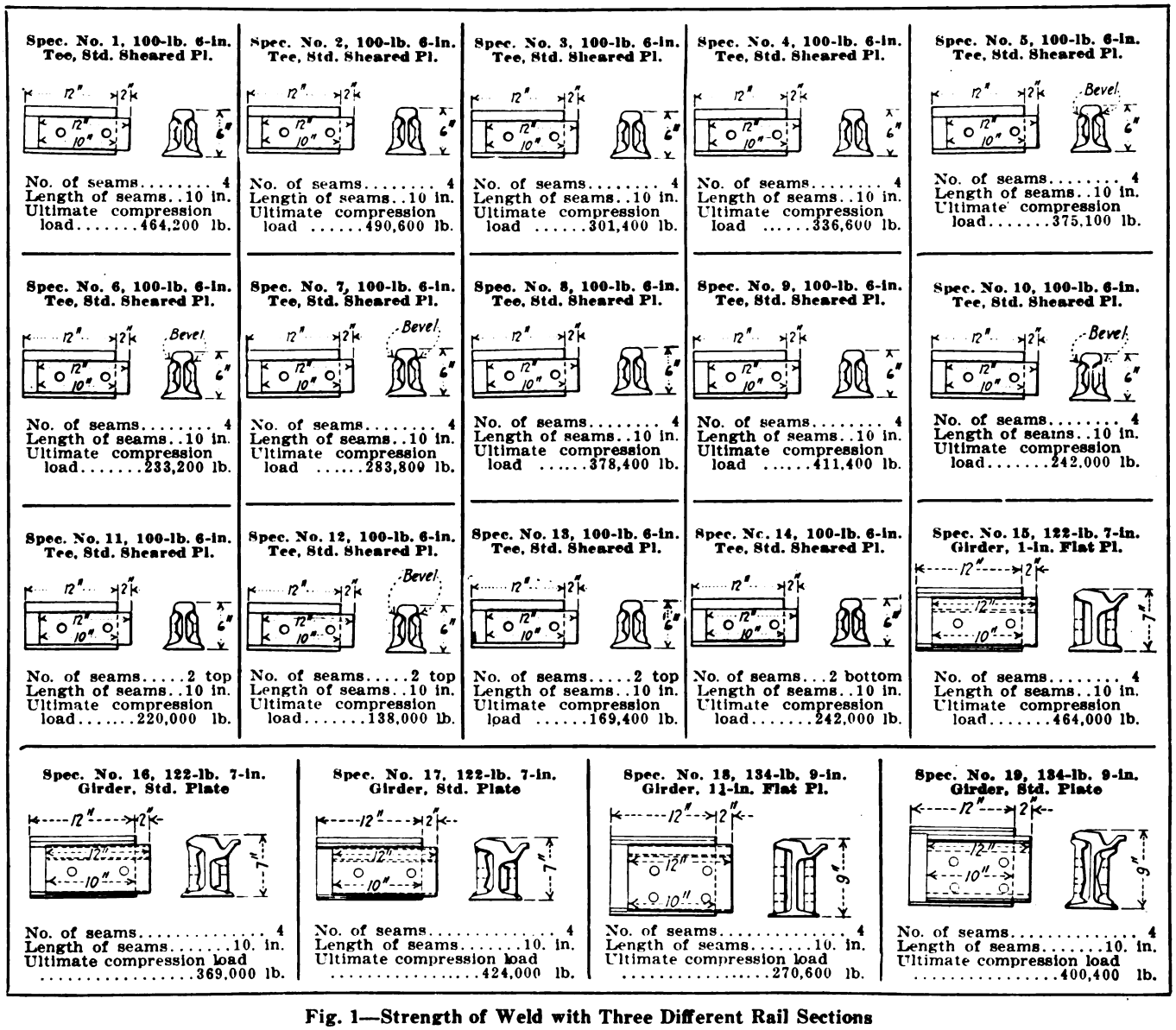

Fig. 1—Strength of Weld with Three Different Rail Sections

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Railway Association and the American Bureau of Welding Mr. Steward has submitted data from these tests for critical study to other members of the committee and the comments of interested readers of this paper will be welcomed.

About 5,000 arc-welded joints are now being installed annually in new track construction by the Boston company. In order to obtain information as to the strength of such joints, arrangements were made to utilize a one million-pound testing machine of the Massachusetts Institute of Technology in the department of materials of engineering of that school at Cambridge. As the strength of the seam weld joint in tension was unknown and as no previous data on the subject were available, it was decided to use short sections of rail and joint plates rather than full-sized joints in order that the resistance to shear of the specimens would be well within the capacity of the testing machine. For this reason a seam length of 10 in. was selected. Tests were in compression, the rail section being pushed through the joint to shear.

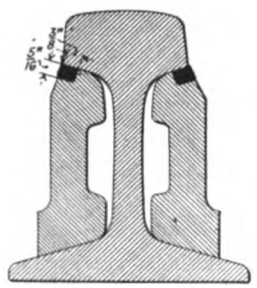
The first set of tests, Table I, were made with three different sections of rail in order to obtain data on the strength of the weld. The standard Rail Welding & Bonding Company process of welding was used on all but three specimens, which were welded by the metallic process.

This group of tests was made with and without bevels and with seams at top and base of rail, and with seams at the top only and at the base only. Fig. 1 shows the cross-sectional appearance of each joint as arranged for testing. The average ultimate load sustained by seven specimens welded with carbon arc was 357,186 lb., the area of four seams being 10 sq.in.. and giving an unit stress in shear on the seam metal of 35,718 lb. per square inch.

Strengthening the Top Seam

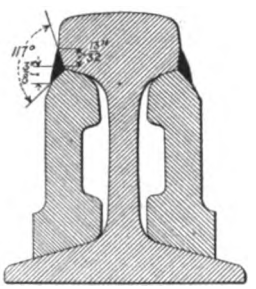
Fig. 2 shows the arrangement of specimens and data secured from the second group of tests, which was made to determine if possible a method of welding that would strengthen the top seam of the rail joint. Five different types of plate bevel were tried. It will be noted in the above group of tests that in one case the bevel was applied to the rail as well as to the joint plate. These tests were all made with 100-lb., 6-in. tee rail, A. R. A. type A, two top seams being used in each case. Since the beginning of the use of arc welding by the

100-lb. 6-in. Tee Rail—Std. Sheared Plate A.R.A. Type A Bevel "A"



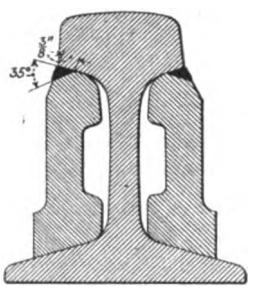
No. of seams.....2 top
Length of seams.....10 in.
Specimen..... 20
Process .....
$\frac{5}{32}$-in. rod welded in place
.....$\frac{5}{32}$-in. rod puddled in
Ultimate compression load
.....215,600 lb.
Specimen..... 21
Process .....
.....$\frac{1}{4}$-in. rod puddled in
Ultimate compression load
.....240,900 lb.
Specimen..... 22
Process .....
.....$\frac{5}{32}$-in. rod in place
.....$\frac{5}{32}$-in. rod puddled in
Ultimate compression load
.....221,100 lb.
Specimen..... 23
Process..2 $\frac{5}{32}$-in. rods in place welded in one operation
Ultimate compression load
.....239,300 lb.

100-lb. 6-in. Tee Rail—Std. Sheared Plate A.R.A. Type A Bevel "B"



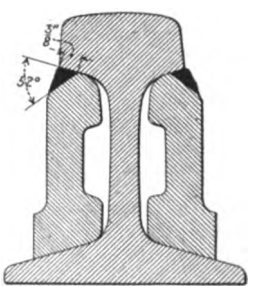
No. of seams.....2 top
Length of seams.....10 in.
Specimen..... 24
Process .....
..$\frac{1}{4}$-in. rod welded in place
Ultimate compression load
.....228,800 lb.
Specimen..... 25
Process .....
.....$\frac{5}{32}$-in. rod in place
.....$\frac{5}{32}$-in. rod puddled in
Ultimate compression load
.....31,900 lb.

100-lb. 6-in. Tee Rail—Std. Sheared Plate A.R.A. Type A Bevel "C"

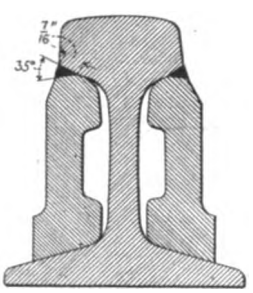


No. of seams.....2 top
Length of seams.....10 in.
Specimen..... 26
Process .....
.....$\frac{5}{32}$-in. rod in place
.....$\frac{5}{32}$-in. rod puddled in
Ultimate compression load
.....297,000 lb.
Specimen..... 27
Process .....
.....$\frac{5}{32}$-in. rod puddled in
Ultimate compression load
.....303,600 lb.

100-lb. 6-in. Tee Rail—Std. Sheared Plate A.R.A. Type A Bevel "D"

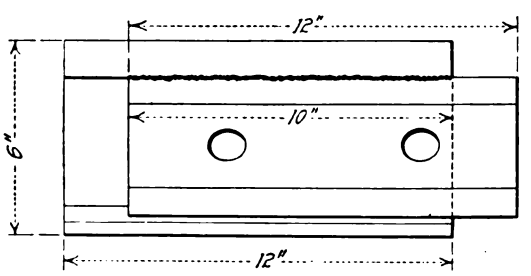


No. of seams.....2 top
Length of seams.....10 in.
Specimen..... 28
Process .....
.....$\frac{1}{4}$-in. rod puddled in
Ultimate compression load
.....119,900 lb.
Specimen..... 29
Process .....
.....$\frac{5}{32}$-in. rod in place
.....$\frac{5}{32}$-in. rod puddled in
Ultimate compression load
.....26,400 lb.



100-lb. 6-in. Tee Rail—Std. Sheared Plate A.R.A. Type A Bevel "E"

No. of seams.....2 top
Length of seams.....10 in.
Specimen..... 30
Process.....$\frac{5}{32}$-in. rod puddled in
Ultimate compression load....
.....242,000 lb.
Specimen..... 31
Process..$\frac{5}{32}$-in. rod and $\frac{1}{4}$-in. rod in place welded in one operation
Ultimate compression load....
.....111,100 lb.



SIDE ELEVATION—Scale: $\frac{1}{4}$ Full Size

Fig. 2—Variations in Plate Bevel to Strengthen Top Seam

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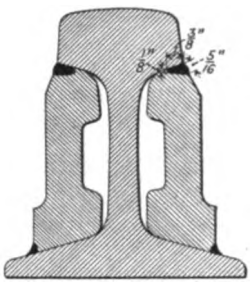
Boston company, all welding has been done by the standard R. W. & B. process.

For making comparative tests it was decided to use the so-called hand-feed process in welding. In this, the operator holds a welding rod in one hand and in the other a carbon electrode. After striking the arc on the seam to be welded, the end of the welding rod is fed into the arc. By this method it is possible to make a weld of any cross-section within certain limits by varying the quantity of weld metal fed into the arc. It was also decided to test a bevel head type of joint plate in order to compare the results with those from the flush head type of joint plate used on the previous tests.

An examination of the specimens after the tests were made showed that in some cases where the hand-feed process had been varied by laying a welded rod in place and feeding in extra metal from a second rod, the arc would not penetrate entirely through the rod in place.

100-lb. 6-in. Tee Rail—A.R.A. Type "A" Standard Joint Plates Top of Plates Beveled as shown



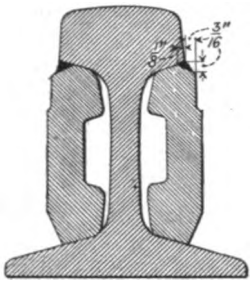
Specimen No. 40
No. of seams, 4.
Length of seams, 10 in.
Hand feed or puddled welds —1¼-in. welding rod per lin. inch of weld.
5/32-in. R. W. & B. welding rod.
Volts, 27. Amp., 160.
Ultimate compression load, 509,300 lb.

Specimen No. 41
No. of seams, 2 top.
Length of seams, 10 in.
Hand feed or puddled welds —1¼-in. welding rod per lin. inch of weld.
5/32-in. R. W. & B. welding rod.
Volts, 27. Amp., 160.
Ultimate compression load, 231,000 lb.

Specimen No. 42
No. of seams, 4.
Length of seams, 10 in.
Hand feed or puddled welds —1¼-in. welding rod per lin. inch of weld.
5/32-in. R. W. & B. welding rod.
Volts, 27. Amp., 160.
Ultimate compression load, 431,200 lb.

Specimen No. 43
No. of seams, 4.
Length of seams, 10 in.
Hand feed or puddled welds —1¼-in. welding rod per lin. inch of weld.
5/32-in. R. W. & B. welding rod.
Volts, 27. Amp., 160.
Ultimate compression load, 422,400 lb.

100-lb. 6-in. Tee Rail—A.R.A. Type "A" Standard Joint Plates



Specimen No. 44
No. of seams, 2 base.
Length of seams, 10 in.
Hand feed or puddled welds —1¼-in. welding rod per lin. inch of weld.
5/32-in. R. W. & B. welding rod.
Volts, 27. Amp., 160.
Ultimate compression load, 257,000 lb.

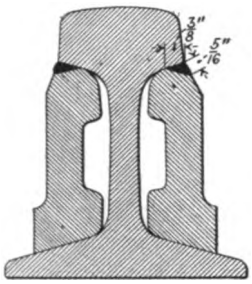
Specimen No. 45
No. of seams, 2 base.
Length of seams, 10 in.
Hand feed or puddled welds —1¼-in. welding rod per lin. inch of weld.
5/32-in. R. W. & B. welding rod.
Volts, 27. Amp., 160.
Ultimate compression load, 228,800 lb.

100-lb. 6-in. Tee Rail—A.R.A. Type "A" Standard Joint Plates Plates Bottom Side Up

Specimen No. 46
No. of seams, 2 top.
Length of seams, 10 in.
Standard process Carbon Arc weld—2 welds, second over the first.
5/32-in. R. W. & B. welding rod.
Volts, 35. Amp., 200.
Ultimate compression load, 247,500 lb.

Specimen No. 47
No. of seams, 2 top.
Length of seams, 10 in.
Standard process Carbon Arc weld.
5/32-in. R. W. & B. welding rod.
Volts, 35. Amp., 200.
Ultimate compression load, 226,600 lb.

100-lb. 6-in. Tee Rail—A.R.A. Type "A" Standard Joint Plates Top of Plates Beveled as shown

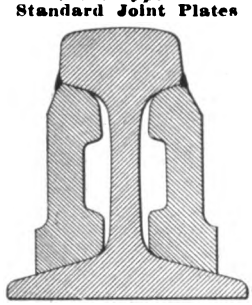


Specimen No. 48
No. of seams, 2 top.
Length of seams, 10 in.
Hand feed or puddled welds —1¼-in. welding rod per lin. inch of weld.
5/32-in. R. W. & B. welding rod.
Volts, 25. Amp., 160.
Ultimate compression load, 264,000 lb.

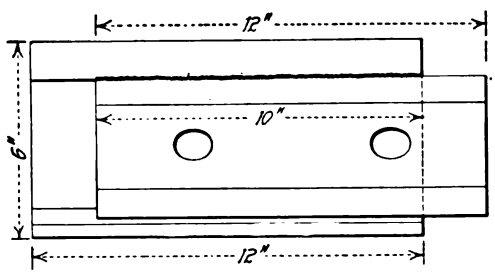
Specimen No. 49
No. of seams, 2 top.
Length of seams, 10 in.
Hand feed or puddled welds —1¼-in. welding rod per lin. inch of weld.
5/32-in. R. W. & B. welding rod.
Volts, 25. Amp., 160.
Ultimate compression load, 236,500 lb.

Specimen No. 50
No. of seams, 2 top.
Length of seams, 10 in.
Hand feed or puddled welds —1¼-in. welding rod per lin. inch of weld.
5/32-in. R. W. & B. welding rod.
Volts, 27, Amp., 150.
Ultimate compression load, 242,000 lb.

100-lb. 6-in. Tee Rail—A.R.A. Type "A" Standard Joint Plates

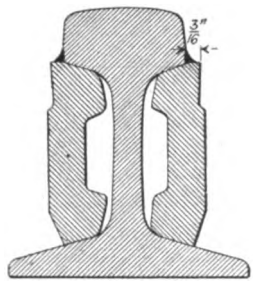


Specimen No. 51
No. of seams, 2 top.
Length of seams, 10 in.
Standard process Carbon Arc weld.
5/32-in. R. W. & B. welding rod.
Volts, 35. Amp., 200.
Ultimate compression load, 191,400 lb.



SIDE ELEVATION OF SPECIMEN

100-lb. 6-in. Tee Rail—A.R.A. Type "A" Standard Joint Plates Plates Bottom Side Up



Specimen No. 52
No. of seams, 2 top.
Length of seams, 10 in.
Hand feed or puddled welds —1¼-in. welding rod per lin. inch of weld.
5/32-in. R. W. & B. welding rod.
Volts, 27. Amp., 160.
Ultimate compression load, 260,700 lb.

Fig. 3—Comparison of Groove and "V"-Bevels

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This occurred with specimens 20, 22, 25 and 29. In the case of specimen 31 it was found that the ends of the joint plates were uneven so that the strain was applied to one plate only.

As bevels "A" and "C" appeared more promising for further tests, eight specimens were prepared and sheared, with the ultimate load data given in Table II.

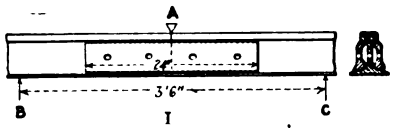
From this series of tests it appeared that as good results are obtainable with bevel "C" as with bevel or groove "A," the latter being too large a cavity to fill with welding metal with no corresponding appreciable gain in the strength of the weld. Some question exists as to the accuracy of the high strength figure secured by the carbon arc process followed by the metallic process (specimen 39, see table II), because an examination of the specimen after testing showed one of the joint plates had bent slightly inward and bound against the end of the rail, increasing loading to a certain extent.

GROOVE VS. "V"-BEVEL

The next set of tests, Fig. 3, was made for the purpose of comparing a groove applied to the top of the joint plate as shown in specimens 40, 41, 42 and 43 with a "V"-bevel as shown in specimens 48, 49 and 50. With one exception these tests were made with the hand-feed process. The exception was made with flush-head plates

Case I

6-in. Tee Rail, 100-lb. A.R.A. Type "A." Std. Joint Plates 24 in. long, seam welded full length. Bevel "A."



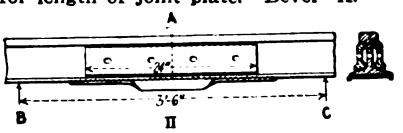
Rail supported at "B" and "C"

Load applied at "A"	Deflection in inches
5,000 lb.	.00
25,000 lb.	.06
50,000 lb.	.15
60,000 lb.	.26
65,000 lb.	See below

One joint plate broke at 65,000 lb. and test was discontinued.

Case II

6-in. Tee Rail, 100-lb. A.R.A. Type "A." Std. Joint Plates 24 in. long, seam welded full length. Base plate seam welded for length of joint plate. Bevel "A."



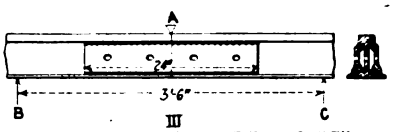
Rail supported at "B" and "C"

Load applied at "A"	Deflection in inches
5,000 lb.	.00
25,000 lb.	.03
50,000 lb.	.07
75,000 lb.	.13
100,000 lb.	.19
120,000 lb.	.25
140,000 lb.	.34
144,250 lb.	See below

At 144,250 lb. rail broke at end of joint plate and test was discontinued. All welds in perfect shape. Base plate slightly deflected at point of rail fracture.

Case III

6-in. Tee Rail, 100-lb. A.R.A. Type "A." Std. Joint Plates 24 in. long, seam welded full length. Bevel "C."



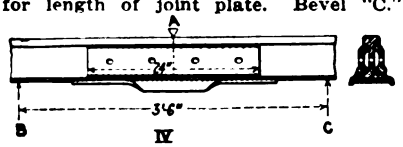
Rail supported at "B" and "C"

Load applied at "A"	Deflection in inches
5,000 lb	.00
25,000 lb.	.04
50,000 lb.	.11
60,000 lb.	.22
65,000 lb.	.28
99,700 lb.	See Below

One joint plate broke at 99,700 lb. and test was discontinued. Slight distortion in welds at point of joint plate fracture.

Case IV

6-in. Tee Rail, 100-lb. A.R.A. Type "A." Std. Joint Plates 24 in. long, seam welded full length. Base plate seam welded for length of joint plate. Bevel "C."



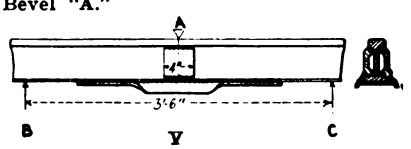
Rail supported at "B" and "C"

Load applied at "A"	Deflection in inches
5,000 lb	.00
25,000 lb.	.02
50,000 lb.	.07
64,250 lb.	See below

At 64,250 lb. rail broke 1 in. inside of joint plate base plate and test was discontinued. Base plate slightly deflected at point rail fracture. No fracture in seam welds.

Case V

6-in. Tee Rail, 100-lb. A.R.A. Type "A." 2 pcs. std. joint plate 4 in. long with base plate. Seam weld full length. Bevel "A."



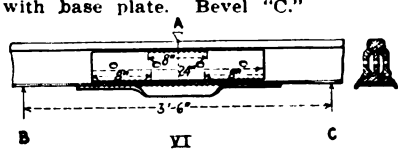
Rail supported at "B" and "C"

Load applied at "A"	Deflection in inches
5,000 lb.	.00
25,000 lb.	.03
50,000 lb.	.07
75,000 lb.	.13
105,000 lb.	.19
125,000 lb.	.38
135,000 lb.	See below

Complete failure at 135,000 lb. rail broke 3 in. inside of end of base plate welds. Base plate slightly deflected at point of rail fracture.

Case VI

6-in. Tee Rail, 100-lb. A.R.A. Type "A." Std. Joint plates 24 in. long. Seam weld 8 in. top seam at joint 8 in. base seams beginning at ends of joint plate with base plate. Bevel "C."



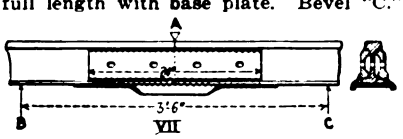
Rail supported at "B" and "C"

Load applied at "A"	Deflection in inches
5,000 lb.	.00
25,000 lb.	.03
50,000 lb.	.07
75,000 lb.	.11
105,000 lb.	.16
125,000 lb.	.26
135,000 lb.	.35
140,000 lb.	See below

Test discontinued at 140,000 lb. Rail broke 1 in. inside end of joint plate at end of base weld. Base plate slightly deflected at point of rail fracture.

Case VII

6-in. Tee Rail, 100-lb. A.R.A. Type "A." Std. Joint plates 24 in. long seam weld full length with base plate. Bevel "C."



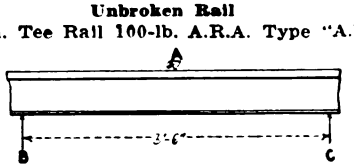
Rail supported at "B" and "C"

Load applied at "A"	Deflection in inches
5,000 lb.	.00
25,000 lb.	.04
50,000 lb.	.07
67,200 lb.	See below

Test discontinued at 67,200 lb. Rail broke 1 in. inside of joint plate.

Unbroken Rail

6 in. Tee Rail 100-lb. A.R.A. Type "A."



Rail supported at "B" and "C"

Load applied at "A"	Deflection in inches
5,000 lb.	.00
25,000 lb.	.03
50,000 lb.	.07
75,000 lb.	.11
100,000 lb.	.16
125,000 lb.	.22
150,000 lb.	.40
160,000 lb.	.51

Test discontinued at 160,000 lb.

6 in. Tee Rail 100-lb. A.R.A. Type "A."

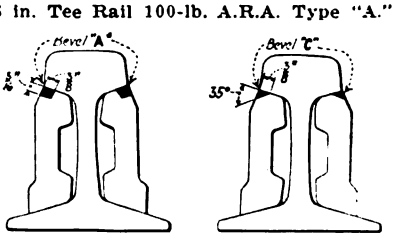


Fig. 4—Bending Tests to Failure of Arc-Welded Joints

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TABLE I—STRENGTH OF WELDED JOINTS 2 AND 4 SEAMS

Spec.	Rail Sec.	Joint Plate	Bevel	Number of Seams	Length of Seams	Weld Steel	Process	Ultimate Comp. Load
1	6 in. tee	Std.	No	4	10 in.	9/32 in. Gr. 10	Carbon	464,200 lb.
2	6 in. tee	Std.	No	4	10 in.	9/32 in. Gr. 10	Carbon	490,600 lb.
3	6 in. tee	Std.	No	4	10 in.	5/32 in.	Metallic	301,400 lb.
4	6 in. tee	Std.	No	4	10 in.	5/32 in.	Metallic	336,600 lb.
5	6 in. tee	Std.	Yes	4	10 in.	3/8 in. top 9/32 in. base	Carbon	375,100 lb.
6	6 in. tee	Std.	Yes	4	10 in.	3/8 in.	Carbon	233,200 lb.
7	6 in. tee	Std.	Yes	4	10 in.	3/8 in.	Carbon	283,800 lb.
8	6 in. tee	Std.	No	4	10 in.	5/32 in.	Metallic	378,400 lb.
9	6 in. tee	Std.	No	4	10 in.	9/32 in. Gr. 10	Carbon	411,400 lb.
10	6 in. tee	Std.	Yes	4	10 in.	3/8 in.	Carbon	242,000 lb.
11	6 in. tee	Std.	No	2 top	10 in.	3/8 in.	Carbon	220,000 lb.
12	6 in. tee	Std.	Yes	2 top	10 in.	3/8 in.	Carbon	138,000 lb.
13	6 in. tee	Std.	No	2 top	10 in.	5/32 in.	Metallic	169,400 lb.
14	6 in. tee	Std.	No	2 base	10 in.	9/32 in. Gr. 10	Carbon	242,000 lb.
15	7 in. Gir.	Flat plate 1 in.	No.	4	10 in.	9/32 in. Gr. 10	Carbon	464,000 lb.
16	7 in. Gir.	Std.	No.	4	10 in.	9/32 in. Gr. 10	Carbon	369,000 lb.
17	7 in. Gir.	Std.	No	4	10 in.	9/32 in. Gr. 10	Carbon	424,000 lb.
18	9 in. Gir.	Flat 1 in. plate	No	4	10 in.	9/32 in. Gr. 10	Carbon	270,600 lb.
19	9 in. Gir.	Std.	No	4	10 in.	9/32 in. Gr. 10	Carbon	400,400 lb.

Average ultimate load sustained by specimens Nos. 1, 2, 5, 6, 7, 9, 10 (Carbon arc) ..... 357,186 lb.
Nos. 3, 4, 8 (Metallic) ..... 338,800 lb.

Area of 4 seams (carbon arc) = 4 x .25 sq.in. x 10 in. = 10 sq.in.

Unit stress (shear) on seam metal $\frac{357{,}186 \text{ lb.}}{10}$ = 35,718 lb. per sq.in.

TABLE II—ULTIMATE LOAD DATA FOR TWO BEVELS

Spec.	Rail Sec.	Joint Plate	Bevel	Number of Seams	Length of Seams	Weld Steel	Process	Ultimate Comp. Load
32	6 in. tee	Std.	A	2 top	10 in.	9/32 in. Gr. 10	9/32 in. rod hand fed in	314,600 lb.
33	6 in. tee	Std.	A	2 top	10 in.	9/32 in. Gr. 10	9/32 in. rod laid in place 9/32 in. rod puddled in	209,000 lb.
34	6 in. tee	Std.	A	2 top	10 in.	9/32 in. Gr. 10	9/32 in. rod and 5/32 in. rod	268,400 lb.
35	8 in. tee	Std.	A	2 top	10 in.	9/32 in. Gr. 10	5/32 in. rod laid in place 9/32 in. rod puddled in	231,000 lb.
36	6 in. tee	Std.	C	2 top	10 in.	9/32 in. Gr. 10	9/32 in. rod puddled in	301,400 lb.
37	6 in. tee	Std.	C	2 top	10 in.	Gr. 10	5/32 in. rod laid in place 9/32 in. rod puddled in	158,400 lb.
38	6 in. tee	Std.	C	2 top	10 in.	Gr. 10	5/32 in. rod welded by carbon arc process followed by 5/32 in. rod metallic process	231,000 lb.
39	6 in. tee	Std.	C	2 top	10 in.	Gr. 10	9/32 in. rod welded by carbon arc process followed by 5/32 in. rod metallic process	382,800 lb.

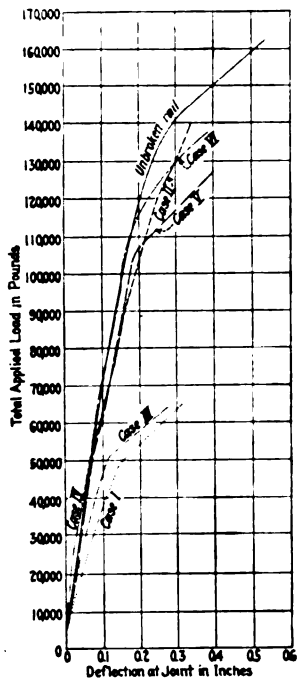

Fig. 5 — Load - Deflection Curves for Arc-Welded Joints and Unbroken Rail

and welded by standard process to check a previous test. Specimens 46, 47 and 52 were made with top seams only, the plates having a special bevel or ledge or combination of the two; also bevel "A" was modified in specimens 40, 41, 42 and 43 by making the groove smaller and so requiring less metal to fill the weld.

Specimens 46, 47 and 52 were made and tested at the request of the Rail Welding & Bonding Company, which furnished the details of the top bevel of the joint plate. To comply with this request it was necessary to use the standard joint plates bottom-side up in order to provide sufficient metal to form a groove or ledge as shown. The Rail Welding & Bonding Company desired these three tests to compare the merits of the hand-feed or puddled method to the standard process carbon arc weld. In each case the data as regards the energy consumption and welding rod used are given.

TABLE III—COMPARISON OF HAND-FEED AND STANDARD PROCESS METHOD OF ARC WELDING

Hand-Feed Process Welds	Pounds
Two top seams, "V" bevel, average load six specimens	264,916
Two top seams, groove, average load three specimens	262,166
Two base seams, average load two specimens	242,500
Four seams (two top and two base) average load three specimens	454,300
Standard Process Carbon Arc Welds	
Two top seams, no bevel, average load three specimens	193,600
Two base seams, average load, one specimen	242,000
Four seams (two top and two base) average load six specimens	397,100

The testing of specimens 46, 47 and 52 as varied somewhat from the Rail Welding & Bonding Company's instructions. These were to the effect that with the bevel shown in specimens 46 and 47 one weld should be made with the hand-feed process and one weld with the standard R. W. & B. process double weld, the standard R. W. & B. process being used with plates as shown with specimen 52, but in order to compare the single and double methods of welding, standard process, it was decided to apply this test to plates having the same bevel in order to get comparative values and the hand-feed process was used with specimen 52.

Summary of Compression Shear Tests

In analyzing and reclassifying the results of the entire series of compression shear tests to date, a comparison of the hand-feed and standard process method of arc welding gives the results shown in Table III.

Taking the average load of the four-seam specimen with V-bevel top seams, hand-feed process, and adding a value for the addition of a rail-joint base plate equal to the load sustained by the two seams, and using the result obtained as a basis of computation, a full-length joint of the same rail section as the test specimen, with standard joint plates, top of plates "V" bevel, with rail-joint base plate and all weld seams 22 in. long, should stand a tension strain of approximately 760,000 pounds.

Cross-Bending Tests

Cross-bending tests on full-size joint specimens were made to determine the value of a base-plate added to a seam-weld joint. The data on these tests are shown in Fig. 4, the joints being deflected to the breaking point in each case. For comparison, a deflection test was also made on an unbroken rail as shown, until a maximum deflection of 0.51 in. was reached, the load then being 160,000 lb. All these rail sections were uniform, a 100-lb., 6-in. tee being used with various bevels at the joints as indicated.

The details of the joint make-up were as follows:

Welds were made by the hand-feed process. The weld metal was R. W. & B. 9/32-in. rod, grade 10, and

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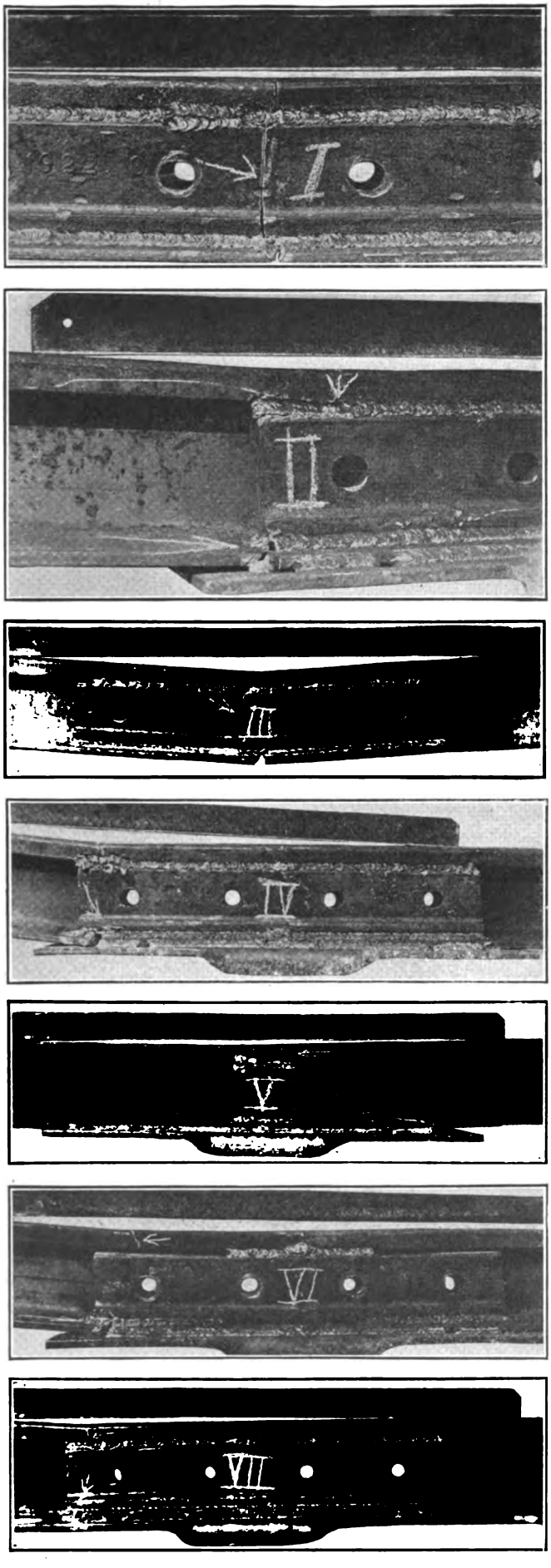

Fig. 6—Appearance of Arc-Welded Joints of Fig. 4 After Failure. The Number of the Specimen Is Shown in Chalk Marks on the Rail Section

approximately 1½ in. of rod was used per linear inch of weld. The power requirement was 125 amp. at 25 volts. All seam welds 24 in. long were equal to the length of the joint plates.

An examination of the joints after testing showed that the only fracture of the seam welds was at the point of rail failure and in no case was any distortion shown between rails and joint plates or between rail and base plates. Also, the deflection in the base plates occurred only at the point of rail fracture.

The relation between deflection and loads is shown in Fig. 5, and Fig. 6 shows the appearance of the joints in Cases I to VII, in Fig. 4, after being broken, to show where failure occurred.

Employees' Funds Total Nearly $2,000,000

Philadelphia Rapid Transit Company Employees Have Four Funds from Which Their Various Activities Can Be Financed

THE employees of the Philadelphia Rapid Transit Company have a co-operative savings fund, a co-operative benefit fund, a co-operative wage dividend and a co-operative helping hand fund. Each of these is for a different purpose, and the securities in each are kept entirely separate.

Co-operative Savings Fund

The purpose of this fund is, as its name implies, to provide an agency for the investment of savings. This fund was established in 1919. There are 7,572 depositors, having an average deposit after three years of $235. Much of this saving has come through the practice of the employees signing an order on the treasurer of the company to make a specified payroll deduction and deposit the amount in the savings fund. Deposits may be withdrawn upon two weeks notice, or in a shorter time when actual emergency is shown. The interest period is 5 per cent, made possible by the purchase of large blocks of securities during the post-war period. The interest paid on depositors' accounts during 1922 was $77,473. The investments composing this fund are as follows:

Par Value		Cost or Book Value
$218,650	U. S. Government and Federal Land Bank securities	$214,204.47
50,000	Real estate mortgages	50,000.00
465,000	Steam railroad bonds	454,350.00
422,000	Equipment trust certificates	417,439.98
661,000	Public utility bonds	656,642.50
$1,816,650	Total investments	$1,792,636.95
	Cash on hand	3,667.37
	Total securities and cash	$1,796,304.32

Co-operative Benefit Fund

The co-operative Welfare Association has a membership of 9,784, or 99.89 per cent of all P. R. T. employees. Its affairs are administered by the Co-operative Council, which also passes upon the validity and merit of all applications for pensions. This association is the medium through which sick benefits, pensions and life insurance policies are paid. The dues are $1 a month for a member, and the company contributes $1 for each dollar paid by the men, with a minimum of $10,000 a month.

Sick benefits are provided at the rate of $1.50 per

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day, for a period not to exceed 100 days in any consecutive twelve months. Pensions of $40 a month are payable to incapacitated employees who have reached sixty-five years of age and have been continuously in the service for twenty-five years. Life insurance is covered by a group contract made with the Metropolitan Life Insurance Company, and each member has a separate insurance policy for $1,000.

It was from the surplus funds of this association that the employees purchased early in 1922 10,000 shares of P. R. T. stock. The report of receipts and expenditures for 1922 are as follows:

Cash balance—Jan. 1, 1922		$9,775.59
Receipts		
P.R.T. contribution ($10,000 per month)	$120,000 00	
Membership dues	117,887 00	
Interest and advances	56,182 60	
Securities sold	223,229 00	
		517,298 60
		$527,074.19
Expenditures		
Life insurance premiums	$127,373 22	
Pensions	70,038.70	
Sick benefits	59,241.75	
Wages and other expenses	25,498 40	
Purchase of 10,000 shares P. R. T. stock	238,330 95	
		520,483.02
Cash balance—Dec. 31, 1922		$6,591.17

Co-operative Wage Dividend Fund

This fund is the result of an agreement by which the management of the company agreed to pay the employees at the end of 1922 a bonus or "co-operative wage dividend," equal to 10 per cent of the annual wage earned by each, provided the company earned the sum required for such payment in addition to the amount required to pay the annual 6 per cent dividend on the $30,000,000 of P. R. T. paid in capital. Exclusive of this dividend, the basic hourly wage of the men is 62½ cents an hour.

The trustees of this fund are selected by the men from among their number, and 99.9 per cent of the employees signed orders instructing these trustees to use this fund for the purchase of P. R. T. stock. In 1922 ten thousand shares were first bought by the trustees, then 55,000 shares of stock were purchased and paid for out of the 1922 co-operative wage fund, making a total of 65,000 shares owned. Later 35,000 shares were purchased with money borrowed from the banks by the trustees of the co-operative wage dividend fund.

Certificates of participation in the stock owned are issued to individual employees. Such a certificate, at the time that 65,000 shares were owned, reads as follows:

65,000 shares Cost $1,650,000

Certificate of participation in 65,000 shares, Philadelphia Rapid Transit Company stock, held by the trustees, co-operative wage dividend fund.

This certificate is issued to and entitles..... while an employee of the company to 2½ per cent quarterly dividends, payable Jan. 31, April 30, July 31 and Oct. 31, upon the shares represented by this certificate, as long as the 6 per cent Philadelphia Rapid Transit dividend is paid.

Upon leaving the service of the company the owner of this certificate, or, in case of death, the owner's beneficiary, will receive at the option of trustees the shares represented by this certificate or cash to the amount of $30 per share for each share or fraction of a share thereof. By authority contained in resolution of Co-operative Committee, ratified by convention of all employers and employees' committeemen, the voting power of this stock is lodged in the trustees.

Dec. 30, 1922. This certificate is not transferable.

It will be seen that the employees own 100,000 shares out of 600,000 or one-sixth of the total capital stock of the company. The stock has a par value per share of $50, but is selling in the market for about $30 a share.

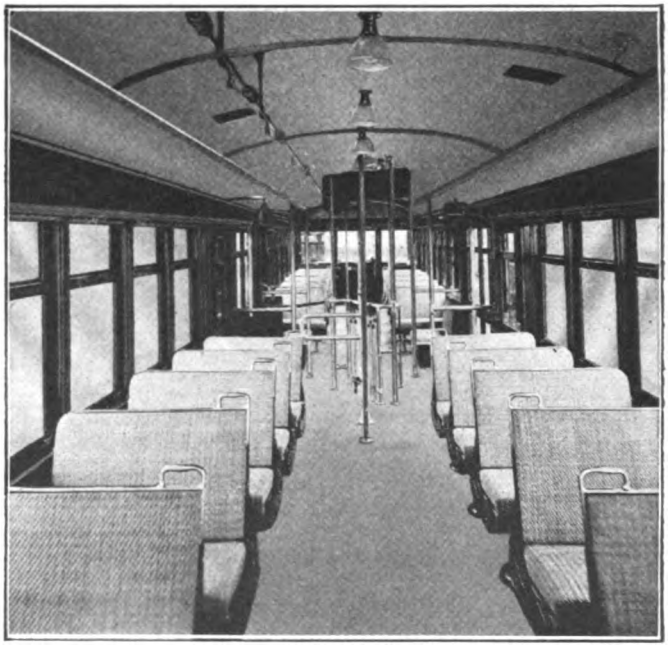
Co-operative Helping Hand Fund

This fund was organized in September, 1922, and is known as the Co-operative Helping Hand Fund. It was started to cover extreme and unusual cases of misfortune, where immediate financial assistance is necessary, as where a number of members of a man's family become seriously sick at one time. Here a loan scarcely answers, since the amount required would appear in the future to the employee an almost impossible barrier to a return to healthy financial condition. This fund has been made up by the payment into it of the profits of the annual picnic, $12,286, with $5,000 from the sale of the Philadelphia trolley route map, $6,000 from a benefit entertainment conducted by the men, and $1,000 from a helping hand tax of 5 cents per pound on the 15 tons of Christmas candy purchased by the men.

Pacific Electric Operates New Cars

FIFTY all-steel suburban type cars have just been shipped by the St. Louis Car Company to the Pacific Electric Company for use between Los Angeles and Hollywood. In the construction of the cars special attention was paid to their operation in trains, and they were provided with center sills capable of taking the pulling and buffing stresses incident to train operation. The center sills have an area of 8 sq.in. and the area of all longitudinal sills is 13 sq.in.

The floor system is supported on drawn steel members and consists of a light gage corrugated steel false floor riveted to the longitudinal members. Between the false floor and the main floor flaxlinum insulation is placed.



Wide Aisle and Seats and Center Entrance Are Features

The main floor is constructed of No. 22 gage Chanarch with Flexolith to a total depth of 1 inch.

The side frame is of the girder type with rolled tees for posts and patent leveled steel sheathing. The arch roof is No. 16 sheet steel with three-ply salamander insulation attached to the underside. The joint between roof sheets is made by flanging and gas welding the sheet be-

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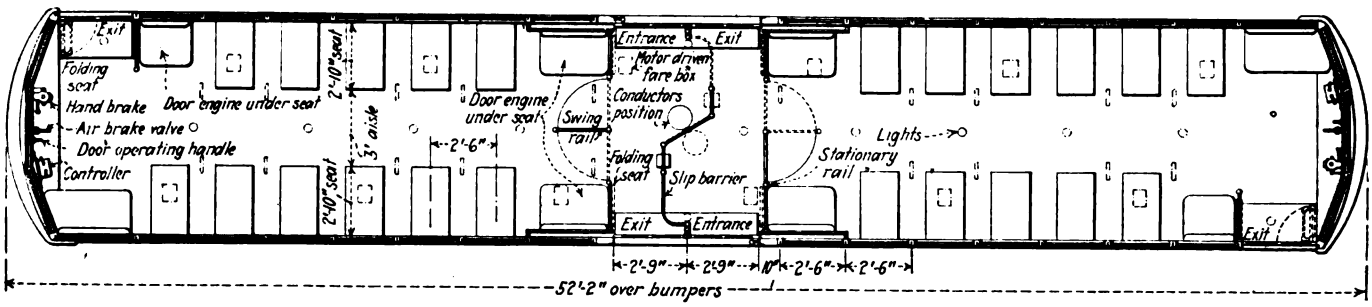


Floor Plan of Pacific Electric Cars

tween the angle carlines. The ceiling is of ¼-in. Agasote. The trucks are the St. Louis Commonwealth cast-steel equalized type. The adoption of the cast-steel frame is expected to reduce maintenance costs, as the side frame and transom are a one-piece steel casting. All joints between longitudinal and cross-members are fastened, which obviates the possibility of the truck getting out of square. The cars weigh completely equipped but 27,000 lb.

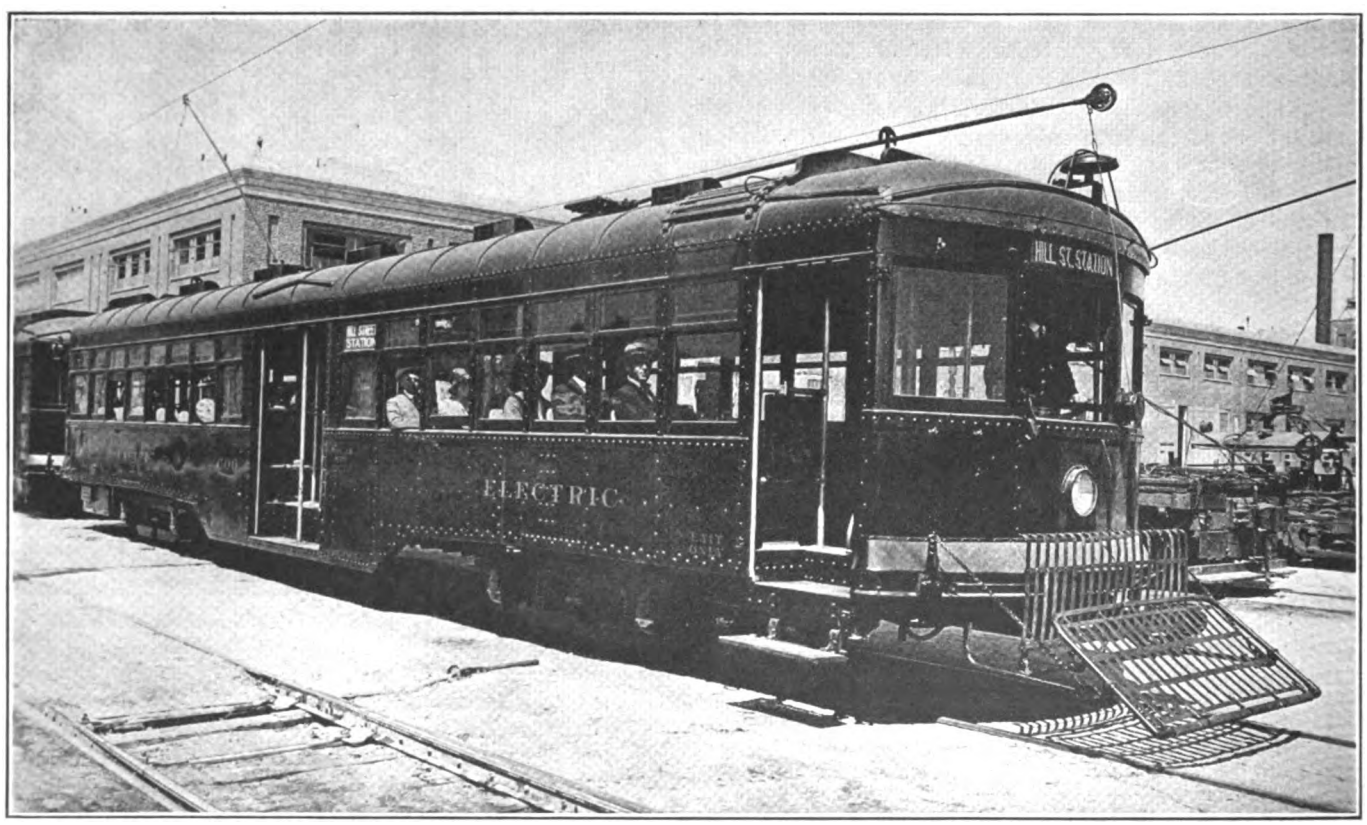
The cars have two doors at the center for entrance and exit and end doors at diagonally opposite corners for exit. The railing construction at the center is such that it can be swung to different positions so as to provide for great flexibility in connection with fare collection and the handling of crowds at terminals. The plan of operation is somewhat unique in that the forward portion of the car can be used as a pay-as-you-pass or as a prepayment section. The rear portion of the car is always used as a prepayment section. The pipe barrier at the center, which extends crosswise of the car from between the doors, is movable. Additional pipe barriers at each edge of the center portion can be swung 180 deg. and can be stopped and locked at either the right or left-hand side of the car or on the center line of the car. At terminals the platform barriers are swung parallel with the center line of the car and both center doors are used as exits. With the barriers swung to the left of the car, passengers are permitted to enter the forward portion without paying fare. This can be collected afterward, either from the passengers as they are seated or as they leave the car. This method is used only where large crowds are gathered. When operated in trains the end door of the first car is operated by the motorman for exit only.

The cars are equipped with four 50-hp. motors and provision is made for operating singly or in two and three-car trains.

High Efficiency of Boiler Fed with Pulverized Coal

THE United States Bureau of Mines has issued a preliminary statement covering tests of one of the boilers in the Lakeside station of the Milwaukee Electric Railway & Light Company. This is one of eight boilers equipped with the Lopulco pulverized coal system, supplying steam to two 20,000-kw. steam turbines. The complete installation in the Lakeside station was covered in an article in the issue of the ELECTRIC RAILWAY JOURNAL for April 15, 1922, page 633.

These tests were carried out by the fuel section of the Bureau of Mines, in co-operation with the research



New Pacific Electric Cars Are Arranged for Train Operation

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department of the Combustion Engineering Corporation. The object of the tests was to determine the thermal efficiency, ease of operation and other particulars of a boiler with especially designed furnace and burners for burning pulverized coal. The boiler tested has 13,380 sq.ft. of heating surface.

Twenty-six tests were run at rates of heat transference varying from 4,000 to 8,000 B.t.u. per square foot of boiler heating surface per hour. The mean thermal efficiency attained was about 84 per cent, based on the gross calorific value of the fuel as fired. The efficiency varied little with the rate of steaming, and its high value is accounted for by the small loss from incomplete combustion and the small amounts of excess air, which varied from 5 to 36 per cent.

The coal burned had a gross calorific value of about 11,500 to 12,800 B.t.u. per pound and contained 2 to 5 per cent moisture, 33 to 36 per cent volatile matter and 9 to 13 per cent ash. It was so ground that 85 to 95 per cent would pass through a 100-mesh sieve. The ash had a softening point of 2,150 to 2,450 deg. F., but did not fuse together at the bottom of the furnace, because it was partly protected from the flame radiation by means of a series of water tubes connected to the boilers, which were placed between the furnace bottom and the flames.

The Readers' Forum

Saving Energy by Training Motormen to Handle Light Cars

ECONOMY ELECTRIC DEVICES COMPANY
CHICAGO, March 26, 1923.

To the Editors:

On page 515 of the ELECTRIC RAILWAY JOURNAL for March 24, in presenting my comments at the Illinois Electric Railway Association meeting when discussing the very interesting paper presented by C. E. Thompson of the North Shore on more comfortable rolling stock, your report might convey an impression contrary to my intent.

Comparing the energy consumption of a heavy interurban with the new light-weight type, I pointed out that the saving in car energy by the introduction of lighter interurban cars should be regarded from the same viewpoint as exists when older and heavier street cars are replaced by light-weight safety cars.

The safety car for city service ordinarily is designed for higher rates of acceleration and braking than were thought attainable when the old heavy street cars were built, and therefore, unless the motormen are instructed, and their methods of handling the controller and brakes are checked up, it is ordinarily found that full advantage of energy reduction through the use of the safety car is not realized. Of course there will come the characteristically lower consumption due to less weight, but there is also a worth-while saving to be made additionally if the motormen are properly trained to take full advantage of the higher rates of acceleration and braking that can be maintained with the safety car.

I desired also to leave the impression that with the newer forms of motors, control and brakes, a heavy type of interurban car could be operated with less energy consumption than the older type cars of the same weight, and likewise there was always available a further reduction for those roads which instructed and checked their men with a view to energy saving. I concluded my discussion of the Thompson paper with the statement that it was refreshing to have advanced ideas set forth at a convention by the representatives of a property which not only had thought out new things but had put them into successful practice.

L. E. GOULD, President.

The College Man in the Transportation Department

WORCESTER, MASS., March 17, 1923.

To the Editors:

Your editorial in the issue of March 10 on "A Place for College Men in the Transportation Department" brings forcibly to my mind the fable of the mouse that proposed to bell the cat; i.e., how do you expect the engineer to connect in the first place?

I grant your statement that this is almost a virgin field, but disagree with you entirely on the willingness of the young engineer to enter this department. With a few conspicuous exceptions, the engineer is not wanted there. Moreover, most railroad executives, having come up from the ranks, and being accustomed to dealing with organized labor, apply the seniority system too extensively. The young engineer, finding many inferior men ahead of him, and continually beset with ignorance, prejudice and custom, naturally gravitates toward less onerous conditions and greater opportunity.

Would it not be fairer to the young men about to graduate to point out to them the greater opportunities with the equipment and specialty manufacturers? Railroading in any department is fascinating work, but most of the railway engineering is done by the manufacturers, and most roads want "practical," that is, platform men only, as operating officials.

ROBERT G. TRUMBULL.

Question is made of how the engineer can be expected to fit in the transportation department. The JOURNAL stakes its faith in the young engineer rather than in the young college man with an A.B. degree, because the engineering training will enable the young man to understand how the tools used by his department to produce the thing he sells are subject to and must be adjusted with the requirements of the mechanical, track, power and line departments—all engineering in nature. Furthermore, the matter of graphing schedules and fitting service to traffic is one that will be readily understood by the engineer, but might be quite a problem for the unscientific mind.

Referring to the second paragraph of Mr. Trumbull's letter, this is all granted as a fact, but this is all the more reason that the subject should be discussed in order that railway men may give consideration to the fallacy of this situation and encourage new blood to enter the transportation department, and then to give it opportunity. One young college man lost heart in the transportation department because he was curtly informed that changes were not wanted; that the kind of men who were desired were those who were willing to carry on things as they are, not change them.

As to whether it would be fairer to the young men to direct their attention to opportunities with the equipment and specialty manufacturers is a question. It is

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believed that the opportunity is distinctly great in the transportation department, provided that managements would give the same consideration in building up the personnel in this department that they have in others. If we were to admit that present conditions could not be remedied, then the JOURNAL would agree with Mr. Trumbull about the opportunity with the manufacturers, but the unsatisfactoriness of present transportation department methods and thinking is the very reason for calling attention to (1) the need for the railways to better the transportation personnel and (2) the opportunity for college men in that department.

—EDITORS.

About the Detroit Bulletins

MOUNT VERNON, N. Y., March 27, 1923.

To the Editors:

Socrates, as the wisest of mankind, realized how hopeless it was to exchange gibes with the playwright Aristophanes. One who enters the lists with an editor is in much the same position because the editor has the first page and the last word. Still, I'll take the chance.

Your editorial of March 3 found fault with me for quoting the opinions of the engineers of the Department of Street Railways instead of my own with regard to the condition of the property when taken over. I let this absurdity pass because the thoughtful reader knows that a person engaged seven months after the event cannot turn back the hands of Time even to please an editor.

Your editorial of March 24 finds fault with me for having opinions which do not coincide with yours. This is far more painful to me, so I will crave your indulgence to answer each of the points raised:

1. *Loss of Car-Miles Due to Trolley Wire Breaks.*—When I was on the editorial staff, I wrote editorials on the relation between equipment defects and lost car-miles. They were not questioned then. Of course, a car may complete its run within schedule time even if there has been a wire break along the line, but it will complete that run with fewer nickels. Have the editors forgotten that there is a pretty lively motor bus company in Detroit and quite a number of jitneys? Just watch those one-every-minute trains pile up on Woodward Avenue for nothing more than an ordinary traffic control stop and then tell me that a break in the trolley wire is a bagatelle. Are you finding fault with a recommendation that only the best be used?

2. *Percentage of Straight, Two-Piece and Three-Piece Runs.*—You are aware that the runs in Detroit have the consent of the platform men. If you do not agree with me that the runs in Detroit show skill as well as a decent regard for the men, I will refer you to your issue for Oct. 2, 1920, carrying an article by Edward Dana, general manager Boston Elevated Railway, on "The Scientific Arrangement of Schedules." On page 651 Mr. Dana says: "In Boston, 60 per cent of the runs are completed within eleven consecutive hours and 40 per cent between eleven and fourteen outside hours." Furthermore, Mr. Dana in a communication in your issue of March 17 shows that Boston's efficiency in man-power is practically the same as Philadelphia's. Detroit is in good company.

3. *The Single-End or One-Armed Car.*—You say: "His severe condemnation of the single-end car would indicate that many operators of large properties are wholly incompetent." You might as well have said this about any other bad feature which the present generation of electric railway managers has inherited, not originated. In your abstract you have me suggesting the early general rebuilding of all cars and track layouts to double-end operation. I suggest that you reread the bulletin, realizing at the same time that the exigencies of abstracting in haste and for limited space did the original report unintentional injustices. There is similar evidence of haste in the reference to lowered morale under the Detroit United management. This referred only to the peak of the bickering period and not to the days of relative peace.

4. *The True Fare Is What the Passenger Pays.*—I was content to say that the true average fare in Detroit was 5.33 cents, but you will not have it so. You claim 4.03 cents for January, 1923, and thus fall into the very same error which I was satirizing in my series of "supposes" that led to the mythical fare of 3.86 cents. In your haste you overlooked my main point, viz., that when a person pays 5 cents for his ride on the originating car and 1 cent on the destination car his fare for the trip is 6 cents and not 3 cents. You believe in the dilution of the originating fare by the transfer; I don't. Just try to convince the Detroit passenger that his fare is 4.03 cents! Who's the publicity expert for Detroit now?

WALTER JACKSON.

The author of the above letter has read into the JOURNAL editorial in question some things that were not there. Issue might be taken with each point in his letter referring to the editorial, but this seems unnecessary. Referring to his criticism of "one-armed cars," however, it is perhaps pertinent to note that the last 200 cars bought by the Detroit Municipal system were of the single-end Peter Witt type.

The abstract was not prepared in haste and it is believed to be a fair epitome of the original report. We are glad to have Mr. Jackson set forth his views in greater detail as above, however, if he thinks an injustice was done in the abstract.—EDITORS.

Proposed Automatic Substation in Cleveland Will Be Economical in Cost

THE CLEVELAND RAILWAY COMPANY

CLEVELAND, OHIO, March 21, 1923.

To the Editors:

Please note an error in the heading of the third installment of my article on "Automatic Substation Experience in Cleveland" on page 447 of the March 17 issue of the JOURNAL. It is pointed out in the heading, among other things, that the cost of the proposed station is to be 40 per cent less than the present structures. This should read 60 per cent, because you will note in the first paragraph on page 480 that I stated that the buildings may be erected for less than 40 per cent of the cost of the present substations.

L. D. BALE,
Superintendent of Substations.

The substantial reduction in fares which came into force last autumn on the Liverpool (England) Tramways has resulted in a considerable increase in the number of passengers, but despite this there has been a reduction in receipts of about £2,000 a week.

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Association News & Discussions

Wisconsin Utilities Convene in Milwaukee*

Gas, Electric, Accounting, Sales and Railway Sections Meet in First Annual Convention of Consolidated Associations—Education, Track Problems, Selling Transportation and Automobile Accidents Hold Interest of Electric Railway Men

MARKED by enthusiastic joint meetings, and by enlightening separate sessions, the first annual convention of the Wisconsin Utilities Association, the consolidation of the gas, electric and electric railway associations, was held in Milwaukee, Wis., on March 22 and 23. Over 400 members and visitors registered for the two-day session, while the banquet reservation of 375 was exceeded on Friday night, the second day of the session. The mornings of each day were devoted to joint sessions, while the afternoons were devoted to meetings of the separate sections. All of the speakers expressed enthusiasm in regard to the prosperity they have experienced in the past year and the outlook for the continuation of this prosperity, which the people of Wisconsin and its industries are now experiencing. Every paper read in the separate sessions of the convention was thoroughly discussed by operating men in a whole-hearted, generous manner indicative of the interest.

J. P. Pulliam, vice-president Wisconsin Public Service Corporation, Milwaukee, and president of the association, in his opening address on Thursday morning, declared that the prosperity of public utilities reflects the prosperity of the communities in which they serve. Continuing, Mr. Pulliam said that there was more gas manufactured and more electricity generated last year than a year ago, despite the handicap of the coal strike and the continuous high cost of materials and labor. The public utilities of Wisconsin will spend between $25,000,000 and $30,000,000 in additions and improvements to their plants during 1923, in order to enable them to keep abreast of the ever-increasing demand for utility service.

Referring to the street railway situation, Mr. Pulliam said in part:

There is a much more hopeful atmosphere with our street and interurban properties. While unfair bus competition is still in evidence, there is the realization that the public can only get dependable transportation through the electric field. New equipment is being purchased, trackage extended and rebuilt, to the end that our business can be properly served. We should not lose sight of the need of the feeder lines in the sparsely settled districts which can be properly served for the present by bus, and after development of the territory trackage can be provided. We have not always looked upon our transportation field and our obligations as clearly as perhaps we should, with the realization that we occupy the field and should serve it, and we should use the buses to take care of that territory which is in the building. Bus transportation has grown tremendously in the state during the past year and to and from those communities which are not adequately served by electric and steam transportation there no doubt will continue to be a demand for bus transportation. In territories where buses are operating in opposition to well established electric and steam transportation, and where the buses are favored by the lack of comparative taxation, injuries are being done to the established companies. The question of taxation, however, is being considered and in due time when the bus companies so operating are subject to the same taxation program that is now placed upon the established lines their existence will not be for long.

Mr. Pulliam urged the utility representatives present to use every means to make the public acquainted with the facts concerning their problems. A record of the amount of newspaper advertising used by utilities in Wisconsin shows a substantial improvement over last year. This advertising, in his estimation, is of direct benefit to the companies, and utilities can make no better investment than to tell their story to the public fairly and honestly.

A paper by F. E. Schornstein, district manager Wisconsin-Minnesota Light & Power Company, Eau Claire, which was read by another, because of the author's illness, urged all public utility officials to join every community movement that had for its object any civic movement for the welfare of the people.

Following the reports of the various officials of the association and two-minute reports on the activities, aims and problems of various committees, an election of officers for the ensuing year was held. Harold L. Geisse, secretary and general manager Wisconsin Valley Electric Company, Wausau, was elected president; Bruno Rahn, vice-president, and G. C. Neff, treasurer.

At the general session the second morning James P. Barnes, president Louisville Railway, addressed the gathering on the three great words of the public utility business, namely, Co-operation, Publicity and Service. This appears in abstract elsewhere in this issue. Following Mr. Barnes on the program of the morning, John B. Maling of New Haven, Ind., in a speech resounding with patriotism, loyalty and Americanism, outlined the origin and effect of class and freak legislation.

He exhorted business men to take the lead in combating the influence of the agitators, parlor socialists and bolsheviks.

ELECTRIC RAILWAY SESSION

B. W. Arnold, manager Eastern Wisconsin Electric Company, Oshkosh, presided at the separate session of the electric railway section on both afternoons. In his opening address Mr. Arnold spoke of the advantages of having joint meetings with the gas and electric men and belonging to such an association as the Wisconsin Utility Association. While the Green Bay meeting, held last August, may have had more railway men in attendance than the present meeting, he felt that the advantages of the joint meeting were greater than those of the separate meeting. O. A. Broten, National Pneumatic Company, Chicago, presented a paper on the pneumatic operation of car doors and steps, which is abstracted elsewhere. Nels C. Rasmussen, in discussing Mr. Broten's paper, brought out the fact that while his original equipment had the door engine underneath the floor of the car, this has been changed to the inside to prevent freezing of the engine. An alcohol anti-freeze font and wick has also been placed between the intake and the reservoir, eliminating freezing almost entirely. Referring to Mr. Broten's figures on time saving with pneumatic doors, J. P. Barnes thought there should not be too much optimism about this. He pointed out that the only saving in time that counts is when it amounts to enough to make it possible to take a car off and still keep the desired headway. He felt that door engines should be considered more as a convenience than as an economy.

TRAINING OF EMPLOYEES

Edward J. Blair, Chicago Elevated Railways, made a short talk on the subject of education of employees as conducted on the elevated properties. From his own early experience on the Elevated, Mr. Blair felt that a general education of the personnel was necessary. Being a representative of the educational committee of the American Electric Railway Association, he explained in some detail the report of this committee and encouraged the men to read it. The problem which is con-

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fronting the Elevated is to provide executives of the future. Mr. Blair asked the delegates if they could tell who on their properties would make a good general manager ten to fifteen years hence. Oftentimes it has been necessary for companies to go outside to provide themselves with the proper executives. However, this is not the attitute taken by the educational committee of the A.E.R.A. nor the Chicago Elevated, for it is felt that effort should be made first to get men from inside the company. It is the desire of the Elevated to start what will be known as an "executive school," taking men from the ranks, not college men, and giving them a liberal education of from three to four years and then putting them into minor executive positions. Although it seemed at first easy to pick the men, it was later found to be very difficult, for after six months of inviting groups into the general manager's office, only three men were selected.

At these meetings in the general manager's office the young men are invited to give suggestions and talk freely about their work or about ideas they may have in regard to the elevated system as a whole. After the selections have been made and three or four years of schooling has been undertaken by the men, during which time they will spend from three to four months in the various departments, the company will then have on one hand the college man and on the other hand the practical man. This, Mr. Blair feels, will lead to a friendly rivalry or competition between the two groups of men and the company will have jobs for all men who wish to stay and rise up in the organization of the company. During this schooling of the practical men they will receive their regular salary. It has been estimated that this course of education will cost the company $45,000, part of which, of course, will be collected in actual work performed by the men during this time. Co-operation with trade schools in the matter of apprentices is familiar to all, but the speaker thought this work should be carried on with men from colleges and a closer co-operation established between railway men and the state universities. He stated that it was hardest to handle the education within the company's own organization, although this could be accomplished to some extent by company section meetings, meetings on accounting and economics, and lectures by some outside speaker. In closing Mr. Blair called upon the men to make a careful study of the personnel of their companies for the jobs, not of tomorrow, but of ten years from today.

Mr. Blair's talk was discussed by J. P. Barnes, who said that many problems on the Elevated of which Mr. Blair had spoken did not apply to his road. Most all of his labor was American, as it was mostly colored. However, a special training had to be carried on for the white boss. With the colored laborer only three generations out of slavery, a grave responsibility fell upon the white boss. Education, to Mr. Barnes, was comparable to a crop, it being necessary to make a thorough analysis of the soil in order to get the best results.

Every job, in his estimation, should be understudied and the best way to do this is to give each man a trial. He spoke of a concern in which every job, from the general manager down to the office boy, was understudied by the man next lower in position. Whenever a man was absent due to sickness or out of town, all that it was necessary to do was to hire an office boy. If one of the officials should die or leave the company all the hiring that would be necessary would be another office boy. This has been successfully carried on for a great number of years.

Mr. Barnes felt that the trouble lies to a great extent with the executives, as they fail to understand the personnel of the company and the people they serve. Oftentimes the executive pays too much attention to the men who ride in automobiles and not enough to those who are the habitual car riders. A plan has been carried out by the Louisville Railway to have at least two or three men in every association in the city, the company paying the dues. This has been very worth while. It has also served for the company, as a means of selection, as it has been very easy to find out who the men were that had initiative enough to get up and get into the discussions carried on at these association meetings. Plans are now under way whereby meetings will be held at the universities in Kentucky and talks will be made by officials to the political economy classes on utility work. Professors at these universities are very eager to have the executives speak to their classes.

Mr. Fox of the Griffin Wheel Company made a few remarks in line with Mr. Blair's paper. He suggested that the young and new men be used in cases of emergency, possibly not to do the work themselves, but at least to sit in and see what the man in charge did.

Practice on Requiring Deposits

A general discusion was then held on the question of fare collection on the one-man cars, especially interurban cars, particular stress being laid upon the question of deposits by employees. Mr. Blair remarked that a deposit was required from all employees on his property for badges, etc., and this amount was carried on the liability side of the books. Mr. Burke of the North Shore Line stated that no deposit was required at the time of issuing materials to the men, this being taken care of by the accounting department in the pay roll, as each man receives his pay five days after the period for which he is paid. In this manner the company would always owe the man enough to cover any loss of company property. Mr. Arnold remarked that his company gave the men $13 worth of tickets and $7.50 in change, and required no deposit.

A round-table discussion was then held on how to handle transportation for employees. Mr. Barnes said that his company gave a sixty-ride book to all employees who make use of the city lines. They do not carry employees on their badge. J. A. Phelan, Rockford, Ill., remarked that his line carries the employees on their badges. However, the families of the employees are not carried free. After five years of service an annual pass, which can be used on the city and the interurban lines, is given to all employees. A special pass is given to city shop men, office employees have a fifty-ride transportation book. He also stated that they do not carry firemen nor policemen.

Mr. Arnold, the chairman, then asked the meeting to discuss the question of handling fares and issuing transfers on the one-man cars. Mr. Phelan of Rockford remarked that fares are collected as the passengers enter the car and transfers are issued as they leave the car at transfer points.

Mr. Barnes said that he had tried all methods, but found that the most feasible plan is to issue the transfer at a transfer point when the passenger leaves the car. The motorman is instructed to make change only when the car is stopped. A railing has been provided to keep passengers away from the operator, as a very serious accident occurred due to a passenger interfering with the operator while the car was in motion.

At the second session of the electric railway section Alfred A. Oldfield presented a paper on track maintenance problems of interurban railways. This appears elsewhere in this issue. Details in regard to laying Hedley grade crossings, and cautions about crossings in general were taken up in discussion on Mr. Oldfield's paper by J. S. Hyatt, Chicago, North Shore & Milwaukee Railroad. He remarked that a very satisfactory, inexpensive grade crossing can be made up of 4-in. x 6-in. planks and the use of this Hedley oil and sand. It has also been highly satisfactory to use this same oil in sealing of macadam crossings in order to keep the rain from seeping in under the macadam and freezing.

Mr. Hyatt diverged a bit from the subject of road material and spoke briefly on the extermination of weeds along the interurban roadway. His road had found it highly profitable to maintain a car especially devised for the extermination of weeds by use of a caustic arsenic solution. This seems to be the most satisfactory and should be applied directly after a rain, about four times a year, the idea being to keep the weeds from going to seed.

F. W. Shappert presented a paper on soliciting traffic which appears in this issue. Br. Barnes, indicating the manner in which his property sold transportation, stated that he wrote a personal letter to every family on a particular line at some time or other during the year and this was followed by a personal call of some official. This

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tended to foster a spirit of friendship and co-operation between the party served and the operating company. C. E. Thompson, Highwood, Ill., stated that selling transportation is largely a question of public relations.

Automobiles and Accidents

R. M. Howard urged the railway men to seek the co-operation of automobile owners in an effort to promote the safety of the public. An abstract of Mr. Howard's paper is presented elsewhere in this issue. According to Mr. Burke, North Shore Line, the proper education of operators and drivers, by telling them what can be done to prevent accidents, is the only thing that will lower the accident hazard. Mr. Simmons, North Shore Line, in charge of the city line in Milwaukee, stated that his company had made it a point to compliment good drivers. This suggestion was made by the employees' safety committee. A check is being made by this company on drivers who do or do not look as they cross the right-of-way. It is felt that the claim department will profit greatly by such statistical records.

C. Allen, Green Bay, stated that all employees in his corporation are on a safety bonus. Every accident prevented gives the man credit, while every accident is to his discredit. Drivers of trucks and pleasure vehicles in Green Bay are on the same basis as the operators of the street cars.

In Louisville the question of automobile accident prevention has been gone into on a large scale by President Barnes. Accidents are classified in three classes: Those in which the responsibility lies with the motorman, those in which there is a question, and those in which the driver is wholly responsible. These are plotted on a map showing the location of the accident and who was responsible. A safety man is sent around to the various carhouses for the purpose of giving short talks on safety and explaining the accident chart to the operators. When this campaign was inaugurated, the motormen were responsible for 50 per cent of the accidents, but this has been reduced to such an extent that in the last month the motormen were responsible for only 30 per cent of all automobile accidents. By paying the expenses of an extra clerk at the State House during the registration for state auto licenses, a pamphlet was inserted with each license to every auto driver cautioning him about street car accidents and giving him the first rules of safety. After each accident Mr. Barnes sends a personal letter to every witness thanking him for the time and interest given to the case.

Interurban Track Maintenance Notes*

By Alfred A. Oldfield
Engineer of Maintenance of Way and Overhead Construction
Eastern Wisconsin Electric Company, Sheboygan, Wis.

PROBABLY one of the most frequent problems of the average interurban property which includes city construction and open trackwork is to reclaim track in some paved street. I frankly admit that we are still looking for a satisfactory solution, not only from the point of view of reclamation but also of cost. Invariably it resolves itself into the old problem of joints.

Good drainage is the first essential. After trying many methods we finally adopted the booster, with simple joint plates. We then built up the cupped rail and so far the results have been satisfactory. This work costs on the average about $15 per joint, exclusive of repaving work.

Special Work

Whenever possible we build up our special work with an oxyacetylene welder. Soft steel is put on in thin layers and finished with a hard steel layer. We use a steel brush for cleaning before welding.

As the properties on which I am engaged are going to lighter equipment on city tracks we are generally specifying hard-center iron-bound construction for frogs, switches and mates, but in some cases have bought solid manganese. On railroad crossings our specifications call for bolted construction, open-hearth steel, and heat-treated bolts. On open track special work, our specifications generally follow the manufacturers' but also incorporate some of our own details.

On open track, curves from 6 deg. up are guarded. The flangeway is 1¾ in. At 10 deg. the gage is widened ⅛ in. and the flangeway 1⅛ in. This proportionate increase of flangeway is carried out to a maximum of 2⅛ in. Maximum widening of gage is ¼ in. On all city lines, curves are guarded, usually with a girder guard rail.

On the Oshkosh property we have kept our switches well drained and sparsely salted, and have not had any case of freezing. On our Sheboygan property the boxes were packed with grease, and oil was added periodically. Grease and oil collect too much sand and dirt. In future the former system will be followed. In this territory, where extreme cold weather is experienced, I consider that complete drainage of switches is a most necessary expense.

Paving

We are doing considerable concrete paving. Some of our past experience in Plymouth and Sheboygan has been disastrous, but I believe most of this failure was due to faulty track construction. We have recently installed on one of the approaches to the Eighth Street bridge at Sheboygan Dayton mechanical tie construction with a straight bar spot-welded to the web and base of the rail, and concrete pavement. On the opposite approach we installed wooden tie construction with bonded joints and standard angle bars, and also concrete pavement. We intend to build one-half mile of straight track this year in Oshkosh using Dayton ties and simplex joint plates with concrete pavement, and at the same time build one-half mile with cedar ties embedded in concrete with a concrete pavement.

Asphalt paving in contact with the rail has proved very unsatisfactory. The city engineer, the city superintendent of streets and my department are experimenting with various tarvia and other macadam fillers.

Track Maintenance Methods

On open trackwork where we are using all cedar ties, we have adopted a tie renewal program extending over six years. As the ties are put in each year a general resurfacing of the track is made. New ballast is used only where absolutely necessary. Last fall I experimented by taking a 2-in. raise on a mile of track, raising it on old ties and using no new ballast. So far it has held up, and today is much better than any other part of our track, including those sections where new ties were put in. At the time this track was raised no new ties were installed, although they were in very bad condition, but every spike was either replaced or reset. The track was entirely cleared of weed, good drainage given to the roadbed and the track was very carefully gaged. Considering the result obtained, we have decided to extend this experiment a little further and then add, say, 600 ties to the mile and gradually build up the ballast section. In five years' time our track again will be standardized, and during the process of rehabilitation it will be in good operating condition.

The main line turn-outs are to be entirely rebuilt. We have adopted a section 7040 split-switch turn-out with No. 9, 15 ft. frogs; 15-ft. switches with two adjustable rods; open side sockets with each point reinforced on one side with one stop; fourteen ¼x6 in. slide plates with ⅜-in. pressed steel rail braces; two gage plates; six Morden adjustable rail braces; two gray iron heel blocks. Standard turn-out timbers are to be used.

Our switch lamps are electrically lighted from the trolley, the same contact being used for lighting telephone booths at each turn-out.

Until a few years ago I was very much opposed to the expense incurred in using chemicals for the destruction of weeds, but after making some very careful comparisons, I am fully convinced that it is cheaper to destroy the majority of weeds chemically. Where considerable rehabilitation of track is contemplated the weed killer is unnecessary, but for ordinary maintainance one and possibly two applications of weed killer during the year are very profitable.

The practice that we have adopted

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for the construction of highway crossings on interurban tracks is to use 4 in. x 6 in. planks, with a 3-in. space between the planks in the middle of the track, this 3-in. space being filled up with macadam; a 12-in. plank is put on the outside of each rail. I find this more satisfactory than a full plank crossing, although the macadam filling requires some maintainance. I have recommended replacing old timber structures for culverts and bridges with reinforced concrete culverts or I-beam spans on concrete. I feel this expense is justified from the viewpoint of safety and maintenance.

On all our interurban tracks which originally were built with continuous joints, standard angle bars are being used, and concealed bonds are replaced by welded bonds wherever necessary.

The roadbed is considerably below standard, but it is gradually being standardized on a six-year program. The sub-grade is to be 16 ft., and particular attention is being paid to improvements in drainage, which undoubtedly will reduce maintenance cost.

The original curves are being spiraled, guard rails placed on all curves of 6 deg. or more and elevation given for 45 m.p.h.

Our standard rail section for all renewals is to be 70 lb. A.S.C.E. This has been decided upon with the advent of lighter equipment which is being purchased by our company. The new interurban safety cars weigh 34,500 lb.

Pneumatic Operation of Doors and Steps*

By O. A. Broten
Western Representative National Pneumatic Company, Inc., Chicago

THE advantages of pneumatic door control in street railway, elevated and subway transportation are indeed manifold, as every department is directly or indirectly benefited by them. This may sound like a very broad statement but I am sure you all will agree that it is *service* to the community that brings out the car riders. Pneumatic door and step control is a time-saving, labor-saving and passenger control safety apparatus, the use of which results in service to both the car rider and the railway company. For instance, the following figures, involving only the transportation and treasury departments, merely show what a few seconds actually mean in dollars and cents to the railway company. Pneumatic door control will actually save from one to five seconds per car stop, but using only an average of two seconds saved per car stop, we arrive at the following:

8	car stops per mile
2	seconds saved per car stop
16	seconds saved per mile
10	miles per hour
160	seconds saved per hour
18	hour car day
2880	seconds saved per day or
46	minutes saved per day or
7½	miles more car travel per day
30	cents average net revenue per mile
$2.25	additional net revenue per day
365	days
$821.25	additional net revenue per year

This would pay for pneumatic door control on quite a number of cars.

In addition to the advantages shown by these figures, the conductor is allowed more time for fare collection and passenger courtesies. He is relieved of considerable fatigue as his day draws on, helping to keep him fresh and alert for his contact with the public.

During the years when hand-operated door and step control was at its height, the hiring of platform employees was based to some extent on brawn; however, pneumatic control has eliminated this particular specification of man power, in that railway properties are now in position to employ platform men on the basis of cashiers and salesmen, with brains, common sense and personality more important than brawn.

Another important item is the matter of maintenance, which generally grows with the addition of apparatus. However, with pneumatic door control this has really been reversed. Pneumatic door engines operate the doors in exactly the same manner with each operation. Hand-operated doors are controlled entirely by the will of the platform employee and are subjected to considerable abuse throughout the day, which of course means that the doors and steps and the operating mechanism are made to suffer through excessive strain, breakage of levers, getting the mechanism out of adjustment, loosening the hinges, breaking the glass and various other such items. With pneumatic door control these items are practically eliminated.

Door engines are all manufactured with the door cushioning feature and adjustable speed. There are really three types of pneumatic control, viz., straight-pneumatic, mechanical-pneumatic and electro-pneumatic, each of which has its specific advantages for different types of operation. For remote control, or where the platform employee is stationed at some distance from the car door, electro-pneumatic control is the ideal operation. Where the operator is stationed closer to the door, either mechanical-pneumatic control or straight-pneumatic control would be the ideal operation, depending entirely on the exact features of door operation desired.

The matter of installation of pneumatic door engines is an item of considerable importance, as this affects the operation as well as the maintenance. With sliding doors the ideal location of door engines is on the car or platform floor, directly behind and adjacent to the door proper. On folding doors it is advisable to install the door engines in a header pocket above the doors, as this gives a direct connection to the door shaft, with the door engine and connections located in a position where dust and dirt will not collect.

Where there is not sufficient headroom to install a door engine above the doors the alternative is on the platform floor, using connecting rods and levers for transmitting motion from the engine shaft under the platform floor to the door and step shafts; however, any connections under a car are subjected to excessive wear. This brings out the point of installing door engines under the platform floor, which is without any recommendations whatsoever, as this materially reduces the life of the door engine because of the collection of sand and dust from the streets.

With reference to adjustment of door engines, as mentioned above, there was a time when all adjustments could be made from the outside of the door engine proper, but this proved so disastrous to the operating company that the adjustments were placed in such a position that the car crews could not regulate the doors themselves, which insures a uniform door operation, meeting with the approval of the responsible department and not of each individual platform employee.

Door engines can be adjusted to operate at almost any desired speed, governed by a safe door operation, and regardless of the size or the type of the door, with or without steps.

With reference to care of door engines, it is the experience of users that a general inspection and overhauling should be given the door engines at the same time that the periodical overhauling is given to the car in general, as every piece of apparatus placed on the car must have its required attention and overhauling.

I have experienced cases where door engines have been condemned because of sluggish operation, when upon investigation the difficulties have centered in the lack of proper lubrication, and scale and foreign substance in the air ports. It is simply necessary to clean out these air ports with the aid of crude oil, when the free air passage will bring new life to the door engine.

Pneumatic door and step control is the most flexible of any type of passenger control apparatus, in that almost any safety feature or any type of door operation can be secured by piping the door engine accordingly. For instance, the following features can be readily secured:

1. Doors cannot be opened until brakes are applied.
2. Release of brakes will automatically close doors.
3. Brakes cannot be released until doors are fully closed.
4. Doors cannot be opened until brakes are applied but can be closed at any time desired.
5. Through the use of pneumatic and

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interlocking safety control it is impossible to have current at the controller until all doors are closed.

The question of door engine weight has often been discussed, and I might advise that considerable experimenting with dozens of different kinds of tests was done before we were fully satisfied that it was not feasible to use the aluminum type of door engine due to the extreme difficulty in securing a metal which would be airtight.

Some Pointers on Soliciting Traffic*

By F. W. Shappert
Traffic Manager
Chicago, North Shore & Milwaukee Railroad,
Chicago

MY CONCEPTION of a traffic manager's job is to sell transportation, to create a market for his goods where there is none, to analyze carefully local conditions and ascertain exactly what you have to sell, and then put up a strong, concise and convincing selling argument to prospective customers. To illustrate better, I will cite some specific cases of North Shore salesmanship.

Since the present management has taken hold of the North Shore Line we have greatly increased the number of chartered or special cars, which now amounts to several hundred special trains annually. Our traffic solicitors at Chicago and Milwaukee cultivate officials of various fraternal organizations, clubs, societies, etc., and arrange for reciprocal visits between such organizations as Kenosha, Racine, Milwaukee, Waukegan and Chicago. In every instance a representative of this office has accompanied the party to insure a comfortable trip. He actively mixes with the guests with a view of getting comments regarding the trip and is also keenly alert for tips regarding future pilgrimages and excursions. These tips are followed with extreme care to secure additional business.

Several years ago, when the writer first joined the North Shore staff, it was customary for a football captain or baseball captain to call up the office and arrange for a small party to some town along the line. Our solicitors now get in touch with the students of the various high schools, colleges and universities and write individual letters calling attention to the proposed game and work up enthusiasm that invariably produces chartered cars or special trains. I have in mind one of these trips, from the Lewis Institute, Chicago, to the Great Lakes Naval Training Station, which was increased in this manner from the original order of twenty round-trip tickets to 235 round-trip tickets.

Several years ago Jim Vaughn, a pitcher on the Chicago National League baseball team, was employed by the Nash motor works during the winter months. We arranged with the Chicago National League Baseball Club to have Vaughn pitch on a certain Saturday afternoon in May, and by securing the co-operation of the officials of the various manufacturing plants at Kenosha traffic was created in such volume that it was necessary to utilize fifteen cars to convey the party to Chicago and return.

We have been very successful in prevailing upon educators to make trips to various points on the line. During the past six years we have handled several thousand school teachers in chartered car trains.

The writer has successfully tried the experiment on several manufacturers of inviting students of engineering schools to make inspection tours to the large industrial plants at Kenosha and Milwaukee. The original trip called for a two-day schedule. This schedule has now been extended to an entire week and includes inspection of large plants at Gary, Ind.; Buffington, Indiana Harbor, Chicago Railway terminals, and Kenosha and Milwaukee plants. These trips are being taken by a number of the large universities throughout the central West. Last fall, through correspondence, we sold the idea to universities located 900 miles away from Chicago, with the result that various institutions and universities sent their engineering students over the North Shore Line for an educational trip. We handled eleven universities last fall and expect to increase this order to fifteen during the fall of 1923.

Some transportation lines merely cultivate the educators shortly before the convention or excursion, whereas this department cultivates these people twelve months in the year. In a number of instances this department has made hotel reservations, secured choice theater seats and made reservations for Pullman and parlor cars over steam rail lines for the party.

Our football business has greatly increased in the last few years due to the fact that we get directly in touch with the alumni and students of various schools and with the fraternities, giving them information on our superior service, dining cars, etc.

This department has arranged with the bar associations in various points in Illinois and Wisconsin and chambers of commerce for special trips and outings. In a great many instances our solicitors suggest to club officials that they invite their fellows to make reciprocal visits and our transportation department co-operates with the sales organization in making a pleasant trip which almost invariably results in new business.

About six years ago this department made an investigation at Winnetka as to why the school children didn't patronize the North Shore Line. One hundred and sixty inquiries by telephone developed the finding that 90 per cent of the parents refused to allow their children to patronize the North Shore because they thought it was not safe. Today we are getting 95 per cent of this business. This was accomplished largely through personal telephone calls, by which it was possible to convince parents of the extreme precautions to secure the greatest safety.

To sell transportation successfully it is absolutely necessary that close co-operation between the operating department and the traffic department be secured. It is impossible for a good traffic salesman to sell transportation unless the operating officials are awake to the fact that to increase earnings on a profitable basis it is necessary to render high-class service. High-class service includes operating trains on time, with thoroughly ventilated and clean cars and courteous, competent and neat appearing employees. Salesmen and ticket agents should be very careful not to misrepresent facts to the public, which is quick to resent misinformation. Selling transportation, in a good many instances, means selling a man his own mind. In other words, it means making a man want to believe what you want him to believe about your company. Elbert Hubbard once said that a man believes what he wants to believe. To make a man want to believe what you want him to believe is the art of selling transportation.

When an agent attempts to sell a prospective passenger a ticket he is not selling a piece of pasteboard. The pasteboard is not worth a small fractional part of the purchase price. The person holding the purchased ticket should have the feeling that his ticket guarantees a safe, comfortable and courteous trip to his destination. He should be made to feel that he has paid for a trip and is a guest of the company for the time that he is on the train. He should be thoroughly "sold." When he gets off the train he should feel greatly appreciative for the transportation that he has received.

The traffic salesman of your line has to sell complete trust and good will for his company. The holder of a ticket should be made to feel that he is entitled to more than merely a ride to destination. One satisfied passenger will sell more transportation to his friends in a week than a solicitor can in two weeks. Successful salesmanship means that a salesman should be able to understand human nature and adapt himself at all times to the moods of his prospective customer. This department is rather proud of the fact that the traffic staff has succeeded in building up a large list of satisfied customers, not only on the line but in cities located several hundred miles away from our line, and our distant friends boost the North Shore Line and greatly assist this department in selling the thousand-mile books and twenty-five-ride tickets as well as single fares. Through this medium we have greatly increased our passenger earnings.

*Abstract of paper presented before the Milwaukee convention of the Wisconsin Utilities Association, March 23, 1923.

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The members of the Wisconsin Utilities Association are undoubtedly aware of the tremendous increase in the business of the North Shore Line during the past four or five years in handling merchandise. This campaign was started some five years ago by opening a small receiving station in an abandoned drug store at Sixth and Clybourn, Milwaukee. In the beginning we had some difficulty in convincing the merchants at Milwaukee that a trolley line could really handle merchandise. We overcame this prejudice by a persistent solicitation. Our solicitation force presented facts. We arranged to notify shippers and consignees of the superior North Shore service which, at that time, included prompt handling of merchandise from Milwaukee to Lake Bluff and points on the Area Division. After we had satisfied our Milwaukee friends that the North Shore could render a superior service, the management extended merchandise service to Evanston and later to Chicago. At the present time we are operating four receiving stations in Chicago and handling several hundred tons of merchandise daily on the system.

The North Shore is fortunate in having a president and general superintendent who are alive to the public needs, with the result that our solicitors are able to go out and sell North Shore transportation, which means the best service offered by any transportation line. Our damage claims are extremely low and our cost of transportation will bear most favorable comparison with any other common carrier.

The Problem of Collisions Between Cars and Automobiles*

BY R. M. HOWARD
Vice-President Wisconsin Railway, Light & Power Company, Winona, Minn.

THE automobile has introduced an accident hazard of such magnitude that automobile-street car collisions now account for more than 50 per cent of the total street railway accidents in the state of Wisconsin.

The almost universal use of air brakes has minimized the collision hazard with pedestrians and horse-drawn vehicles, the folding door which prevents passengers from boarding or alighting while cars are in motion has almost eliminated the step accident, but we have not found any way to dodge the fast-moving automobile, so our accident records show a constant increase from year to year.

Statistics pertaining to this situation are presented herewith.

Wisconsin licenses issued during the past five years are as follows:

Year	Autos	Trucks	Motorcycles	Total
1918	189,983	6,861	7,246	204,090
1919	226,093	10,888	7,223	244,204
1920	277,093	16,205	8,012	301,310
1921	320,477	21,264	8,423	350,164
1922	361,060	26,788	5,917	393,765

A total of 2,135 dealers' licenses were also issued in 1922.

During 1922, 361,060 automobile licenses were issued, or one for every 7.2 inhabitants, while the average increase in automobile licenses issued during the past four years is 42,769 per year. This increase, if continued for five or six years, will place more than 600,000 automobiles on the streets and highways of Wisconsin.

Street railways may look forward to a continual increase in the number of automobile collision accidents unless some plan is developed which will impress every auto driver with the necessity of exercising care in approaching or driving on streets where street cars are operated.

The accompanying record of automobile-street car collisions in Wisconsin indicates the advisability of some form of educational program which will reach the auto drivers.

From a percentage standpoint the record is not unfavorable, as the automobiles increased 90 per cent and accidents 65 per cent. Analysis of our accident reports indicates that more than 90 per cent of these accidents are due to careless automobile operation, and that not to exceed 10 per cent of the accidents leave a question of responsibility. We may obtain some improvement in the debatable 10 per cent by careful supervision and instruction of trainmen, but the 90 per cent caused by the auto drivers presents a larger and more difficult problem.

In our study of the 1922 accidents at La Crosse, we took a system map and placed a red tack at the point where each accident occurred. This brought out the danger points on the system. We are keeping a similar map for 1923. These maps are installed in the trainmen's room, and we hope will assist them in the work of reducing accidents.

We found that 65 per cent of the accidents occurred on 10 per cent of our trackage located in the business district. Further study indicated that the majority of accidents were due to parking cars near the curb, and were caused by autos turning or backing onto the car tracks immediately in front of an approaching street car, or that the parked auto at the curb forced the moving autos in front of or into the sides of the street cars. Abolition of the parking privilege in the business districts on streets where street cars are operated will reduce materially this accident hazard. It also will speed up both street car and auto movements.

The suggestion is offered that our member companies use their influence toward abolishing the parking privilege on car line streets in their business districts, and that our association consider the advisability of arranging for the insertion of a safety bulletin in license plate envelopes to insure their receipt by every auto owner, or if this cannot be arranged, to secure addresses and mail a bulletin to each auto owner in the state.

*Abstract of paper presented before the Milwaukee convention of the Wisconsin Utilities Association, March 22-23, 1923.

ACCIDENT DATA—STATE OF WISCONSIN
(City Lines Only)

	1922	1921	1920	1919	1918
Car-miles operated	34,469,690	32,831,916	33,694,023	30,870,393	34,028,371
Passengers carried	246,809,978	248,288,805	264,333,189	246,578,129	222,187,616
Total transportation accidents	11,279	11,257	12,247	9,636	9,438
Auto collisions	5,780	5,522	5,662	3,997	3,497

Co-operation, Publicity and Service*

BY JAMES P. BARNES
President Louisville (Ky.) Railway

A SHORT time ago I made a few inquiries about the attitude of the public toward the utilities in the State of Wisconsin. In the answer which I received this phrase struck me particularly: "Some people in this state still have an idea that the average public utility men wear horns."

Now this phrase was written to me by a man whom I had never seen, who had never seen me and with whom this was my first correspondence. However, I understood what he meant because we use the same language, although accustomed to different colloquialisms. Reflection along this line brought me to realize, perhaps more clearly than usual, the fact that the good will of the public-utility business is, after all, founded on the element of understanding.

Public-utility men are sometimes too impatient with the straightforward, honest-intentioned business man who fails to understand their problem because they do not state it in his language. The public utility business has a highly specialized vocabulary. For example, we speak fluently of "return on investment," or "return on fair value of property," yet we refer infrequently to the fact that in our business the usual rate of gross earnings is from 15 per cent to 30 per cent annually of the amount invested in the property. The merchant or manufacturer usually turns over his capital from two to ten times annually. I have known a thoughtful man positively to gasp at the thought of an industry which requires from three to six years to turn over its capital, in some cases even longer. Such realization in most cases immediately enlists his sympathy with our problems and brings about co-operation.

This spirit of co-operation must permeate the investor and management,

*Abstract of address before meeting of Wisconsin Utilities Association, Milwaukee, Wis., March 22 and 23, 1923.

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and in addition the employees and the customers of the property. Co-operation cannot be built on any basis other than that of mutual understanding of their common problems, and this understanding cannot be obtained without publicity. Publicity is a two-edged sword, but its use is essential and indispensable to the understanding and confidence upon which a successful public utility must be built. Like the legendary sword of King Arthur, publicity is a sharp, powerful and dangerous weapon, but it carries for its user a charm of protection if he but understands its spell. The formula for self-protection in its use can be expressed in one word: "Honesty." This will, in turn, bring justice.

The operator who will tell the truth about his business—its trials, difficulties, triumphs and successes—telling this story as news when it is news, as paid advertising when the purpose of the copy is advertising or propaganda, will find building up behind his property a public opinion based on confidence and sympathy of understanding, which will stand the test when the crisis comes.

Employees May Become Effective Publicity Agents

Publicity is of many kinds. Publicity through the newspapers, news stories and advertisement, is indispensable, but there is a subtler form of publicity disseminated through the contact of employees with the public, particularly in the street railway business, which is extremely powerful and often unappreciated. Employees are human beings and their impressions of the utility corporation, formed from their daily contacts with it, are often surprisingly accurate. These impressions will find frequent expression, consciously or unconsciously, in conversations with other people. Thus those with whom the employees talk will form opinions of your corporation and men, based very largely upon what your employees say and what they leave unsaid. We come back to the first rule of good citizenship, namely, that "our first duty is to put our own house in order." No detail is too small and no policy too large to be frankly discussed with and completely explained to any employee who has sufficient interest to inquire into it.

Summing up the whole proposition, it seems to me that success for the public utilities depends for the individual company on co-operation and publicity as to its affairs, both based on the sympathy of understanding arising from frank expression and discussion. Similarly, in a broader sense, the more the railways know of lighting and power problems and the more the telephone people know of railway problems, the closer we get together, the more intimately we discuss matters of policy, the better will be the investing, employee and public reaction to the public utility industry as a whole.

On the foundations of understanding, co-operation and publicity, with addition of courtesy, is built public service, our sole reason for being in business.

Too many men appear to conceive the sole function of management to be the payment of dividends. They forget that this obligation is but secondary, in the sense that dividends are only truly concerned when the public is served. The public service will stand as the goal of operation as we realize that today abide these three: co-operation, publicity, service, and the greatest of these is service.

American Association News

Power Distribution Engineers Meet in Chicago

A TWO-DAY meeting of the Engineering Association committee on power distribution was held in the Edison Building, Chicago, March 12 and 13. On March 12 six subcommittee meetings were held, three each morning and afternoon. The second day was taken up with a general meeting of the committee, at which the reports of subcommittees were considered. Those present were Messrs. M. B. Rosevear, chairman; J. W. Allen, R. L. Allen, L. W. Birch, H. G. Burd, L. E. Delf, D. D. Ewing, C. L. Hancock, C. J. Hixson, C. H. Jones, F. McVittie, W. Schaake, A. Schlesinger, J. Scott, F. J. White, C. R. Harte, sponsor, and A. Hughes, Jr., who acted as secretary.

Ralph H. Rice, Chicago Board of Supervising Engineers, and D. L. Smith, Metropolitan West Side Elevated Railway, also attended the meeting.

On the specifications for catenary construction other than for steam railroad electrification, Mr. Jones reported that the preliminary specification drawn up in 1921 is being carefully studied in sections by members of the subcommittee and that redrafts of all parts of the specification have been made and will be presented at the May meeting of the committee.

Mr. Murphy reported that progress is being made on the subject of trolley wire specifications, with a view to harmonizing the specifications of the association with those of the A.S.T.M., and ultimately to presenting a specification for adoption as "American standard" through the A.E.S.C. A questionnaire will be sent out to a selected list of railway companies to collect information regarding trolley breaks occurring from causes other than wear. Current-collecting devices will also be considered, and, if possible, a joint conference with the equipment committee will be held for the purpose of considering how best to deal with the current-collecting problem.

As to the Engineering Manual, the committee prepared a request to the executive committee to consider binding the Manual in three volumes, dealing respectively with roadway, equipment and electrical matters (power generation, power distribution and signals). It was thought that in this form the Manual would be more convenient than if bound in one volume.

Mr. McVittie stated that on the subject of trackless trolley the report will be confined to a historical summary of the development in this field, the description of each installation to be approved by the operating company before inclusion in the report.

The chairman announced that the association representatives on the technical committee which has been formed in connection with the revision of the crossing specification under the auspices of the A.E.S.C., will be as follows: On hazards, Mr. Harte; on clearances, Mr. McVittie; on definitions, Mr. Pharo; on underground construction, Mr. Rosevear. He also stated that the subjects of wood poles and tubular iron poles, which have been referred to the A.E.S.C., had been in turn referred to special committees, but no reports have as yet been received from these. Another subject referred to the A.E.S.C. was that of wires and cables, regarding which Mr. White, who is secretary of the sectional committee, reported that there were twelve technical committees handling this subject, some of which have been active and others inactive. Mr. McVittie stated that little progress has been made since the last report on the subject of lightning protection, which is also in the hands of the A.E.S.C.

There were some general discussions regarding conductivity of aluminum, on which a research committee and a policy committee have been appointed. It seemed to be the consensus of opinion that the standard for aluminum should be based upon copper, in spite of the fact that changes in conductivity, due to temperature variations, in the two metals are not parallel.

The committee also discussed inductive co-ordination and temporary connections to trolley wire for apparatus using heavy current, and reviewed certain of the power distribution specifications which are in the Manual.

The committee adjourned to meet in New York City on May 21 and 22.

Regulation of Motor Buses and Trucks

THE special committee of the American Association on motor buses and trucks, under the chairmanship of Philip H. Gadsden, met in New York City on March 28 with a good attendance of members of the committee and guests. Among those present were representatives of the United States Chamber of Commerce and the National Automobile Chamber of Commerce. A preliminary draft of a report, prepared by Harlow C. Clark, covering the whole subject of the committee's assignment in a general way was carefully reviewed. Plans were laid for the compilation of data regarding the electric railway industry which will show its magnitude and the nature of the service which it is rendering to the public.

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Maintenance of Equipment

Steel Trolley Wire Replaced

New York, Westchester & Boston Has Changed Material of Contact Wire on Account of the Deposit of Rust on Cars—Porcelain Insulators Have Replaced Wood—Hangers Now Bolted

WHEN the New York, Westchester & Boston Railway was originally built in 1910, a departure from customary practice was made by using steel instead of copper for contact wire in the overhead construction. The low voltage d.c. power in general use on electric railways at that time necessitated copper trolley wire, but it was thought that with high voltage a.c. power, it would be feasible to use the cheaper material. Recently, however, this company has been replacing the old steel contact wire with phono-electric wire, and on new construction only the latter wire has been used.

The overhead system of this property is similar to that in use on the New York, New Haven & Hartford Railroad between Stamford and New Haven, on the Harlem River division of that road and elsewhere. Three wires in the same vertical plane are used over each track. From the topmost, or catenary, messenger are suspended by hangers a pair of parallel wires about 2 in. apart. The upper of the two parallel wires is the straight messenger, and the lower is the contact wire. All three wires are alive, and power is supplied at 11,000 volts at the anchor bridges about 9 miles apart.

Size No. 0000 grooved steel wire was used for the contact wire when the road was first built. No trouble has ever been experienced on account of the lower conductivity of steel as compared to copper. The freedom from this trouble may be due to the fact that the power demands have never closely approached 100 per cent of the line capacity. But it has been found that the steel wire rusts badly, especially in the groove. This defect was considered so serious that all replacements and extensions are now being made with No. 0000 phono-electric trolley wire. At present about 36 miles of the latter are in use, and only about 21 miles of the old steel wire remains on the upper end of the White Plains branch.

The use of steel contact wire produced a most undesirable result in another direction. The friction of the steel shoe of the pantograph against the steel of the contact wire caused a steel oxide dust of some sort resembling iron rust to be deposited on the roofs of the cars. There was not so much objection to the presence of the iron oxide on the roof, but when it rained, this substance was washed down onto the sides of the cars, quickly giving even a newly painted car a very drab appearance. No method of cleaning has been successful in removing this discoloration. A car fresh from the paint shop could hardly be distinguished at the end of a month's time from any other car on the road.

In the ELECTRIC RAILWAY JOURNAL of May 18, 1918, appeared a description of the way that special gutters along the roof had been applied to remedy the difficulty. But even this step did not wholly prevent the trouble. The use of phono-electric contact wire, however, has reduced to a marked degree the deposit of rust on the roofs of the cars. The original dark green color of the paint is preserved longer and it is expected that the trouble will be entirely eliminated as the use of alloy wire is extended.

PORCELAIN STRAIN INSULATORS SUBSTITUTED

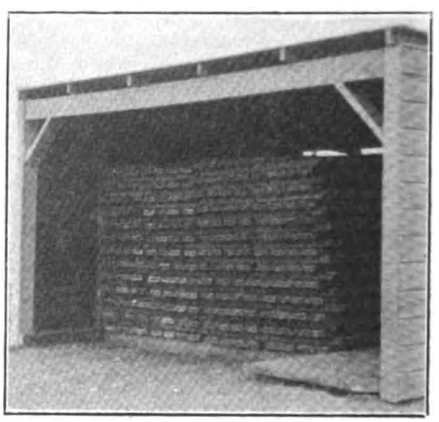
Another change which is being made in the overhead construction of the New York, Westchester & Boston is in the type of span wire insulators. Wood strain insulators were used at first, but their maintenance has been so expensive that porcelain insulators are now replacing them at the rate of 300 to 400 a season. In damp weather there was considerable current leakage across the surface of the wood. This charred and burned the material until at length it was so weakened that it could no longer stand the strain. In order properly to maintain a wood insulator it was found necessary on this property to take it down at least once in two years, sandpaper the surface thoroughly and give it three coats of varnish. On the other hand, a porcelain insulator needs almost no further attention after being once installed, and is therefore more economical in the long run.

LOOSE HANGERS ELIMINATED

Some trouble has been experienced on the N. Y., W. & B. at times from loose trolley hangers. The vibration caused by the passing of the pantograph along the wire loosened the screws which held the hangers clamped to the wire. To obviate this trouble, the screws have now been replaced by bolts and lock washers. Since the change a loose hanger is an almost unknown thing on this road.

Weather Protection for Joint Plates Pays

THE Market Street Railway of San Francisco recently bought 1,200 pairs of joint plates in preparation for track reconstruction now contemplated and stored these plates in the material yard awaiting use.



Inexpensive Housing Over Storage Pile of 1,200 Joint Plates

As it will be at least several months before all of these will be required, a pile was made at a point convenient to a spur track and a light frame shed, with tar paper roof, was erected over the pile.

The shed was built at very little labor cost, with old lumber available in the yard, and will prevent the rust and scale that accumulates rapidly on new metal exposed to the weather.

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Removing Grease and Dirt from Compressor Parts

A NUMBER of railways use hot lye for cleaning dirty and greasy metal parts, but its use in compressor overhauling is not generally practiced. The equipment, however, for carrying on this work is simple and easy to construct and the results obtained far outweigh the cost necessary.

The New York Consolidated Railway overhauls all its air compressors on a time schedule which brings them in about once every fifteen months. The compressors are entirely dismantled, and before any work is done toward replacement or repairs the parts are thoroughly cleaned. To do this all parts except gears, pistons, crankshafts and connection rods are placed in a tank containing a cleaning solution. Two tanks constructed of sheet iron are used for the cleaning work. They are the same size, being 41 in. x 32 in. x 31 in. high, set on a framework which brings the bottoms 9 in. above the floor and having angle iron corners to provide for stiffness and convenient riveting. A 2-in. x 2-in. angle iron is used at the bottom. The legs are also made of 2-in. x 2-in. angle iron and there are three on each side. A 1½-in. flat strip helps to steady the legs and form a more rigid support. One of these tanks is used for the hot cleaning solution, the other is a rinsing tank, in which cold water is used.

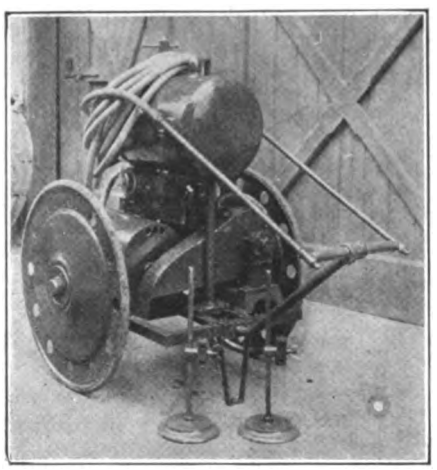
The tank containing the cleaning solution has a gas heating equipment which consists of three long burners installed underneath the tank. Also, in order to circulate the cleaning solution and provide for proper mixing, an air connection is led into the solution at one corner. Air is injected at an elbow near the bottom which has a plug with a large number of holes in it. Two sheet-iron covers with proper handles are used to cover the cleaning tank while the various parts are being cleaned. Ordinarily the parts are left in the solution about one-half hour. The large parts are handled by an overhead air crane and the small parts are placed in the solution by hand after ropes have been attached to them so that they can be conveniently removed. Small bolts, washers, nuts and the like are placed in an iron receptacle which is filled with holes so that the cleaning solution readily enters it. The cleaner used at present is furnished by J. C. Ford of Wyandotte, Mich., and 20 lb. of the cleaning powder is used to 100 gal. of water. About every other day 2 lb. of cleaning powder and 10 gal. of water are added.

After the various parts to be cleaned have been in the cleaning solution for a half hour they are removed and brushed briskly with a hand brush or a broom and are then placed in the rinsing tank. Large parts are raised and lowered in the rinsing water by means of the overhead hoist, and the smaller parts are moved around so as to give them a thorough rinsing. Cold water is continually flowing into and out of the rinsing tank, and an overflow is made with a 1-in. pipe connection and the opening into this has a screen. The tanks used will hold 130 gal. when filled up to the overflow pipe.

In order that the various parts may be kept together and assembled in the proper compressor each is numbered with red paint as it is removed from the rinsing tank.

Light-Weight, Double-Burner Preheater

THE Metal & Thermit Corporation has perfected a new light-weight double-burner rail preheater for thermit rail welding which is particularly designed to expedite work where the joints to be welded are scattered. The capacity of the blower and gasoline tank of the new double-burner preheater is double that of the single-burner preheater, and the new preheater is equipped with two heating coils instead of one, also with two 25-ft. lengths of hose.



Light-Weight Double-Burner Preheater

where the two burners can be used for preheating two joints simultaneously.

The new double-burner preheater has been thoroughly tested and has proved to be of as high efficiency as the single-burner preheater, which will continue to be supplied for use in cases where the double-burner preheater is not feasible, such as

Obtaining Best Results from Preheaters

THE Metal & Thermit Corporation, which has recently been conducting some extensive experiments with different types of burners to be used in connection with its standard thermit preheaters, found that the best results were secured with a burner pipe ⅜ in. in diameter, swaged down at one end and then drilled with a 7/32-in. hole. Such a burner pipe fully atomizes the fuel before it enters the mold and gives the best combustion. It was found that when larger burners were used, or when ends had not been swaged down, considerable air and fuel was wasted. The fuel does not become fully atomized, with the result that raw oil is carried into the mold or is wasted by dripping from the end of the pipe. A proper nozzle as described can be easily made.

Tin Superior to Solder for Fastening Wires

SOLDER has been replaced by tin in the shops of the Municipal Railway at San Francisco as a means for holding together the wires used in banding armatures. This change has been made to take advantage of the superior bonding quality developed by molten tin in contact with tinned steel and copper. Copper strips are placed around the armature as bands on which to wind the steel wires and the tin is applied with a soldering iron just as in the ordinary use of solder.

Keeping Down Oil Consumption

IN THE shops of the Eastern Massachusetts Street Railway at Fall River the local master mechanic, J. J. Curley, has his oilers divided into crews, each of which is supposed to do its work as if it were operating a small carhouse of its own. Each crew has its own packing can in the oil house with its own waste soaking and draining outfit. Each is allowed a certain amount of oil per month and is expected to get along within

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this allowance. Each man is furnished with a 5-gal. can with a padlock so no one else uses his oil.

Smoothing Off Rebabbitted Bearings

THE old method of trimming up the edges of "windows" in rebabbitted bearings for the journal boxes of street cars has been discarded in the shops of the Municipal Railway at San Francisco in favor of the oxyacetylene torch. The torch flame is simply run around the edges of the windows, removing surplus metal and leaving a smooth edge.

Utilizing Out-of-Doors in Pipe Cutting

IN THE Fall River shops of the Eastern Massachusetts Street Railway a pipe vise is mounted on a bench close to an outside wall. A hole has been made in the wall and covered with a slide, to permit the end of a pipe to be threaded or cut without having the entire length of the pipe in the room, the pipe being pushed out through the hole to get rid of it. For use where quarters are close this plan appears to have merit and it certainly has proved to be convenient.

Closing Up Spread Armature Core Laminations

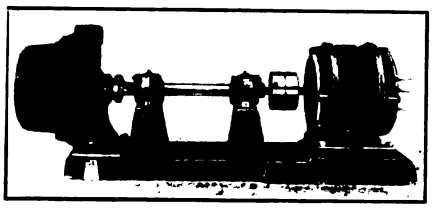
IN REPAIRING railway motor armatures, the laminations are sometimes found to be bent at the end of the armature core to such an extent that the coils used for rewinding will not fit. Also in the ventilated core type of armature the laminations become bent adjacent to the ventilating slots, sometimes to such an extent that the slots are entirely closed at the top. Where armatures are found in this condition it is quite necessary that the laminations be bent back into place. In doing this, if the laminations are struck on the end without some sort of support a little farther on, the bending is only transmitted to another part.

In order to take care of this condition, the New York & Queens County Railway has made some special tools which it uses in its Woodside shop armature room. To hold the laminations at the ventilating slot and also to bend these back in position a wedge-shaped tool with a slot in the wedge portion is used. This is driven into the ventilating core opening, the slotted part of the tool being of sufficient size to fit over the through portion of the slot. With the tools inserted in the ventilating core, the end laminations can be bent back without danger of shifting other laminations. A tool has been made which fits over the end bell of the armature and has a flat end to rest against the end lamination. This can be driven with a mallet without danger of its tipping up due to the blows, and thus the laminations can be bent back into position. Sometimes where laminations rub the pole faces badly they become distorted to as much as ½ inch.

New Equipment Available

New Ball-Bearing, Self-Priming Pump

THE Fulflo Specialties Company, Blanchester, Ohio, has added to its line of pumps the 75-gal., ball-bearing, motor-driven pump shown in the accompanying illustration. The



Motor-Driven, Impeller Pump of the "Fulflo" Type

manufacturers have given special attention to the self-priming and anti-clog features of these pumps and to their free-floating impellers. The construction is such that a steady flow of liquid is assured, whether the demand be small or great.

New Device Signals Rear Traffic

THE tremendous increase in automobile traffic has created new types of accidents in the form of damages to street cars from rear-end collisions and injuries to alighting passengers from automobiles failing to stop with the car.

An indicating stop signal system has been developed exclusively for street railway service, arranged so that with the first act of the motorman to stop the car by air-brake application, a signal light located on the rear dash signals the act to the rear traffic.

The signal is in the form of an inclosed electric lamp, one side of the box being fitted with a red cross-ribbed glass and the word "stop" ground into it, somewhat on the order of the popular stop lamp signal now used with such great success by motorists. The box is of such size that large distinct letters are used enabling the rear traffic to see the signal from considerable distance.

The signal control is tied in with the vestibule doors in such a manner that the signal lamp will remain lighted until all doors are fully closed and the air brakes released. This is accomplished by the use of door switches which make contact when the doors are opened.

The signal is controlled by application to the air brakes through a pneumatically operated switch arranged so that the switch contacts are closed with the first few pounds of air pressure applied to the brake system. The standard electric railway 23-watt lamp is used, eliminating the necessity of a new size in lamps.

On cars of the one-man safety type, where the doors are interlocked with the air brakes so that they cannot be opened until the brakes are applied, the door switches are not required.

This device is manufactured and sold by the Oskel Equipment Company, McCormick Building, Chicago.

Duplex Tape Saves Time

A COMBINATION tape, serving the purpose of both rubber and friction tapes, is now being made by the Diamond Holdfast Rubber Company. One side of the tape is a high-grade rubber compound, red in color, and the reverse side is fabric (friction tape) impregnated with adhesive and insulating mixtures. The friction side of the tape is black. Two advantages are claimed for this duplex tape: first, that the time saved by doing in one operation what is usually done in two, much more than counterbalances a higher initial cost; and second, that the presence of the two elements in one tape insures that any joint which is taped at all will be taped with both materials.

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The News of the Industry

$25,000,000 Project Proposed

Plans for Subway System for Lines of Pacific Electric Railway in Los Angeles

The Los Angeles Planning Commission has just filed its plans with the Los Angeles Board of Public Utilities for a subway system for the cars of the Pacific Electric Railway that operate in congested streets. The railway company has favorably received the plans. The construction of the lines embraced in the project would represent an expenditure of $20,500,000. The proposed system of subways includes the provision of an underground terminal beneath the city's central park known as Pershing Square. The plans have also been approved by the Community Development Association of Los Angeles.

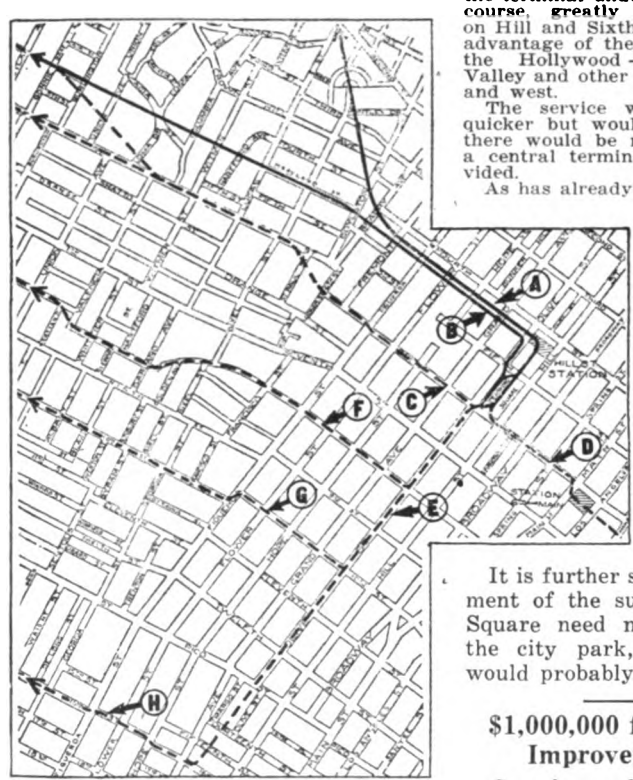
It is understood that the report of the City Board of Public Utilities to the City Council on transportation matters in Los Angeles will recommend that the Pacific Electric and the Los Angeles Railway lines be awarded the franchises asked by them to operate motor bus "feeder" lines to serve throughout the entire city; that the two railways arrange to establish a system of intercompany transfers, and that the Pacific Electric lines provide the necessary subway system whereby it would remove all of the interurban electric trains from the city's streets.

There will be no definite recommendation by the board, it is said, with respect to the application of the People's Motor Bus Company, which is fostered by the McAdoo interests, for franchise rights on 60 miles of the city's streets. The board's proposal in this matter is left to the decision of the people at the election on May 1. One of the initiative measures is designed to open up the congested district of the city to the operation of jitneys and motor buses. The other measure calls for a straw vote on the question whether the City Council shall advertise for sale a twenty-one-year franchise such as petitioned for by the People's Motorbus Company for the operation of a motorbus system in Los Angeles.

The huge system of subways has also been approved by the Los Angeles Traffic Commission.

The Pacific Electric Railway has plans already prepared for the construction, at a cost of $3,000,000, of its proposed Hollywood rapid transit subway, the terminal in Los Angeles being proposed at the company's present Hill Street terminal located between Fourth and Fifth Streets on Hill Street.

The City Planning Commission suggests that the present plan be abandoned of making the Pacific Electric Railway terminal on Hill Street between Fourth and Fifth Streets the terminal of the Hollywood subway, on which it was proposed to begin work shortly, and that, instead, Pershing Square, located on Hill Street between Fifth and Sixth Streets, be made the site of the terminal. The cost of the Hill Street-Hollywood subway project is estimated at $3,000,000, whereas the Pershing Square plan would cost $4,500,000 to carry out. Located four blocks east of Pershing Square is the present main interurban terminal of the Pacific Electric Railway at Sixth and Main Streets. The plan would be to connect this with the Pershing Square terminal.



Map of Downtown Transit Area

A—Glendale-Hollywood-San Fernando tunnel. B——Original P. E. Santa Monica Bay subway right of way. C—Possible extension along and under Sixth Street, west. D—Possible extension to P. E. Station at Sixth and Main Streets. E—Possible extension along and under Olive Street. F—Possible extension along and under Eighth Street. G—Possible extension along and under Tenth Street. H—Possible extension along and under Sixteenth Street. C, F, G and H are to serve western Los Angeles and Santa Monica Bay districts.

D. W. Pontius, vice-president and general manager of the Pacific Electric lines, in commenting on the plans of the City Planning Commission of Los Angeles, stated, in part:

> If instead the Hill Street surface terminal is used then it cannot subsequently be changed because of the difference in grades and in the end the subway system serving the city would be disconnected. There would be a further advantage in the location and the available space. Am informed that the city is in position to grant franchise for subway surface rights.

From the Pacific Electric viewpoint the serious problem is presented of expending probably $1,500,000 more, since subsurface terminals are expensive. The expenditure could be justified only in the hope that it might fit into the future plans, beneficial alike to the city and to the railway. It could not be justified on the basis of any increased volume of business in connection with the construction now authorized. We recognize fully though the force of the City Planning Commission's idea with respect to the future and for that reason will make effort at once to secure the necessary money if this project is officially approved.

The subways immediately to be built with the terminal under Pershing Square will, of course, greatly relieve traffic congestion on Hill and Sixth Streets, to the very great advantage of the city and to the people in the Hollywood - Glendale - San Fernando Valley and other districts lying to the north and west.

The service would not only be much quicker but would be made regular, since there would be no street interference and a central terminal location would be provided.

As has already been announced, the work on the subway with the old location of the terminal at Hill Street has been authorized and the right-of-way has been substantially all purchased and we are now ready to let contracts in accord with the agreement with the Railroad Commission, to furnish improved service to Hollywood, Glendale and other districts concerned. Therefore a prompt decision should be reached in connection with the City Planning Commission's project in order that relief may be had at the earliest possible moment.

It is further stated that the establishment of the subway beneath Pershing Square need not ruin the beauty of the city park, but on the contrary would probably improve it.

$1,000,000 for Extensions and Improvements in Toledo

Complete rebuilding of the railway system at Toledo is contemplated in the studies now being made. It will be recalled that under the Milner service-at-cost ordinance the Doherty interests are required to furnish $1,000,000 of new capital for extensions, crosstown line, and betterments within a period of two and one-half years from the granting of the ordinance. The time limit for the new work and new capital will be up July 1.

Commissioner Wilfred E. Cann has informed Council that his organization was busy mapping out some of the changes necessary to be made and in securing data for the use of engineers working on the problem.

E. O. Mills has begun the study of the railway for the purpose of arranging an ideal system to handle the business and traffic. His idea is to coordinate the railway system with the general zoning plan, development of railroad terminals, grade crossing eliminations, and other angles of the city plan. The crosstown line, which has been a demand for several years, will probably be worked out in this study.

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Commissioner Cann had contemplated the use of motor buses on several of the extended lines or in crosstown service provided their operation on lines now authorized furnished data to insure their successful use.

A new loop for interurbans entering the downtown district would also give them access to the Interurban Station with only a small portion of their runs over existing lines used by city cars and with a much shorter distance to travel in the congested district. This plan has the approval of all sides and is awaiting financing to carry it out. Interurbans may be asked to help in the financing of the new track construction due to the fact that it will mean a large saving to them in trackage rentals annually. Within the loop is also contained the present interurban freight station.

Killed by Ridicule

A bill in the Missouri Legislature requiring the United Railways, St. Louis, to equip its cars with stoplights was fought by the receiver's attorneys until finally it was loaded down with absurd amendments and then killed by ridicule.

The bill as amended provided that the law should not be operative except during total eclipses of the sun and moon.

When Senator Kinney called up the bill Senator Irwin offered an amendment which provided that every driver of a street car should be required to keep a copy of Senate Bill 124 (the anti-bootlegging bill) conspicuously posted in each and every car while standing still and in operation.

Senator Kinney said the amendment did not appear to be germane, but it was adopted, only Kinney dissenting. This resulted in much merriment. When quiet was restored, Senator Painter sent up an amendment which provided that the conductor should have additional wire and when the car stopped he should go back 400 ft. and post a light that bore the word "stop." He should carry a pole on which a light should be posted.

"I am afraid that amendment will weaken this bill," said Senator Kinney, laughing. "I hope the Senate will defeat it." The amendment won unanimously.

"Another amendment, Mr. President," said Irwin. That amendment made the bill applicable to all vehicles and wheelbarrows when in operation on the public highways. That was adopted.

Senator Proctor then offered an amendment which provided that the law be only in effect during total eclipses of the sun and moon. "Now that the bill has been perfected," said Senator Kinney, "I move that it be put upon its final passage." "How about the title?" inquired Proctor. "The House can amend the title," said Kinney. It passed with only two dissenting votes.

The bill as originally drafted applied to St. Louis and Kansas City. It passed the House in that form. The Senate committee reported it favorably with an amendment making it applicable only to St. Louis. In the Senate it was laughed to death.

Railway Relieved from Paving Requirements

At a special municipal election held in Santa Cruz, Calif., on Feb. 28 to vote on a charter amendment that would relieve the Union Traction Company from the necessity of paving between the rails and for 2 ft. outside the tracks, the amendment carried by 143 votes; the total number of votes cast was 2,445.

There was no organized effort on the part of the proponents to carry the election, their activity being confined to sending out a circular prepared by a citizens' committee explaining the facts of the case. This circular was a four-page leaflet containing questions and answers. The situation was put very forcibly by four of these answers, which were as follows:

Q. It has been stated that the street-car company carries a certain amount of watered stock. Could not the dividends paid on this stock be used for street paving purposes?

A. There has never been a dividend paid on any of the stock of the Union Traction Company, watered or unwatered. None of this stock has any value and any person desiring to own it may secure title to it without cost.

Q. Would it not be possible to reduce the amount being paid as interest on borrowed money, thus securing means to pay for cost of street paving?

A. No interest has been paid by the company for six years and no money has been available for that purpose. As a result of this the bonds of the company can be bought at 10 cents on the dollar, or less.

Q. Why should the city not acquire the street car system and pay for street paving out of the earnings?

A. If the people desire to try this experiment the company stands ready to transfer the property to the city without charge.

Q. Is it possible to cut down street car expenses by reducing salaries of company officials?

A. Officials of the company receive no salaries whatever; neither is any charge made for office rent or clerical service. Investigation by a committee of citizens disclosed that only car men, shop men and track men are on the payroll.

$9,000,000 to Be Spent for Improvements

The officials and directors of the Terre Haute, Indianapolis & Eastern Traction Company of Indiana have approved plans calling for an expenditure of nearly $9,000,000. The program as outlined by Robert I. Todd, president, calls for the following:

Construction of super-power plant, $6,000,000.
Seven substations, estimated cost $750,000.
Power transmission lines, $1,000,000.
Company's part of freight interurban development, $333,000.
Total for Terre Haute, Indianapolis & Eastern, $8,083,000.
Indianapolis Street Railway, new rolling stock, $500,000.

Mr. Todd hopes to see most of the program put through this year. However, the outcome so far as the construction of the power station here depends on the suit filed in Indianapolis to determine the right of the Indiana Public Service Commission to issue an order of convenience permitting the company to enter this field with a new power plant. The order issued by the commission does not limit the T. H., I. & E. to supplying power for itself. It is being attacked by the Indianapolis Light, Heat & Power Company and the Merchants Heat & Light Company, which have plants at Indianapolis, Ind., and insist that they are able to take care of the city's needs of power.

In a statement which he made Mr. Todd said:

There are just two factors which are confronting us in our effort to solve present power transmission and street railway problems. They are, more power, and next, more equipment—rolling stock—and our entire development program scheduled for the present year revolves about those two. In order to remedy the power situation, we have plans and have made arrangements to construct a super-power plant at our West Tenth Street station, costing approximately $6,000,000.

More electric power is imperative for the solution of our railway traffic problem, and to that end, we have planned to erect six or seven substations at various points throughout the city. The next step will be the purchase of more rolling stock, and the year's plans call for the purchase of fifty new cars for the Indianapolis Street Railway.

However, much of this development work is contingent upon the litigation in the local court. We expect when that is out of the way to begin immediately upon the year's construction program. It is one of the most extensive developments ever attempted by the company. I, of course, would rather have said "we did" than "we are going to do," but I am telling you the scope of our plans for this year.

A special judge has been appointed to try the case immediately.

San Diego Employees Receive Pay Increase

An increase of pay to its platform men which will cost the San Diego (Calif.) Electric Railway about $40,000 a year more than the old schedule was announced by Claus Spreckels, general manager, at a meeting of the company's employees March 15. The new schedule became effective March 16 and will mean an increase of from 5 to 10 cents an hour for the men. The wage increase was a complete surprise to the men, and, along with other plans of the company, was announced by Manager Spreckels as a part of his aim to make San Diego's the "best street car system in the United States."

The new wage scale of the company ranges from 40 cents an hour for beginners to 55 cents an hour as top pay, with possible bonuses that bring the top pay to 65.5 cents, and 4 cents an hour is added all the way through for one-man car operators.

The new schedule of pay is as follows:

TWO-MAN CAR OPERATORS

	New Rate	New Rate with Estimated Bonus
First three months	40 0	50 5
Next three months	41 5	52 0
Next six months	43 0	53 5
Second year	45 0	55 5
Third year	46 0	56 5
Fourth year	47 0	57 5
Fifth to ninth year	48 0	58 5
Tenth to fourteenth year	49 0	59 5
Fifteenth to nineteenth year	50 0	60 5
Twentieth to twenty-fourth year	52 5	63 0
Twenty-fifth year and after	55 0	65 5

Estimated amounts included in the bonus:

Ticket commissions	$3 50
Accident fund	3 00
Monthly bonus	2 00
Welfare service	2 00
Total	$10.50

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Columbus Award Sustained, but Reduced Slightly

The Court of Appeals of Ohio in the case of the Columbus Railway, Power & Light Company, Columbus, Ohio, against E. W. Clark & Company and the individual members of that company has rendered a judgment for $799,017, which with interest of $337,292 computed to April 1 makes a total amount of $1,136,310. This is a smaller amount than was awarded by the lower court mainly due to the fact that the management contract was not made until the year 1912. Under the decision of the Court of Common Pleas the principal award was $1,079,726 with interest of $432,294 to April 1, making $1,512,-021 as against the Court of Appeal's principal, including interest, $1,136,310, or a net difference of $375,711.

On Jan. 21, 1922, Judge Kinkead of the Franklin County Common Pleas Court rendered a judgment of $1,079,726 in favor of the local Columbus Company against E. W. Clark & Company, former operating managers at Columbus, in the so-called Slaymaker suit. A list of the items in the judgment was published in the ELECTRIC RAILWAY JOURNAL for Jan. 28, page 168.

Arbitration to Be Discussed in New York

The week of May 7-12 will be "Arbitration Educational Week." In that seven-day period commercial associations and trade organizations in New York City and State will unite in an intensive effort to make known to all citizens the benefits to be derived by making use of arbitration in the settlement of business differences and disputes.

An endeavor will be put forth in this week of may to let people know that within their reach there is a simple and direct, a prompt and inexpensive way of deciding controversies and of avoiding the costly, harassing and tedious processes of litigation.

The announcement of this "educational drive for arbitration" was made at a dinner given by the Arbitration Society of America to some 400 representatives of trades, industries and commercial and professional organizations at the Hotel Pennsylvania, New York City, the evening of March 14.

All who are interested in the movement for the week's educational course in arbitration are requested to communicate with temporary headquarters of the committee which have been established in Room 906, 115 Broadway, where information as to the plan for "Arbitration Educational Week" will be gladly given.

New Plant Ready in August

The City Light & Traction Company's new plant at Sedalia, Mo., in course of erection by the Henry L. Doherty interests of New York City, will probably be ready for operation by August. The plant will have a capacity of 8,000 kw. It will cost about $350,000 fully equipped. It is the aim of the company to have the plant finished in time for the annual Missouri State Fair in August. A combination of coal and oil settings is being installed so that either fuel can be used. The smokestack will have a diameter of 20 ft., setting on a block of concrete, which will be 40 ft. in diameter and 9 ft. deep.

Passage of Bill Permits Railway to Enter Cincinnati

The first step toward the entrance of the Cincinnati, Lawrenceburg & Aurora Electric Street Railroad into the heart of the Cincinnati business district on an elevated structure was taken on March 9, when the House of Representatives at Columbus, unanimously passed the bill of Representative Samuel Lipp of Cincinnati carrying the necessary legislation. The bill repeals an old law which limited the fare to be charged on elevated railways within city limits to 5 cents and substitutes a provision that the rate of fare shall be agreed upon between the City Council and the interurban company. The proposed elevated structure will extend the interurban line from its present terminus at Anderson's Ferry to the Dixie Terminal.

Arrangements were completed more than a year ago to extend the interurban road so as to bring its cars into the Dixie Terminal on elevated tracks from Sixth Street and State Avenue. When it was found that the Schmidlapp law provided that only a 5-cent fare could be charged the project was abandoned for the time being because it could not be financed on that basis. The Cincinnati, Lawrenceburg & Aurora Electric Street Railroad will use the right-of-way of the Big Four Railroad from Anderson's Ferry to Sixth Street and State Avenue. The railroad has agreed to lease part of its property to the interurban company for that purpose. The extension would cost $750,000.

Looks to Electrification.—P. H. Nee, superintendent of the Wisconsin Valley division of the Chicago, Milwaukee & St. Paul Railway, stated in Merrill recently that he looked forward to the eventual electrification of the Wisconsin Valley system of the road with overhead lines.

Reports No Accidents. — The City Light & Traction Company at Sedalia, Mo., on March 16, announced that not a single accident had been reported since Jan. 1. This is declared to have been the longest period of time ever passed that some employee of the traction had not incurred a personal injury of some sort.

Seeks Restoration of Service.—Assemblyman Dunne has introduced a bill in the New York State Legislature directing the Brooklyn Heights (N. Y.) Railroad, or such person as may be in control of the same, to restore service on the Tompkins-Culver line, in the Borough of Brooklyn, State of New York, for a fare not exceeding 5 cents.

Classes for Supervisors Formed.—Regular classes for supervisors have been started by the Los Angeles (Calif.) Railway, to keep them informed on recent matters affecting transportation. The meetings are held every Friday in the instruction department lecture room. Subjects are announced for one week ahead and certain supervisors are instructed to prepare to lead the discussion.

Opposed to Germantown Branch.—In a report to the City Council Transit Director Twining of Philadelphia, Pa., opposed the construction of a high-speed branch of the Broad Street subway to Germantown and Chestnut Hill. He said he believed that the proposed electrification of the Philadelphia & Reading Railway branch to Germantown would take care of the transportation needs of that section.

Commission Requires Data Filed.—In line with its policy of keeping a close account of the affairs of all public utilities corporations in order that the public interest may be thoroughly safeguarded, the California Railroad Commission recently adopted a resolution requiring public utilities to file salary data and an accounting of donations, contributions, subscriptions and cash balances.

Employees Have Chance to Win Money.—The British Columbia Electric Railway, Vancouver, B. C., will offer a prize of $5 each month to the best article on the prevention of street car accidents. The contest is open to any employee not on the office payrolls. According to the rules of the contest articles must be turned in on or before the twentieth of the month and should not be more than 500 words long.

Re-Elect Employees Representative.—Employees of the Louisville (Ky.) Railway, were so well pleased with the work of Daniel L. Kehl, representative of the Welfare Association of Employees on the board of directors of the company, that they re-elected him as employees' representative at the annual election on Feb. 15. Mr. Kehl is a clerk in the maintenance of way department. The practice of having an employee on the board was started in 1922, and has become a part of the regular method of handling the affairs of the company.

J. N. Clark Heads Pacific Railway Club.—The Pacific Railway Club, at its meeting in Berkeley, Calif., on March 8, listened to an address by George M. Basford, consulting engineer, Lima Locomotive Works, Inc., on the subject "As to the Locomotive, What Next?" New officers for the year were elected as follows: President, J. N. Clark, chief fuel supervisor Southern Pacific Company; first vice-president, J. M. Yount, master mechanic Market Street Railway; second vice-president, H. A. Mitchell, vice-president and general manager San Francisco-Sacramento Railroad; treasurer, R. G. Harmon, chief clerk city freight department, Western Pacific Railroad.

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Financial and Corporate

$15,103 Behind Return

Grand Rapids Year Better, but Company Ran Behind Return Allowed Under New Grant

For the first time in several years the Grand Rapids (Mich.) Railway in 1922 earned a small surplus over charges. This surplus was only $6,583, but it compares with a deficit of $30,481 in 1921, and a deficit of $147,070 in 1920. Since 1920 the ratio of operating expenses to gross earnings has been gradually reduced from 74.17 per cent in 1920 to 66.33 per cent in 1921, and to 65.29 per cent in 1922. Likewise the ratio of operating expenses and taxes to gross earnings has been decreased from 81.27 per cent in 1920 to 73.51 per cent in 1921 and then to 72.41 per cent in 1922.

It will be recalled that a new franchise was passed by the City Commission of Grand Rapids on June 12, 1922, and was accepted by the company subject to the approval of the electors of the city. At an election held Sept. 12 the franchise was submitted to the people and approved by approximately 72 per cent of the voters. The franchise was immediately put into effect. It is of the service-at-cost type, based on an initial valuation of the property for rate making purposes of $5,500,000, plus the cost of additions made from time to time, the rate of return depending upon the rate of fare charged. The initial rate of return was fixed at 8 per cent with the same fare as was in effect during the greater part of 1922, namely, 10 cents cash or seven tickets for 50 cents, transfers free.

L. J. DeLamarter, vice-president and general manager of the company, explained in the report of the company that from Sept. 1, 1922, the date as of which the franchise became effective, to Dec. 1, 1922, the company failed by the amount of $15,103 to earn the return to which it was entitled. He says that more favorable results are expected in 1923, however, as the management hopes to effect further operating economies without any curtailment of the service rendered to the public.

Capital expenditures during the year were devoted principally to the betterment of the company's existing facilities. They amounted to $207,840. Against this sum there was a credit of $102,136 representing the cost of property retired from service, making the net addition $105,704. Seventeen cars were remodeled into equipment of more modern type and fitted with standard safety car devices, so that they may be operated as one-man cars. It is planned to remodel twenty-eight more cars in a similar manner during 1923 and to purchase eight new cars of this type. It is also proposed, according to Mr. DeLamarter, to purchase six modern motor buses to provide service in some parts of the city not now supplied with railway facilities and for use in other sections when the streets are placed in good condition.

SERVICE RENDERED

Total number of passengers carried annually by the Grand Rapids Railway for the past five years:

	Revenue Passengers	Transfer Passengers	Total Passengers
1922.....	24,058,780	6,191,023	30,249,803
1921.....	24,437,134	6,250,583	30,687,717
1920.....	27,813,220	6,627,889	34,441,109
1919.....	26,307,032	6,474,666	32,781,698
1918.....	24,884,739	5,990,443	30,875,182

Mr. DeLamarter reports that business conditions in Grand Rapids showed further improvement during 1922 and that a recent survey of the industrial situation indicates that the various local manufacturers will operate their plants at capacity throughout 1923. He says that there is every indication that Grand Rapids will enjoy a continuation of progress and prosperity during the coming year and that the effect of this increased activity should be reflected in the company's operating results for the coming year.

Statement of earnings of the Grand Rapids Railway for the year ended Dec. 31, 1922, together with comparative statement of income and expenses for the two preceding years.

	1922	1921	1920
Gross earnings:			
Passenger revenue—city lines	$1,813,246	$1,795,634	$1,740,952
Revenue from special cars, etc.	1,171	1,092	3,992
Rent of equipment, tracks, etc.	43,223	47,584	57,987
Non-operating revenue	3,836	421	1,362
Total	$1,861,476	$1,844,731	$1,804,293
Operating expenses, taxes and depreciation:			
Operating expenses	$1,215,522	$1,223,779	$1,338,312
Taxes	132,403	132,244	128,052
Depreciation	176,131	181,323	150,000
Total	$1,524,056	$1,537,346	$1,616,364
Gross income	$337,420	$307,385	187,928
Interest and other fixed charges	330,836	337,867	334,998
Net income	$6,584	$*30,484	$*147,070
* Deficit			
Ratio of operating expenses to gross earnings	65.29%	66.33%	74.17%
Ratio of operating expenses and taxes to gross earnings	72.41%	73.51%	81.27%

I.T.S. Stockholders Approved Merger Plan

At an adjourned meeting of the stockholders of the Illinois Traction Company, Peoria, Ill., held in Portland, Me., the plan was approved for consolidating the Southern Illinois properties controlled by Clement Studebaker, Jr., and his associates, with those of the Illinois Traction Company. The plan will be carried out in accordance with terms outlined in the ELECTRIC RAILWAY JOURNAL for March 10, page 424.

New Directors Elected

At the annual meeting of the stockholders of the Philadelphia (Pa.) Rapid Transit Company held on March 21 a resolution was passed providing that a co-operative wage dividend of 10 per cent of the annual wage for 1923 be paid employees after the payment of the usual 6 per cent dividend had been made to stockholders.

Three new members were elected to the board of directors. They are Leon Jewell, vice-president in charge of traffic; W. K. Myers, acting vice-president, and R. R. Nyman, who, as president of the Co-operative Welfare Association, represents the employees.

The first two men replace Nelson Robinson and H. G. Tulley. Mr. Nyman, who is a motorman on the Lombard and South Streets line, replaces John E. McElroy, a foreman, who is the past-president of the Co-operative Association.

Other changes in organization were referred to in the ELECTRIC RAILWAY JOURNAL, issue of Feb. 24.

Net Income Up 63 per Cent

Summary Presented of Reports of 225 Companies—Outlook for Industry Very Promising

Edmund J. Murphy, chief statistician of the American Electric Railway Association, writing in A.E.R.A. for April, 1923, says that reports from electric railways for the year 1922 show that at the present time the electric railways are in a stronger position financially than they have been at any time since 1917. The operating ratio is down to 72.6 per cent and the net income after the payment of all expenses, taxes and fixed charges has increased more than 60 per cent over the figure for 1921. The 1921 net was 186 per cent greater than that of 1920. In 1922, the interurban lines came back strongly.

The summary of the trend of railway operations in 1922 is based on reports of 225 companies. Their combined figures are shown in the accompanying tables together with certain traffic ratios calculated from the figures on a comparable basis. The 225 companies operate 21,484 miles of single track, of which 13,679 miles are city track and 7,805 miles interurban track. The city track is about half the total in the country and the interurban track about 43 per cent of all interurban track. The combined railway revenues of these companies amount to about one-half of the total railway earnings of the industry.

The tables show that the net income of these companies increased from $22,852,418 in 1921 to $37,237,680 in 1922, or 63 per cent. The operating ratio of the combined groups dropped from 75.54 per cent to 72.66 per cent.

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TABLE I—COMBINED INCOME STATEMENT OF 225 URBAN AND INTERURBAN RAILWAYS FOR 1922 COMPARED WITH 1921

	1922	1921	Increase	Per Cent Increase
Railway operating revenue..	$464,365,210	$469,548,024	*$5,182,814*	*1.10*
Railway operating expenses.	337,419,485	354,738,718	*17,319,233*	*4.88*
Net operating revenue....	$126,945,725	$114,809,306	12,136,419	10.57
Net revenue auxiliary operations	20,709,359	18,631,987	2,077,372	11.14
Taxes	33,622,064	32,347,991	1,274,073	3.94
Operating income	$114,033,020	$101,093,302	12,939,718	12.80
Non-operating income	9,203,921	8,444,185	759,736	9.00
Gross income	$123,236,941	$109,537,487	13,699,454	12.51
Income deductions	85,999,261	86,685,069	*685,808*	*0.79*
Net income	$37,237,680	$22,852,418	14,385,262	62.95
Operating ratio (per cent)	72.66	75.54	*2.88*	*3.81*
Ratio: net income to operating revenue (per cent)	8.02	4.87	3.15	64.68

Note—*Italics* denote decrease.

TABLE II—COMBINED INCOME STATEMENT OF 121 URBAN RAILWAYS FOR YEAR 1922 COMPARED WITH 1921

	1922	1921	Increase	Per Cent Increase
Railway operating revenue..	$387,244,748	$390,739,415	*$3,494,667*	*0.90*
Railway operating expenses.	277,774,741	291,631,472	*13,856,731*	*4.75*
Net operating revenue....	$109,470,007	$99,107,943	10,362,064	10.45
Net revenue auxiliary operations	14,203,448	12,770,636	1,432,812	11.22
Taxes	28,528,551	27,403,521	1,125,030	4.10
Operating income	$95,144,904	$84,475,058	10,669,846	12.63
Non-operating income	6,606,859	5,842,356	764,503	13.08
Gross income	$101,751,763	$90,317,414	11,434,349	12.66
Income reductions	69,025,224	69,390,202	*364,978*	*0.53*
Net income	$32,726,539	$20,927,212	11,799,327	56.38
Operating ratio (per cent)	71.73	74.63	*2.90*	*3.89*
Ratio: net income to operating revenue (per cent)	8.45	5.36	3.09	57.64

Note—*Italics* denote decrease.

TABLE III—COMBINED INCOME STATEMENT OF 104 INTERURBAN RAILWAYS FOR 1922 COMPARED WITH 1921

	1922	1921	Increase	Per Cent Increase
Railway operating revenue..	$77,120,462	$78,808,609	*$1,688,147*	*2.15*
Railway operating expenses.	59,644,744	63,107,246	*3,462,502*	*5.49*
Net operating revenue....	$17,475,718	$15,701,363	1,774,355	11.30
Net revenue auxiliary operations	6,505,911	5,861,351	644,560	11.00
Taxes	5,093,513	4,944,470	149,043	3.01
Operating income	$18,888,116	$16,618,244	2,269,872	13.66
Non-operating income	2,597,362	2,601,829	*4,767*	*0.18*
Gross income	$21,485,178	$19,220,073	2,265,105	11.78
Income deductions	16,974,037	17,294,867	*320,830*	*1.86*
Net income	$4,511,141	$1,925,206	2,585,935	134.32
Operating ratio (per cent)	77 34	80.08	*2.74*	*3.43*
Ratio: net income to operating revenue (per cent)	5.85	2.44	3.41	139.75

Note—*Italics* denote decrease.

TABLE IV—COMBINED STATEMENT OF OPERATING EXPENSES OF 225 URBAN AND INTERURBAN RAILWAYS FOR 1922 COMPARED WITH 1921

	1922	1921	Increase	Per Cent Increase
Way and structure	$48,888,542	$50,492,228	*$1,603,686*	*3.18*
Equipment	40,668,430	44,836,816	*4,168,386*	*9.30*
Power	51,574,563	52,161,245	*586,682*	*1.13*
Conducting transportation..	143,220,630	153,981,163	*10,760,533*	*6.99*
Traffic	1,131,400	1,009,636	121,764	12.06
General and miscellaneous..	46,269,268	46,580,538	*311,270*	*0.67*
Transportation for investment credit	*178,132*	*76,256*	101,876	133.60
Total operating expenses	*$337,419,485	†$354,737,813	*$17,318,328*	*4.88*

* Includes $5,844,784 miscellaneous expense and undistributed depreciation.
† Includes $5,752,443 miscellaneous expense and undistributed depreciation.
Note—*Italics* denote decrease.

TABLE V—COMBINED INCOME STATEMENT ON A CAR-MILE BASIS (IN CENTS) OF 121 URBAN, 104 INTERURBAN AND THE COMBINED TOTAL OF 225 URBAN AND INTERURBAN RAILWAYS FOR 1922 COMPARED WITH 1921

	121 Urban Railways			104 Interurban Railways			225 Urban & Interurban Railways		
	1922	1921	Per Cent Increase	1922	1921	Per Cent Increase	1922	1921	Per Cent Increase
Railway operating revenue	45.7	46.1	*0.9*	45.1	47.2	*4.5*	45.5	46.6	*2.4*
Railway operating expenses	32.8	34.4	*4.7*	34.9	37.8	*7.7*	33.0	35.2	*6.3*
Net operating revenue	12.9	11.7	10.3	10.2	9.4	8.5	12.5	11.4	9.7
Net revenue auxiliary operations	1.7	1.5	13.3	3.8	3.5	8.6	2.0	1.8	11.1
Taxes	3.4	3.2	6.3	3.0	3.0	....	3.3	3.2	3.1
Operating income	11.2	10.0	12.0	11.0	9.9	11.1	11.2	10.0	12.0
Non-operating income	0.8	0.7	14.3	1.5	1.6	*6.3*	0.9	0.8	12.5
Gross income	12.0	10.7	12.2	12.5	11.5	8.7	12.1	10.8	12.0
Income deductions	8.2	8.2	....	9.9	10.3	*3.9*	8.4	8.6	*2.3*
Net income	3.8	2.5	52.0	2.6	1.2	116.7	3.7	2.2	68.2

Note—*Italics* denote decrease.

TABLE VI—COMBINED STATEMENT OF OPERATING EXPENSES OF 121 URBAN RAILWAYS FOR 1922 COMPARED WITH 1921

	1922	1921	Increase	Per Cent Increase
Way and structures	$38,538,528	$39,478,562	*$940,034*	*2.38*
Equipment	33,681,548	37,081,258	*3,399,710*	*9.17*
Power	40,769,134	41,089,374	*320,240*	*0.78*
Conducting transportation..	122,005,545	131,017,097	*9,011,552*	*6.88*
Traffic	636,656	531,214	105,442	19.85
General and miscellaneous..	36,560,251	36,857,759	*297,508*	*0.81*
Transportation for investment credit	*132,880*	*48,230*	84,650	175.51
Total operating expenses	*$277,774,741	†$291,631,472	*$13,856,731*	*4.75*

* Includes $5,715,959 miscellaneous expense and undistributed depreciation.
† Includes $5,624,438 miscellaneous expense and undistributed depreciation.
Note—*Italics* denote decrease.

TABLE VII—COMBINED STATEMENT OF OPERATING EXPENSES OF 104 INTERURBAN RAILWAYS FOR 1922 COMPARED WITH 1921

	1922	1921	Increase	Per Cent Increase
Way and structures	$10,350,014	$11,013,666	*$663,652*	*6.03*
Equipment	6,986,882	7,755,558	*768,676*	*9.92*
Power	10,805,429	11,071,871	*266,442*	*2.41*
Conducting transportation..	21,215,085	22,964,066	*1,748,981*	*7.62*
Traffic	494,744	478,422	16,322	3.41
General and miscellaneous..	9,709,017	9,722,779	*13,762*	*0.15*
Transportation for investment credit	*45,252*	*28,026*	17,226	61.40
Total operating expenses..	*$59,644,744	†$63,106,341	*3,461,597*	*5.49*

* Includes $128,825 miscellaneous expense and undistributed depreciation.
† Includes $128,005 miscellaneous expense and undistributed depreciation.
Note—*Italics* denote decrease.

TABLE VIII—COMBINED STATEMENT OF OPERATING EXPENSES ON A CAR-MILE BASIS (IN CENTS) OF 121 URBAN, 104 INTERURBAN AND A COMBINED TOTAL OF 225 URBAN AND INTERURBAN ELECTRIC RAILWAYS FOR THE CALENDAR YEAR 1922 COMPARED WITH THE CALENDAR YEAR 1921

	121 Urban Railways			104 Interurban Railways			225 Urban & Interurban Railways		
	1922	1921	Per Cent Increase	1922	1921	Per Cent Increase	1922	1921	Per Cent Increase
Way and structures	4.6	4.6	....	6.0	6.6	*9.0*	4.9	5.0	*2.0*
Equipment	4.0	4.4	*9.0*	4.1	4.7	*12.8*	3.9	4.4	*11.4*
Power	4.8	4.8	....	6.3	6.6	*4.5*	5.0	5.2	*3.9*
Conducting transportation	14.3	15.4	*7.1*	12.4	13.7	*9.5*	14.0	15.3	*8.5*
Traffic	0.08	0.06	33.3	0.3	0.3	....	0.1	0.1	....
General and miscellaneous	4.3	4.4	*2.3*	5.7	5.8	*1.7*	4.5	4.6	*2.2*
Transportation for investment credit	*0.02*	*0.006*	233.3	0.3	0.02	50.0	0.02	0.008	150.0
Total operating expenses	*32.8	†34.4	*4.7*	(a)34.9	(b)37.8	7.7	(c)33.0	(d)35.2	*6.3*

Note—*Italics* denote decrease.
* Includes 0.7 cent miscellaneous expense and undistributed depreciation.
† Includes 0.7 cent miscellaneous expense and undistributed depreciation.
(a) Includes 0.08 cent miscellaneous expense and undistributed depreciation.
(b) Includes 0.08 cent miscellaneous expense and undistributed depreciation.
(c) Includes 0.6 cent miscellaneous expense and undistributed depreciation.
(d) Includes 0.6 cent miscellaneous expense and undistributed depreciation.

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TABLE IX—COMBINED STATEMENT OF TRAFFIC STATISTICS OF 121 URBAN, 104 INTERURBAN AND THE COMBINED TOTAL OF 225 URBAN AND INTERURBAN RAILWAYS FOR YEAR 1922 COMPARED WITH 1921

	121 Urban Railways			104 Interurban Railways			225 Interurban and Urban Railways		
	1922	1921	Per Cent Increase	1922	1921	Per Cent Increase	1922	1921	Per Cent Increase
Car-miles (revenue)	$845,734,745	$847,592,698	*0.22*	$171,178,091	$166,655,977	2.71	$1,016,912,836	$1,014,248,675	0.3
Car-hours (revenue) (*a*)	$87,859,148	$88,183,278	*0.37*	$12,312,871	$11,975,022	2.82	$100,172,019	$100,158,300	0.013
Total passengers (*b*)	7,141,465,488	7,115,513,825	0.36	664,830,692	662,025,859	0.42	7,806,296,180	7,777,539,684	0.37
Revenue passengers (*c*)	5,594,228,682	5,589,527,249	0.08	582,097,091	583,373,097	*0.22*	6,176,325,773	6,172,900,346	0.05
Transfer passengers	1,484,724,216	1,456,458,387	1.94	76,311,362	71,800,780	6.28	1,561,035,578	1,528,259,167	2.14
Miles of single track	13,678.9	13,667.8	0.08	7,804.7	7,697.6	1.39	21,483.6	21,365.4	0.55
Cars operated (*e*)	20,841	20,381	2.26	1,301	1,286	1.16	22,142	21,667	2.65
Passenger revenue	$377,438,473	$379,870,548	*0.64*	$64,278,476	$64,490,371	*0.33*	$441,716,949	$444,360,919	*0.69*

Note—Italics denote decrease.
(*a*) Car-hours were reported by one hundred and eighteen urban companies and eighty-two interurban companies, making a total of two hundred companies.
(*b*) Two interurban companies did not report total passengers carried.
(*c*) Two interurban companies did not report revenue passengers carried.
(*e*) Cars operated were reported by one hundred and four urban companies and seventy-four interurban companies, making a total of one hundred and seventy-eight companies.

These are the outstanding features of the year's returns. The increase in the net income amounted in actual money to $14,385,262, a most hopeful sign.

The number of passengers carried in 1922 was greater by nearly 30,000,000 than in 1921. The first half of the year the electric railways sustained heavy losses. The second half of the year found the trend in the other direction and each succeeding month showed an increased gain in the number of passengers carried. These gains more than offset the earlier losses so that the year as a whole registered a slight improvement over 1921. Thus, the actual conditions are more favorable than these figures would seem to indicate.

Although the number of passengers carried increased slightly as set forth above the receipts from railway operations fell off slightly more than 1 per cent. This was brought about by reductions in fares in 1922. For the most part these fare reductions took the form of lower rates for the frequent rider who purchases reduced rate tickets. For the whole group of 225 companies the average fare per passenger dropped from 7.2 cents in 1921 to 7.1 cents in 1922. For the city lines alone, it fell from 6.8 cents to 6.7 cents and for the interurbans it remained constant at 11 cents. As Mr. Murphy sees it this indicates very clearly that the industry is not yet in a position where it can afford to reduce its fares. Under present conditions a very small reduction in fares is immediately reflected in lower revenues.

The total operating expenses for the whole group fell from $354,738,718 in 1921 to $337,419,485 in 1922, a decrease of $17,319,233, or 4.88 per cent. The city lines showed a decrease of 4.75 per cent and the interurban 5.49 per cent. This, of course, is the main reason for the improved condition of the electric railways. Conducting transportation, which is made up principally of trainmen's wages, decreased 7 per cent, representing a saving of $10,760,533.

Mr. Murphy says it would seem that the industry will have to look to increased traffic to further improve its position in 1923 rather than to a continued decline in the cost of operation.

Earnings Statement Presented at Buffalo Meeting

Thomas E. Mitten was re-elected chairman of the board of directors of the International Railway, Buffalo, at the annual meeting of stockholders. The entire capital stock of the company, consisting of 167,075 shares, was voted supporting the work of Mitten Management, Inc., during the strike of 1922 and for its continuance in conformity with its contract covering the operation of the local and interurban lines of the International.

Coleman J. Joyce, was re-elected vice-chairman and counsel. Other officers elected were: Herbert G. Tulley, president; Thomas Penney, general counsel; R. Harland Horton, vice-president in charge of traffic; H. L. Mack, vice-president in charge of engineering; F. T. Nelson, comptroller; C. A. Webber, secretary-treasurer and C. A. Chavel, auditor. Those on the executive committee are Messrs. Mitten, Joyce and Tulley.

The following directors were elected: Thomas E. Mitten, Dr. Henry C. Buswell, John J. Clawson, Walter P. Cooke, W. C. Dunbar, Coleman J. Joyce, R. Harland Horton, Charles R. Huntley, H. L. Mack, Thomas Penney, Harry T. Ramsdell, Nelson Robinson, Carlton M. Smith, Herbert G. Tulley, C. A. Weber, Harry Yates and Henry C. Zeller.

Passenger revenue for the six months ended Dec. 31, 1922, was $1,995,733 and for the year ended June 30, 1922, was $10,248,361. The cost of conducting transportation in the last six months of the year (during the period of the strike) was nearly two-thirds as much as for the previous full year.

Conducting transportation cost $2,085,-433 in the six strike months, as compared with $3,440,020 in the previous full year. Gross operating income for the full year ending June 30, 1922, was $1,596,604 as compared with an operating deficit of $3,396,226 in the six months beginning with July 1, 1922, the day the strike started. After payment of all charges, including interest, rentals, taxes, etc., the company had a net income of $284,893 in the full year ending with June 30, 1922, but the six months' operation during the strike resulted in a net deficit of $4,107,514. The balance sheets lists this "unamortized strike suspense" of $4,107,514 as an asset. Other items are $44,000,-

TABLE X—SOME SIGNIFICANT RATIOS DERIVED FROM THE FIGURES SHOWN IN TABLES I TO IX.

	121 Urban Railways			104 Interurban Railways			225 Urban and Interurban Railways		
	1922	1921	Per Cent Increase	1922	1921	Per Cent Increase	1922	1921	Per Cent Increase
Railway operating revenue	$387,244,748	$390,739,415	*0.90*	$77,120,462	$78,808,609	*2.15*	$464,365,210	$469,548,024	*1.10*
Per mile of single track	28,310	28,588	*0.97*	9,881	10,238	*3.49*	21,614	21,977	*1.66*
Passenger revenue	$377,438,473	$379,870,548	*0.64*	$64,278,476	$64,490,371	*0.33*	$441,716,949	$444,360,919	*0.59*
Per revenue passenger, cents	6.7	6.8	1.47	(*e*) 11.0	(*e*) 11.0	....	7.1	7.2	*1.39*
Per total passengers, cents	5.3	5.3	....	(*e*) 9.6	(*e*) 9.7	*1.04*	5.6	5.7	*1.75*
Per mile of single track	$27,593	$27,793	*0.72*	$8,236	$8,378	*1.69*	$20,561	$20,798	*1.14*
Per car-mile, cents	44.6	44.8	*0.45*	37.6	38.6	*2.59*	43.4	44.0	*1.36*
Per car operated	(*a*) $16,587	(*a*) $17,046	*2.69*	(*f*) $24,759	(*f*) $24,134	2.60	(*m*) $17,068	(*m*) $17,467	*2.28*
Per car-hour	(*b*) $4.10	(*b*) $4.10	....	(*g*) $4.49	(*g*) $4.55	*1.32*	(*k*) $4.14	(*k*) $4.16	*0.48*
Revenue passengers	5,594,228,682	5,589,527,249	0.08	(*e*) 582,097,091	(*e*) 583,373,097	*0.22*	(*l*) 6,176,325,773	(*l*) 6,172,900,346	0.05
Per mile of single track	408,968	408,955	....	(*e*) 75,140	(*e*) 76,361	*1.59*	(*l*) 288,267	(*l*) 289,706	*0.50*
Per car-mile	6.6	6.6	....	(*e*) 3.4	(*e*) 3.5	*2.86*	(*l*) 5.2	(*l*) 5.2	....
Per car operated	(*a*) 245,163	(*a*) 249,705	*1.82*	(*h*) 178,358	(*h*) 187,173	*4.72*	(*m*) 241,275	(*m*) 246,032	*1.94*
Per car-hour	(*b*) 60	(*b*) 60	....	(*p*) 44	(*p*) 45	*2.23*	(*n*) 58	(*n*) 58	....
Total passengers	7,141,465,488	7,115,513,825	0.36	(*e*) 664,830,692	(*e*) 662,025,859	0.42	(*l*) 7,806,296,180	(*l*) 7,777,539,684	0.37
Per mile of single track	522,078	520,604	0.28	(*e*) 85,820	(*e*) 86,663	*0.98*	(*l*) 364,343	(*l*) 365,014	*0.19*
Per car-mile	8.4	8.4	....	(*e*) 3.9	(*e*) 4.0	*2.50*	(*l*) 6.6	(*l*) 6.6	....
Ratio: Transfer passengers to revenue passengers, per cent	26.5	26.0	1.92	13.1	12.3	6.51	25.2	24.8	1.61
Car-miles	845,734,745	847,592,698	*0.22*	171,178,091	166,655,977	2.71	1,016,912,836	1,014,248,675	0.30
Per mile of single track	61.828	76.014	*0.30*	21,933	21,650	1.30	47,335	47,472	*0.29*
Per car operated	(*a*) 37,233	(*a*) 38,085	*2.24*	(*f*) 62,175	(*f*) 61,824	0.6	(*m*) 38,699	(*m*) 39,494	*2.01*
Per car-hour	(*b*) 9.2	(*b*) 9.2	....	(*g*) 11.6	(*g*) 11.6	....	(*k*) 9.5	(*k*) 9.5	....
Car-hours	(*b*) 87,859,148	(*b*) 88,183,278	*0.37*	(*g*) 12,312,871	(*g*) 11,975,022	2.82	(*k*) 100,172,019	(*k*) 100,158,300	0.013
Per car operated	(*c*) 4,128	(*c*) 4,213	*2.03*	(*i*) 4,948	(*i*) 4,956	*0.16*	(*o*) 4,169	(*o*) 4,250	*1.88*

Note—Italics denote decrease.
(*a*) 104 companies. (*b*) 118 companies. (*c*) 101 companies. (*e*) 102 companies. (*f*) 74 companies. (*g*) 82 companies. (*h*) 72 companies. (*i*) 52 companies. (*j*) 181 companies. (*k*) 200 companies. (*l*) 223 companies. (*m*) 178 companies. (*n*) 195 companies. (*o*) 153 companies. (*p*) 77 companies.

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000 valuation of road and equipment and $754,000 cash. The total assets are $51,913,854.

Liabilities include $16,707,500, par value, of capital stock; $26,841,782 in funded debt; $2,672,000 in notes issued on account of strike. Other items totaling about $4,000,000 are accounts payable and reserved for depreciation and accidents and damage. The surplus is declared to be $866,625.

Taxation of Gross Receipts Upheld

Constitutionality of the 1919 law for taxation of gross receipts of street railway, traction, gas, electric light, heat and power corporations has been upheld by the Court of Errors and Appeals at Trenton. The decision was rendered in an appeal of the Salem & Pennsgrove Traction Company. The court ruled the additional franchise tax imposed by the 1919 law is in the nature of a license tax and not a levy upon property. The State Board of Taxes and Assessments levied a tax of $4,806 on gross receipts of $139,727 for 1920.

Auction Sales in New York.—At the public auction rooms in New York there were no sales of electric railway securities this week.

Preferred Stock Being Offered. — Pynchon & Company, New York, N. Y., are offering 10,000 shares of the cumulative preferred stock, class "A," of the General Gas & Electric Corporation. The price is $100 per share and accrued dividend, yielding 8 per cent.

Preferred Stock Offered.—John Nickerson & Company and Eastman, Dillon & Company, New York, are offering 12,000 shares of the Metropolitan Edison Company's cumulative participating preferred stock. The price is $98 per share and accrued interest to yield about 7.14 per cent.

Notes of Interurban Offered.—Halsey, Stuart & Company and the National City Company, New York, N. Y., are offering for subscription at 100 and interest $1,000,000 of three-year 6½ per cent secured sinking fund gold notes, Series C, of the Chicago, North Shore & Milwaukee Railroad, Highwood, Ill.

Large Increase in Net Income.—For the eight months ending Feb. 28, 1923, the Brooklyn (N.Y.) City Railroad reports a passenger revenue of $7,665,354 against $7,412,175 for the eight months ending Feb. 28, 1922. The net corporate income was $1,318,667 against $950,051 for the eight months ending February, 1922.

Merger Effected.—The merger and consolidation of the Northwestern Pennsylvania Railway, the Northwestern Connecting Railway, the Crawford County Railways and the Peoples Incandescent Light Company into and with the Northwestern Electric Service Company of Pennsylvania has become effective.

Approves Issue.—The Massachusetts Department of Public Utilities has approved the issue by the Holyoke Street Railway of $265,000 6 per cent first mortgage bonds, series C, maturing April 1, 1935. The issue is for the purpose of refunding a like amount of 5 per cent debentures maturing April 1, 1923.

Initial Common Stock Dividend Declared.—The American Water Works & Electric Company, Pittsburgh, Pa., has declared an initial dividend of 1 per cent on the 6 per cent participating preferred stock and the regular quarterly dividend of 1¾ per cent on the 7 per cent cumulative first preferred, both payable May 15 to stock of record May 1.

Gold Bonds Offered.—Halsey, Stuart & Company, New York, The Union Trust Company, Pittsburgh, and W. A. Harriman & Company, New York, are offering $6,000,000 of the first mortgage 5 per cent gold bonds, Series E of the West Penn Power Company. The bonds, due March 1, 1963, are offered at 90 and accrued interest.

Net Income Shows Loss.—The Eastern Massachusetts Street Railway, Boston, Mass., for the two months ended February, 1923, reports revenue and income of $1,868,108 against $1,739,050 for the same period in 1922. The net income was $184,095 for the two months ended February, 1923, and $229,223 for the two months ended February, 1922.

Holders of Chicago Railways Certificates Protest. — Holders of Chicago (Ill.) Railways Series 1 certificates have called a meeting of protest for March 26. They claim that it was agreed at time certificates were distributed that when the company had accumulated a sinking fund of $250,000 certificate holders would receive dividends at the rate of $8 per certificate. There is an unpaid accumulation of $1,384,000.

Increase in Net Income.—For the two months ended Feb. 28, 1923, the Philadelphia (Pa.) Rapid Transit Company reports operating revenue of $7,042,088, against $6,586,706 for the same period in 1922. The net income was $372,219, compared with $350,876 for the two months ended February, 1922. There were 143,428,307 passengers carried in the two months of 1923, with a passenger revenue realized of $6,930,950.

B.R.T. Plan Before Commission.—The plan of reorganizing the Brooklyn Rapid Transit Company (N. Y.), was formally submitted for approval on March 23 to the Transit Commission. George McAneny, chairman of the commission, said that while the commission reserved its final judgment on all the details that required its statutory action, it had been well satisfied with the general scheme developed and with the progress made.

Net Income Increases.—Although for the eight months ending Feb. 28, 1923, the total operating expenses of the Brooklyn (N. Y.) Rapid Transit Company increased more than $1,300,000 the total operating revenues increased sufficiently to produce a net revenue from operation of $50,000 more than the net revenue for the eight months ending Feb. 28, 1922. The net income for the eight months ending Feb. 28, 1923, was $1,732,508 against $1,661,700 for the same period ending Feb. 28, 1922.

Issuance of Equipment Trusts Authorized.—Railway service in Ashland, Wis., will be improved following approval by the Railroad Commission of the application of the Lake Superior District Power Company, parent company of the Ashland Street Railway, Light & Power Company, providing for the issuance of $65,000 equipment trust certificates for the purpose of securing nine cars costing $85,050, $20,050 of which is to be paid in cash.

Gold Bonds Offered.—A syndicate headed by Tucker, Anthony & Company, New York, N. Y., is offering at 99½ and interest to yield more than 6.50 per cent $7,000,000 of first mortgage and refunding lien sinking fund 6½ per cent gold bonds of the Consolidated Power & Light Company. The bonds are dated March 1, 1923, and are due March 1, 1943. The Consolidated Power & Light Company and its subsidiaries will own and operate without competition the gas and electric railway business in Lynchburg besides the electric light and power business in Huntington, W. Va., and Lynchburg and a substantial part of the electric power and light business in Roanoke, Va.

Change Proposed in Financial Structure.—An offering of $6,000,000 convertible 6½ per cent gold debenture bonds of the Standard Gas & Electric Company, Chicago, Ill., due 1933, is being made by H. M. Byllesby & Company, Janney & Company, and Hambleton & Company, at 98, to yield more than 6.75 per cent. The conversion privilege applies to the common stock at prices ranging from $33.33⅓ to $40 per share. The proceeds will be used to retire $2,072,500 face value of 7 per cent notes and to provide additional working capital. A meeting of shareholders has been called for April 3 to authorize a change in the common capital stock from shares of $50 par to shares of no par value and to increase the authorized no par common stock from 300,000 shares to 600,000.

Rochester Doing Better, but Still $160,917 Behind.—The report of Commissioner of Railways Charles R. Barnes of Rochester, N. Y., covering operation of the New York State Railways, shows a surplus of $66,556 for the quarter ended Feb. 28, 1922. The figures were presented to the Council on March 20. The total revenue for the three months was $1,338,672 and the total railway operating expense was $910,203. After all deductions had been made, including the return on investment of $289,479, there remains a surplus of $66,556. Commissioner Barnes' annual report, for the year ended July 31, showed a deficit of $94,001. This added to the deficit for the previous year of operation under service-at-cost made a total deficit of $227,999. The surplus for the quarter Aug. 1 to Nov. 1 was $524, and deducting this sum and the surplus of the last quarter from the total deficit shows a remaining deficit to date, under the service-at-cost contract, of $160,917.

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Traffic and Transportation

Accidents Analyzed

Report Submitted Shows That 32 per Cent of Milwaukee Accidents Were Intersection Collisions

That almost one-third of all traffic accidents in the city of Milwaukee during the year 1922 were intersection collisions resulting from two vehicles approaching each other at right angles at street intersections, is one of the conclusions reached in a report recently submitted to the Safety Division of the Milwaukee Association of Commerce.

The report has been prepared at the Safety Division's request from the accident records of the Milwaukee Police Department Traffic Bureau, and of the Milwaukee County Sheriff's and Coroner's records. It is based on an analysis of approximately 4,300 accidents recorded during the last two months of 1921 and the entire year 1922.

The condition of the records was such that most of the desired information was taken directly from these records. In analyzing the records forty-three different causes were assigned which when properly interpreted presented a fair picture of the status of accidents in Milwaukee.

As has already been pointed out, it was found that approximately 1,300 accidents out of a total of 4,200 or about 32 per cent were intersection collisions of two vehicles.

The next largest single group of accidents was one resulting from carelessness of pedestrians. These accidents number about 600 or about 15 per cent of the total. Of these accidents the greater number were due to carelessness, principally "jay walking" either in the middle of the block or diagonally across the street at intersections.

RATIO OF FATALITIES TO ACCIDENTS
CITY OF MILWAUKEE—1922

Cause of Accident	Number of Accidents	Fatalities	Fatalities Per 1,000 Accidents
Motor vehicle crossing tracks.	27	8	296
Speeding.....	39	4	102
Driving while intoxicated....	90	7	73
Children playing in street.....	154	8	52
Carelessness of pedestrian.....	615	16	26
Skidding.....	110	2	18
Intersection accidents.....	1,332	7	5

Of particular interest to electric railway men is Table III of the report which analyzes accidents involving street cars and trains. Here again intersection collisions constitute about a third of the total. Next in importance are accidents resulting from motor vehicles proceeding in the same direction as street cars turning to the left in front of the car. A relatively large number of accidents it is found were due to skidding and about as many were caused by vehicles driving out of parking spaces in front of approaching street cars. The practice of trying to get ahead of street cars is responsible for a number of accidents in which the moving vehicle trying to get ahead of the street car was caught between the street car and an automobile or truck parked along the side of the street.

It was found that there appears to be a relatively large number of accidents between 12 midnight and one in the morning, that there were almost none in the early morning and that they then steadily increased until the peak was reached between 5 and 6 p.m. A decrease followed until midnight. The distribution of accidents by months indicated that the peak was reached in October.

An analysis of accidents resulting in fatalities indicated that the largest specific cause was carelessness of pedestrians and the next largest was children playing in the street. The report points out that vehicle drivers were not always altogether blameless in these cases especially in the cases which occurred outside of the city, that is on suburban roads.

An analysis of accidents by age groups shows that the largest single group was that from six to eleven years of age, the next largest group was five years of age and under, and the next largest eleven to fifteen years of age. The report calls attention to the fact that the number of accidents caused by serious violations of law or traffic ordinances does not constitute a very large proportion of the total, neither was the number of accidents caused by driving while intoxicated a very large proportion of the total.

The highest number of fatalities per thousand accidents resulted from motor vehicles crossing steam road or electric railway tracks. The next highest number was due to speeding. The next number was due to driving while intoxicated, the next in order was due to children playing in the street, the next in order was carelessness of pedestrians, then skidding and finally intersection accidents.

Results of Five-Cent Fare Given —Tariff Continued

The experimental tariff introduced by the Puget Sound Light & Power Company, in the city of Bellingham, providing for twenty street car tokens for $1, a flat 5-cent token rate, has proved a failure as a revenue producer, according to a report submitted by the City Council. The report contained a table of figures showing a loss of $6,468 in revenues for a period of twelve weeks, ending March 11, 1923, in comparison with a similar period ending March 11, 1922. A slight increase in the number of passengers carried during the past twelve weeks was reported, but this gain was not sufficient to make up for the reduction in the former rate of four tokens for 25 cents. Believing that the 90-day period is possibly too short to judge the value of the decrease, the company has agreed to continue the present tariff until midnight of May 31, 1923, and the Council has voted to accept this continuance. The company pointed out that the 5-cent tariff made a 28 per cent reduction in the rate of fare, necessitating an increase of 40 per cent in passenger traffic to keep the revenues to the point where they were prior to the reduction. The increase lacked 33.12 per cent of reaching this figure.

Bill Introduced Provides for Five-Cent Fare

Representatives of the city and the International Railway, Buffalo, N. Y., have reached an agreement on a bill which will be introduced in the Legislature to permit a city-company contract for a 5-cent fare and a 1-cent transfer. Under the proposed legislation the company may be relieved of its franchise, paving and other taxes. Without such tax relief, the International would not consider the restoration of the 5-cent fare, Herbert G. Tulley, president of the International, told Mayor Frank X. Schwab and the municipal authorities.

As its language indicates, the bill is merely permissive. The city and company now cannot enter into an agreement for a 5-cent fare and a 1-cent transfer as the railroad law prohibits a charge for transfers. Neither can the company be relieved of its franchise or paving taxes without special authority from the Legislature.

If the bill is passed the city and company will enter into negotiations for a new fare agreement covering its Buffalo city lines.

Council Turns Down One-Man Car Proposition

In order to keep up service at the 6-cent rate now charged by the Duluth Street Railway it was recently proposed by the Advisory Council of Superior, Wis., that the one-man car be given a trial in that city. This proposal met with a storm of opposition on the part of the labor unions. The City Council turned down the proposition and the matter is now practically as it stood before.

In Duluth the one-man car has never been given a real tryout. Officials of the Duluth Street Railway declare that the finances of the company, in view of its present construction program and its temporary 6-cent fare, will not permit of any experiment along this line. It would mean the purchase of considerable new equipment and would probably meet with some opposition at first on the part of the public, which has never shown any great enthusiasm for the plan.

The one-man car, however, is in operation on two of the company's lines in Duluth, the Park Point and the Kenwood lines. Both lines serve thickly populated districts.

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Radial Five-Cent Fare Abolished at Bridgeport

The Connecticut Company is directed, in an order issued on March 28 by the Public Utilities Commission, to return to the flat rate system of fare collection in Bridgeport on April 1. A previous order of the commission permitting a 5-cent fare without transfer privilege is rescinded. This order established a 5-cent fare without transfer on all lines radiating from the center of the city and a 10-cent fare from the center of the city to points beyond the city limits but within the three first fare limits.

The new rate will be a cash fare of 10 cents, or metal tokens, to be sold at the rate of two for 15 cents. Free transfers will be issued.

The action of the commission follows a public hearing which was held in the Bridgeport city hall last week at which testimony was largely in favor of a 7½-cent token fare. The city has been operating under the 5-cent fare order since November 12, 1921.

The order issued at that time authorized the company to charge a flat rate of 5 cents without transfer on all lines radiating from the center of the city, and a 10-cent fare from the center and points beyond the city limits as far as the first fare limit. The order was slightly modified in May, 1922, when the 10-cent rider had the option of buying metal tokens three for a quarter.

In its order the utilities commission said:

> A careful examination and tabulation of the statistics of operating income and expenses show a great improvement over previous revenues in the city of Bridgeport, but present revenues are inadequate to pay a fair return on the fair value of the property used in the public service.

Stock Pledged for New Company

A mass meeting was recently held at Bridgeton, N. J., to ascertain whether the people of that community wanted electric railway service resumed or were satisfied with the buses. The meeting was called at short notice when it was rumored that the trolley tracks would likely be torn up to make room for an improved highway. The entire assets of the old Bridgeton & Millville Traction Company were recently purchased by a resident of Bridgeton. At the mass meeting subscriptions were secured for stock in a new company to operate the railway. Fifty-six residents pledged themselves to take stock in the new company. The Cumberland Traction Company, the new company, has taken over the Bridgeton-Millville division of the company, but buses are being operated in Bridgeton.

The Board of Public Utility Commissioners of New Jersey recently took up the matter of the Cumberland Traction Company, which is seeking a franchise to operate over the route of the old railway. It is claimed that the railway is operating without a franchise. The new company has applied to the state board for permission to issue securities to provide funds to pay for two new cars.

Will Extend One-Man Car Service.—The Charleston (S. C.) Consolidated Railway & Lighting Company has received permission from the City Council of Charleston to extend its one-man car service.

Bus Service Extended.—The Intercity Terminal Railway, North Little Rock, Ark., operating the north side buses announces an extension of bus service on the Little Rock side to Fourth and Louisiana Streets.

New Business Added.—Freight and express business has been added between Abilene, Kan., and Junction City, Kan., by the United Traction System. A freight car also is being run between Junction City and Manhattan over the interurban tracks.

Companies Effect Merger.—The Newburgh Public Service Corporation, a subsidiary of the Orange County Traction Company, has formed an alliance with the Hudson Transit Corporation. Both companies will retain their identity in providing the city of Newburgh with bus operation.

Distinguishes Cars. — The Houston (Tex.) Electric Company has designated all one-man cars by painting a red square on the front. This plan was decided upon in response to a call for suggestions from patrons and to avoid confusion. Front entrance cars were formerly green but repainted yellow. As both old and new type cars are in operation it became necessary to distinguish them.

Detroit Riders Are Customers.—For the purpose of thoroughly educating employees with the understanding that all electric railway passengers are in reality customers, heads of departments of the Detroit (Mich.) Municipal Railway have been asked by Ross Schram, assistant general manager, please to see that whenever new report sheets are printed the word "customer" is substituted for "passenger."

Seeks Polite Employees.—The New Brunswick Power Company, St. John, N. B., has placed in its cars printed cards stating: "The New Brunswick Power Company requests civility and courtesy on the part of its employees and would ask from the public specific instances where this has been deviated from." The company is endeavoring to impress upon its trainmen, especially operators of the one-man cars, the need for being polite even under the most trying circumstances.

Bus Operation Started.—The East St. Louis & Suburban Railway began the operation of two twenty-five passenger White buses in East St. Louis, Ill., on March 15. The bus operation is an experiment which will have influence in shaping the future policy of the company. The fare in the buses is the same as on the electric railway cars, a 7½-cent token or 8 cents cash within the city limits. It was announced in the Jan. 20 issue of the ELECTRIC RAILWAY JOURNAL that the company was planning the installation of the buses.

Book Reviews

Depreciation of Public Utility Properties

By Henry Earle Riggs, A.B., C.E. McGraw-Hill Book Company, New York, 1922; 211 pages.

The publication of a book on this subject is most appropriate at this time because of the important place which depreciation has in valuation of utilities. The author quotes from and analyzes the leading court decisions on depreciation, showing how there has been a gradual development of thought on this subject. He also brings out clearly his own ideas, which include the thought that while a utility is obligated to maintain its property in safe and adequate condition to render continuous service, renewals can and need be made only when due, and "an unmatured obligation to make a renewal is not a loss of value."

Shall State Regulation of Public Utilities Be Abandoned?

An examination of Governor Smith's proposal for municipal control. Issued by the Institute of American Business, New York. Thirty-three pages.

In this pamphlet the subject is considered under four heads, namely, (1) The Attack on State Regulation, (2) Shall We Turn Back the Clock? (3) Governor Smith's Proposals Analyzed, (4) The Good Faith of the State. In the first section a contrast is shown between the Governor's statements in 1919 and 1920 when he indorsed the principle of state regulation and the now famous recommendations in the 1923 message. Statements are then published from different authorities as to the failure of municipal regulation, and arguments are presented for state regulation.

Earning Power of Railroads for 1922

Compiled and edited by Floyd W. Mundy. 442 pages. Published by James H. Oliphant & Company, New York, N. Y.

This book, now in its seventeenth issue, presents important statistics and other facts relating to the earning power and to the securities of railroads, arranged in convenient form for ready reference. The statistics are given for practically all the important railroads in the United States, with a few others.

The introductory chapters explain in a general way the fundamental principles which must be applied by the investor to inform himself as to the value of the stocks or bonds of any railroad.

The tables give vital statistics regarding earnings, mileage, capitalization, tonnage, etc. They are designed to present the statistics mentioned in such a way as to permit of easy comparison between those of each railroad.

The notes give information as to dividends and such other information about the railroads' capitalization, investments, physical and financial condition, etc., as appears to be of direct interest to the investor.

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Personal Items

Dr. Hutchinson Joins Engineering Firm

Heads Department of Sanderson & Porter in Charge of Electrification Work

Dr. Cary T. Hutchinson is now associated with Sanderson & Porter, New York, and will direct the department of railroad electrification of that firm. For thirty years he has been engaged in handling railroad electrification problems. In 1891 his then firm, Sprague, Duncan & Hutchinson, built for Henry Villard, who at that early day was considering the electrification of the Chicago freight terminals, the first heavy electric locomotive constructed in this country. It is interesting that nearly a generation later he has just ended service on the commission appointed by the Illinois Central Railroad for planning the electrification of its Chicago terminals.

The Baltimore & Ohio Railroad engaged Duncan & Hutchinson as consulting engineers for the first steam railroad electrification in the United States—built through Baltimore in 1895—and a few years later they made a report to that company on the electrification of the mountain division of its road. This project is now under consideration and there are rumors that it will soon be taken up.

From 1906 to 1908 Dr. Hutchinson was engaged by the Great Northern Railway to take charge of the design and construction of the electric equipment of its road over the Cascade Mountains, the first three-phase electrification to be built in the United States. The considerations that led him to use induction motors for that heavy service were the same that, fifteen years later, influenced the engineers of the Norfolk & Western to use them.

Later the Illinois Central Railroad appointed Dr. Hutchinson a member of its electrification commission. Numerous other investigations and reports on railroad electrification have been made by Dr. Hutchinson. He was selected in 1920 to take charge of the railway electrification division of the Superpower Survey. He has also been connected, as consulting engineer, with many important hydro-electric developments. In addition to these activities, Dr. Hutchinson was, for a time, in charge of the department of electrical engineering at Johns Hopkins University.

As Sanderson & Porter see it, the improved financial condition of the railroads and the urgent need of many of the steam lines for increased facilities, which generally can best be met by electrification, make probable a great increase in the work of this kind. The new department is intended to cover all phases of electrification work.

F. W. Doolittle

New North American Vice-Presidents

Work of Messrs. Fogarty and Doolittle with Huge Holding Company Recognized by Their Advancement

Announcement has just been made of the election of James F. Fogarty and F. W. Doolittle as vice-presidents of the North American Company, New York, effective on April 1.

For the past twenty years Mr. Fogarty has been connected with the North American Company in various capacities. He entered its employ as stenographer in November, 1902. In January, 1910, he became assistant secretary of the company and in March, 1912, was elected secretary and assistant treasurer. He still retains the office of secretary. During the greater part of his long service he has been intimately in contact with the financing of the North American Company and its subsidiaries. He was born in Philadelphia on March 16, 1888. Mr. Fogarty has for several years been a director of the North American Company. He is also vice-president and director of the North American Edison Company and secretary and director of various subsidiary companies of the North American Company, among which are included the Milwaukee Electric Railway & Light Company.

J. F. Fogarty

For several years Mr. Doolittle has been intimately connected with the activities of the North American Company and its subsidiaries as a special rate and valuation engineer with his headquarters at Milwaukee, Wis. Mr. Doolittle was born in Hopkinton, Iowa, in 1883. He was graduated from Princeton University and the University of Colorado. He taught engineering at the University of Colorado and University of Wisconsin and assisted in the development of the statistical department of the Wisconsin Railroad Commission. From there he went to Springfield, Ill., where he did similar organization work for the first Illinois Public Utilities Commission.

In 1914 Mr. Doolittle became director of the Bureau of Fare Research of the American Electric Railway Association and shortly thereafter published his book on electric railway rates and service, known as "Studies in the Cost of Urban Transportation Service." Since 1916 Mr. Doolittle has been retained as consulting engineer by the North American Company and its subsidiaries and has handled investigations of new properties and rates and valuation cases for these companies before various commissions.

Messrs. Horton and Mack Made Vice-Presidents of International Railway

R. Harland Horton, for many years associated with the Philadelphia (Pa.) Rapid Transit Company, has been appointed vice-president in charge of traffic of the International Railway, Buffalo, N. Y. For some time past Mr. Horton has been assistant to the vice-president of the International. Mr. Horton has been a traffic expert with Mitten Management since 1912.

H. L. Mack, who has been with the International Railway, since 1892 in charge of track and maintenance of way, has been elected vice-president in charge of engineering, a new position with the International Railway created by Mitten Management, Inc.

Edgar J. Dickson has resigned as vice-president in charge of traffic of the International Railway, Buffalo, N. Y., according to announcement made by Herbert G. Tulley, president. Mr. Dickson had held the position for almost twelve years, having been appointed when E. G. Connette was president of the company.

Mitten Colors to Fly at Metropolitan Tracks

"Racing," says the New York *Telegram*, "is attracting any number of newcomers to the fold. Two valuable additions are getting together a stable each for campaigning over metropolitan tracks this summer. Joseph B. Choate, Boston banker, has asked for registration of colors and will hope to

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see one or more of his newly acquired thoroughbreds land. in the charmed circle. Thomas E. Mitten, Philadelphia traction magnate, is also in the fie'd."

Mr. Sparks Goes to Chicago

Ralph M. Sparks became vice-president of the Yellow Coach Manufacturing Company, Chicago, Ill., on April 1 in charge of the public utility division of that company. Mr. Sparks, a native of Muncie, Ind., received his education in the local high school and at Purdue University. In 1910 he became special assistant to President P. F. Sullivan of the Bay State Street Railway. During his nine years with the railway, he filled many positions, being successively general passenger agent, assistant to the general manager, assistant to the first vice-president and transportation manager in charge of operations. In 1919 Mr. Sparks organized a company for the distribution of Willys-Knight cars in Worcester, Mass., and Worcester County. Mr. Sparks, two years later was the prime mover in the organization of the public utility division of the Republic Motor Truck Company at Alma, Mich. In this position, he developed and introduced the Republic Knight motored bus. Fifty-two of these buses were installed in eight cities, namely, Baltimore, Boston, Providence, New Haven, Newark, Youngstown, San Diego and Detroit.

Employee New Director on P. R. T. Board

Ralph R. Nyman, a motorman in the employ of the Philadelphia (Pa.) Rapid Transit Company, on March 21 was elected a member of the board of directors of the company. Mr. Nyman is president of both the Co-operative Welfare Association, the organization of the P. R. T. employees which represents the men in their dealings with the company, and also the Wage Dividend Fund, which represents the men in the profit-sharing plan operated by the company. Mr. Nyman was one of the three new directors elected by the stockholders at the annual meeting. He succeeded John McElroy, the first employee elected to the directorate, who is compelled to step out of the board through promotion to foreman, which ranks him as an official and no longer as an employee. Mr. Nyman was born in Boonesboro, Md., down in the Blue Ridge Mountains. He started out in street railroading in Baltimore, where he worked for five years as a motorman. He then went to Philadelphia. He has been a committeeman from the Belmont carhouse for seven years, being known as "No. 1 committeeman," the one receiving the highest number of votes of the men in the carhouse. Mr. Nyman is a bachelor.

Frank Titus has succeeded M. T. O'Connell as engineer of power stations of the Capital Car Line, Bismarck, N. D., a 1.5-mile line owned and operated by the State.

L. H. Palmer Becomes General Manager

Well Known Baltimore Official Promoted to Post Formerly Held by H. B. Flowers

L. H. Palmer was appointed on March 27 by the board of directors of the United Railways & Electric Company, Baltimore, to the position of general manager of that company, made vacant by the recent resignation of Herbert B. Flowers, who has become president of the New Orleans Public Service, Inc. Mr. Palmer's previous title was assistant to the president, a position which he has held since October, 1917.

Louis Hooker Palmer, through his activity in connection with the solving of various national electric railway problems and in association work, is one of the best known men in the executive and transportation side of the industry. He has a reputation for getting things done, and not only in company, but in association work, puts his whole energy into anything which he undertakes. By his tact and his spirit of helpfulness he inspires a willing co-operation in those with whom he is associated.

L. H. Palmer

Mr. Palmer was born in Chicago. His business life, however, has been spent in the East. After he was graduated from Williams College in 1902, Mr. Palmer was associated with the operating department of the Central Railroad of New Jersey for four years. He then entered the service of the Metropolitan Street Railway, New York, as a clerk in the office of Oren Root, vice-president and general manager. In April, 1908, he was appointed assistant to the general manager for the receivers of that company and a year later was made superintendent of transportation. He resigned in 1912 to join the organization of Harrison Williams. In June, 1915, he went to Baltimore to do some special work for the president of the United Railways & Electric Company, and in the following year became connected with the Eastern Pennsylvania Railways, first as general superintendent and then as general manager. He returned to the Baltimore Company in 1917, at the request of William A. House, then president of the company.

Mr. Palmer was president last year of the American Electric Railway Transportation & Traffic Association and is chairman this year of the American committee on mail pay and the special committee on co-operation with the National Safety Council, as well as a member of other association committees. He is also a director of the Maryland Public Utilities Association, formed recently; a trustee of the United Railways Building Association, vice-president of the Traffic Club of Baltimore, and vice-president and one of the organizers of the Baltimore Safety Council.

William H. Penoyer has replaced A. J. Crane as roadmaster of the Schenectady (N. Y.) Railway.

H. M. Brown has succeeded John Jacobs as vice-president of the Kaydeross Railroad Corporation, Ballston, New York.

J. M. Donington has succeeded George R. Doremus as assistant secretary of the J. G. White Company, Inc., New York, N. Y.

E. T. Jones has replaced S. W. Dill as district claim agent of the electric division of the New York Central Railroad.

A. C. Ray, formerly an assistant treasurer of the American Power & Light Company, New York, N. Y., is now treasurer.

John Nichol, vice-president of the Pine Bluff (Ark.) Company, has been chosen president of the Simmons National Bank of Pine Bluff to fill the vacancy caused by the death of Dr. Z. Orto.

William L. Sayers is continuing as general manager of the Marine Railway, operated between Manhattan Beach and Brighton Beach, N. Y. He will not longer perform the duties of secretary, this office now being taken care of by Robert J. Seekamp.

W. F. Graves, chief engineer of the Montreal (Que.) Railways, has resigned. The assistant chief engineer, R. M. Hannaford, is acting in the capacity of chief engineer.

Charles W. Wilson has succeeded W. F. Tshudy as superintendent of the Penna.-New Jersey Railway, and the New Jersey & Pennsylvania Traction Company, Trenton, N. J.

W. P. Ballard, formerly superintendent of the Visalia Electric Railway, Exeter, Calif., has been appointed Industrial agent for the Southern Pacific System in the San Joaquin Valley.

A. L. McFarland, formerly inspector of the Charlotte (N. C.) Electric Railway, has been promoted to the position of chief inspector. In this capacity he succeeds the late Robert J. Small.

Fred A. Lorentz has been appointed to the position of chief engineer of the Board of Public Utilities of the city of Los Angeles to succeed H. Z. Osborne, Jr., resigned. Mr. Lorentz has been assistant chief engineer of the board for several years. He entered the service of the board twelve years ago.

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S. P. MacFadden, secretary to the district manager of Stone & Webster, has been transferred to Port Arthur, Tex., as superintendent of the Port Arthur Light & Power Company and the Port Arthur Ice & Refrigerator Company. Mr. MacFadden relieves Joseph Bowes, who has been transferred to Beaumont, Tex., as general superintendent of the Eastern Texas Electric Company.

E. J. Seaborn, formerly assistant treasurer of the Truckee River Power Company, has been transferred to Houston as assistant treasurer of the Houston Electric Company and the Galveston-Houston Electric Railway. Mr. Seaborn has been with Stone & Webster for sixteen years and was with the Truckee River Power Company for five years. He is taking the place vacated by the transfer of H. L. Harding to Boston in the treasurer's department of Stone & Webster.

Albert E. Reynolds, who resigned in January as general manager of the United Traction Company, Albany, N. Y., to become connected with the engineering firm of Sanderson & Porter, has been made vice-president and general manager of both the Springfield (Mo.) Traction Company and the Springfield Gas & Electric Company, managed by the engineering firm. He succeeds in these positions E. C. Deal, who has become connected with the Electric Bond & Share Company, New York.

Gus W. Wagner, formerly general purchasing agent of the Detroit (Mich.) United Railway, has been placed in charge of the steam and electric railway sales division of the I. M. Jacobson & Sons Company. His offices will be located at 1011 Majestic Building, Detroit, Mich. Mr. Wagner was long connected with the Detroit railway. As a matter of fact he entered its employ as a boy in 1901 under A. H. Stanley, the present head of the London underground group. He caught on quickly and was advanced rapidly through the organization until finally he succeeded A. F. Edwards in the purchasing department when Mr. Edwards was made treasurer. Mr. Wagner's railway career was reviewed briefly in the ELECTRIC RAILWAY JOURNAL for June 10, 1922. Among the products of the Jacobson company are babbitt and bearing metals and white metal alloys.

Claude O. Weidman, general manager of the Morris County Traction Company, Morristown, N. J., has resigned. Otto G. Schultz, treasurer of the company, will in addition assume Mr. Weidman's duties. Mr. Weidman became superintendent of the company eight years ago and three years later was advanced to the position of general manager. Previous to going to Morristown he was superintendent of transportation of the Otsego & Herkimer Railroad. Mr. Charles Fields has been appointed superintendent of the company. The Morris County Traction Company operates an interurban system of more than 58 miles through a well-built-up section of New Jersey.

Mr. Hecht Chairman of the Board

R. S. Hecht, who has been succeeded as president of the New Orleans (La.) Public Service, Inc., by H. B. Flowers, will retain the chairmanship of the board of directors and continue his supervision of the financial affairs of the company. Mr. Hecht is a commanding figure in the financial and banking activities of New Orleans. It was he, very largely, who succeeded in bringing together the representatives of the holders of the various issues of securities of the New Orleans Railway & Light Company and in reconciling the conflicting interests to a workable reorganization plan. He is president of the Hibernia Bank & Trust Company, New Orleans. A portrait and a biography of Mr. Hecht were published in the ELECTRIC RAILWAY JOURNAL for Nov. 11, 1922. A. L. Kempster has been re-elected vice-president and general manager of the company.

The New Orleans *Item* said of Mr. Hecht:

> R. S. Hecht leaves the stockholders and bondholders greatly in his debt. In a sense, he achieved the impossible. A number of the policies he introduced and some of the things he did for this company were opposed by this newspaper. However, one can differ with Mr. Hecht, and oppose him, without losing personal regard for him, and even come away with increased respect for his abilities.

Obituary

J. S. Walsh

Julius S. Walsh, eighty years old, financier and retired railroad and electric railway magnate, chairman of the board of directors of the Mississippi Valley Trust Company, St. Louis, and for many years a dominant figure in the financial world of the Central West, died in St. Louis on March 21.

Mr. Walsh was born in St. Louis on Dec. 1, 1842. He was educated in the town schools, later attending St. Joseph College, Bardstown, Ky., where he received his A.B. in 1861; Columbia University, where he obtained his LL.B. in 1864, and his A.M. at St. Louis University the following year. He also received an honorary LL.D. from the latter institution in 1904.

When his father died in 1864, Mr. Walsh became administrator of his estate and succeeded him as a director of the Bank of the State of Missouri and of the Franklin Avenue, Union, Fairgrounds and the Suburban Street Railways.

About 1870, when B. Gratz Brown was ambitious to become Governor of Missouri, he removed his residence from St. Louis to Iron County and upon his election as Governor finally persuaded Mr. Walsh to succeed him as president of the Citizens' Street Railway. Mr. Walsh had built the Northern Central line in 1885, and that and other horse car lines he controlled were the forerunners of the present unified system, the United Railways. Later he became president of the St. Louis & Suburban Railway. In 1875 Mr. Walsh succeeded Mr. Dickson as president of the St. Louis Bridge Company, which built the famous Eads bridge, and remained as its head.

Later Mr. Walsh became interested in electrical development and in 1889 was elected president of the Municipal Electric Light Company. This company was later absorbed by the present Union Electric Light & Power Company, St. Louis.

He organized the Mississippi Valley Trust Company in 1890 and became its president, and in 1906 was made chairman of the board, holding that position at his death.

William Loft, for thirty-two years superintendent of lines of the Springfield (Mass) Street Railway, died in Springfield on March 22, aged seventy. He installed the first telephone system for the New England Telephone & Telegraph Company in Cambridge, which was started with thirty-two subscribers. Later he assisted in building the first trolley systems in Boston and Cambridge for the Thomson-Houston Electric Company. Later, Mr. Loft had charge of overhead construction for the car lines in Utica, N. Y., and other places, following which he went to Springfield to direct similar work there. He was then made superintendent of lines.

Philip Increase Robinson, manager of the Baton Rouge (La.) Electric Company, died on March 22. He had been a prominent figure in the railway and lighting field since 1908, when he entered the statistical department of Stone & Webster, Inc. In less than three months after joining the Stone & Webster forces he was transferred to Houghton, Mich., as assistant to the engineer. He was made assistant superintendent of the Houghton County Traction Company in 1912. Later he entered the lighting field in Houghton, Fort Madison and Dallas. It was only in February of this year that he became manager of the Baton Rouge Electric Company. Mr. Robinson was born in 1886 and made his home in Waterville, Me. He was graduated from the University of Maine in 1906 as an electrical engineer. He is survived by his wife and two children.

Major Abram J. Gifford, formerly in charge of the transportation department of the General Electric Company for many years, died on March 20 at his home in Schenectady after an operation. Major Gifford was born at Hudson, N. Y., in 1849. Prior to his entry into the electrical industry, he was in charge of the Indian agency at Fort Berthold, N. D., from 1884 to 1889, under appointment by President Chester A. Arthur. In 1891 he became connected with the Northwest Thomson-Houston Company at St. Paul, but was transferred in 1894 to the transportation department of the General Electric Company at Chicago. In 1899 he was put in charge of the transportation interests of the company and moved to Schenectady, where he resided until the time of his death. On March 1, 1920, he gave up his active duties, which were taken over by M. C. Fitzgerald, but continued on in an advisory capacity.

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Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Economic Adjustment Desirable

Report and Recommendations Presented of President's Conference on Unemployment—Mr. Hoover Pleased

The special committee on unemployment from the depression in the business cycle appointed by Secretary Hoover, as chairman of the President's Conference on Unemployment, has made public the conclusions reached after more than a year's study. The committee comprised:

Owen D. Young, president General Electric Company, as chairman; Joseph H. Defrees, formerly president U. S. Chamber of Commerce; Mary Van Kleek, Russell Sage Foundation; Matthew Woll, vice-president American Federation of Labor; Clarence M. Woolley, chairman American Radiator Company, Edward E. Hunt, secretary.

The committee was requested by Secretary Hoover to make an exhaustive investigation into the facts and causes of periodic business depression —hard times—and see if suggestions could be made for remedial steps that might be taken by the business community to avoid such interruptions to prosperity and employment.

Committee Issues Summary of Conclusions

The committee has now issued its own summary of conclusions and suggestions. This will be followed at an early date with the complete publication of the facts and much of the material collected.

The committee analyzes the various economic phenomena of the periodic business boom and sequent depression, and its conclusions are that preventative measures must lie in the better handling of business in boom times because depressions are due to over expansion, inflation, loss of efficiency, waste, and extravagance in the boom periods; that therefore the first point of attack on the problem must be more informed action by individual business men in periods of rising markets in order that excessive expansion may be prevented and the extent of the decline reduced. Stress is laid upon the necessity of better understanding of the business cycle by the business executives generally. The suggestions for control of excessive expansion embraces recommendations as to the control of credit. by individual banks, possible control of inflation by the Federal Reserve System, the control by individual business men of expansion in their own business, and the retardation in boom times of governmental and large utility building and construction.

The methods of reducing the extent of the decline lie in the building up of governmental and public utility construction in times of depression, the use of unemployment funds, and the expansion of Federal, State, and farm employment bureaus. The better control of credit against over-expansion and speculation through individual banks and the guidance of business itself by danger signals of over-expansion are fundamental.

The committee considers that before the banks, business men, and others can take constructive action in the enlightened conduct of business in this relation, there must be recruited and constantly disseminated the fundamental information on which the trends in business can be properly adjudged by each individual business man, and it strongly recommends the recruiting of enlarged and more systematic statistical information by the Department of Commerce and its wider dissemination.

The committee calls attention to the fact that the ebb and flow in demand for consumable goods is less controllable than that of construction of buildings and equipment both governmental and private; that the tendencies of boom periods is to thrust a double burden on the community of providing for increased consumable goods and at the same time undertaking the larger burdens of construction; that therefore, the construction industries are to some extent the balance wheel on the ebb and flow of boom and depression.

The committee points out the part the Federal Reserve Banks can play in restriction of speculation and at the same time in liberalizing credit in times of depression.

A questionnaire is proposed to business men, bankers, managers of public utilities, wage earners, and public organizations with a view to stimulating organized consideration and inquiry.

The report does not suggest panaceas or economic revolution, but seeks to drive home the facts that the enlargement of judgment in individual business men as to the trend of business and consequent widened vision as to approaching dangers will greatly contribute to stability, and that the necessary information upon which such judgments can be based must be systematically recruited and distributed.

British Get Indian Contract

The English Electric Company has obtained a contract for the electric equipment of the cars to be used on the Bombay suburban lines of the Great Indian Peninsula Railway. The overhead equipment will be carried out by the British Insulated & Helsby Cables, Ltd.

Westinghouse Air Brake Sees Satisfactory Prospects

The Westinghouse Air Brake Company, Wilmerding, Pa., has submitted its report on operations during 1922. After providing from earnings for federal taxes, dividends and adequate reserves, there was a net addition to surplus of $2,252,881. In consideration of the industrial and financial condition existing early in the year under review it was deemed advisable by the board to reduce the first quarterly dividend from $1.75 to $1 a share and this rate prevailed until the last quarter when the original rate, which it was felt the earnings then justified, was restored.

At a special meeting of stockholders which was held on March 2 the authorized capital stock of the company was increased from $30,000,000 to $50,000,000. The directors on the following day declared a stock dividend of 35 per cent payable April 30 to stockholders of record on March 29. In the statement to the stockholders it was stated that when the last annual report was issued the outlook for the immediate future was not encouraging due to the unsettled business conditions then prevailing, but the prospects for the current year were satisfactory. The annual meeting of the company will be held in Wilmerding on April 10.

National Association of Manufacturers

The annual conference of the National Association of Manufacturers will be held at the Waldorf-Astoria in New York on May 14, 15 and 16.

Hardwood Institute Annual Meeting

The Hardwood Manufacturers' Institute will hold its first annual convention on May 10 and 11 at the Blackstone Hotel, Chicago. The Institute was organized in June, 1922, with some seventy members. Its membership now includes more than 300 hardwood producers, and its lumber inspection force of three men has now increased to an inspection corps of twelve.

Metal, Coal and Material Prices

Metals—New York	March 27, 1923
Copper, electrolytic, cents per lb	17.187
Copper wire base, cents per lb	19.375
Lead, cents per lb	8.25
Zinc, cents per lb	7.975
Tin, Straits, cents per lb	47.50
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	6.50
Somerset mine run, Boston, net tons	3.125
Pittsburgh mine run, Pittsburgh, net tons	2.375
Franklin, Ill., screenings, Chicago, net tons	2.375
Central, Ill., screenings, Chicago, net tons	1.625
Kansas screenings, Kansas City, net tons	2.60
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft	7.50
Weatherproof wire base, N. Y., cents per lb.	19.50
Cement, Chicago net prices, without bags	$2.20
Linseed oil (5-bbl. lots), N. Y., per gal	$1.07
White lead, (100-lb. keg), N.Y., cents per lb	13.375
Turpentine, (bbl. lots), N.Y., per gal	$1.57

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Rolling Stock

Indianapolis (Ind.) Street Railway expects to spend $500,000 for new cars.

Citizens Traction Company, Oil City, Pa., has placed the order as of March 15 for six Birney cars.

Tampa (Fla.) Electric Company has ordered eight single-truck safety cars. Delivery is expected in May.

Youngstown (Ohio) Municipal Railway recently placed an order for eleven buses. By April 1 the fleet will total eighteen buses.

Ashland (Wis.) Street Railway, through the Wisconsin Railroad Commission, has been authorized to provide for the issuance of $65,000 equipment trust certificates for the purpose of securing nine cars costing $85,050.

Montreal (Que.) Tramways is about to call for tenders for the construction of fifty cars. The order will mean an expenditure of approximately $750,000. No particular type of car will be specified in calling for tenders.

Missouri-Kansas-Texas Railway has purchased from the General Motor Truck Company at its branch in Dallas a GMC Model K-20 motor bus. The bus has been placed in service between the city of Waco and Bellmead.

New York, New Haven & Hartford Railroad, New York, N. Y., has increased by five its original contract for electric locomotives recently placed with the Westinghouse Electric & Manufacturing Company. Twelve locomotives are now covered by the contract.

Boston (Mass.) Elevated Railway recently placed orders for fifty cars from the Brill Company, twenty-five from the Laconia Car Company and twenty-five from Osgood-Bradley. These 100 cars are for use on surface lines and are of the same type as the last 200 purchased. They are double-truck cars arranged for one-man operation if desired.

Pittsburgh (Pa.) Railways has placed an order for twenty additional double-truck cars. The cars are to be built by the St. Louis Car Company and equipped with Westinghouse motors and airbrakes. They were added to a recent order for fifty-five cars, making a total of seventy-five new cars to be delivered within four months beginning in June. The cars cost approximately $11,000 each.

St. Petersburg, Fla.—The city is now advertising for bids to be opened on April 2 for the following cars: Three standard, single-truck Birney type safety cars, and one standard double-truck, double-end, safety car, with one double folding door at each end of the right-hand side, arranged for one-man operation and with a seating capacity of fifty-two passengers. Specifications have been sent out to car builders.

Eastern Massachusetts Street Railway, Boston, Mass., as noted in the issue of the ELECTRIC RAILWAY JOURNAL for March 24, has placed an order with the J. G. Brill Company for fifty one-man two-man cars. These cars will be very similar to the twenty-five cars ordered about nine months ago and described in this paper. The order for motors was divided. The General Electric Company will supply motors for twenty of these and the Westinghouse Electric & Manufacturing Company will furnish thirty equipments.

Track and Roadway

Lehigh Valley Transit Company, Allentown, Pa., during 1922 rebuilt 3 miles of track and laid twenty-two blocks of paving.

Three Rivers (Que.) Traction Company, through its manager, states that the company contemplates a $75,000 extension.

Tampa (Fla.) Electric Company will spend about $300,000 in improvements during the present year. Double-tracking of various lines is planned.

Lehigh Traction Company, Hazelton, Pa., and the Wilkes-Barre & Hazelton Railway have received 7,000 and 3,000 ties respectively. These will be laid in conjunction with new rails to go down this summer.

Pacific Electric Railway, Los Angeles, Calif., is enlarging its freight storage yards in Los Angeles approximately 100 per cent and some eight freight storage sidings have been completed recently on the company's lines between Los Angeles and the harbor for more adequately handling of this growing freight business.

Salt Lake & Utah Railroad, Salt Lake City, Utah, in co-operation with the federal government will construct a siding and erect a terminal station in connection with the construction of a permanent camp for the accommodation of 5,000 summer training troops. The camp will be established at Jordan Narrows about 12 miles south of Salt Lake City.

Power Houses, Shops and Buildings

West Penn Company, Pittsburgh, Pa., through one of its subsidiary companies, recently purchased the Iron Exchange Building. The growth of the properties has made this step imperative.

Union Traction Company of Indiana, Anderson, Ind., has been manufacturing since Feb. 1 all of its own power at its Anderson plant. The company has shut down the Eaton and Winchester plants.

Louisville (Ky.) Railway, has placed contracts for repairs to its Main Street carhouse, which recently burned, and has secured a building permit for a new office and gymnasium at the Fourth Street carhouse, to cost $30,000. Contracts for rebuilding the Fourth Street property will be placed within a few days.

Trade Notes

Ohmer Fare Register Company, Dayton, Ohio, has issued a series of business lessons illustrating the weakness of any method of collecting fares that is not in harmony with correct business principles.

Cama, Norton & Company, Bombay, India, importers of electrical machinery plants, devices and appliances, are soliciting the catalogs and correspondence of general engineering firms and trade pertaining to allied industries.

Texas Company, New York, N. Y., producer of Texaco petroleum products, has been awarded the contract for the lubricating requirements for the rolling stock equipment of the United Railways & Electric Company, Baltimore, Md., for a period covering eighteen months.

Westinghouse High Voltage Insulator Company, Derry, Pa., a subsidiary of the Westinghouse Electric & Manufacturing Company, has started work at Emeryville, Calif., on the first high-voltage porcelain insulator works to be built west of the Mississippi River.

Rubber Insulated Metals Corporation, New York, N. Y., announces that about April 1 it will remove its general offices from 50 Church Street, New York City, to 18 Oliver Street, Newark, N. J. This concern manufactures the well known "Rimco" rubber-insulated pliers, screw drivers, and other tools—popularly known as "the safety tools" for linemen and high-tension work. The new location will give the Rubber Insulated Metals Corporation larger accommodations and afford the company every facility for handling a steadily increasing business.

Metal & Thermit Corporation, New York, N. Y., has appointed Charles F. Lederer as general supervisor of rail welding to assume entire charge of all technical work in the field. This appointment is made in order to organize more effectively for the greatly increasing thermit rail welding business. Mr. Lederer is well fitted for this new position. He has been connected with the rail welding department of the corporation for more than two and a half years and was formerly superintendent of way of the Milwaukee Electric Railway & Light Company.

New Advertising Literature

Walter A. Zelnicker Supply Company, St. Louis, Mo., has issued Bulletin 300, giving useful information in regard to track material and describing its products.

Kinnear Manufacturing Company, Columbus, Ohio, has issued an illustrated booklet entitled "Exposure Hazard and Window Protection," showing how the Kinnear steel rolling shutters safeguard buildings from fire. Shutters approved by the Underwriters Laboratories, Inc., are illustrated and described.

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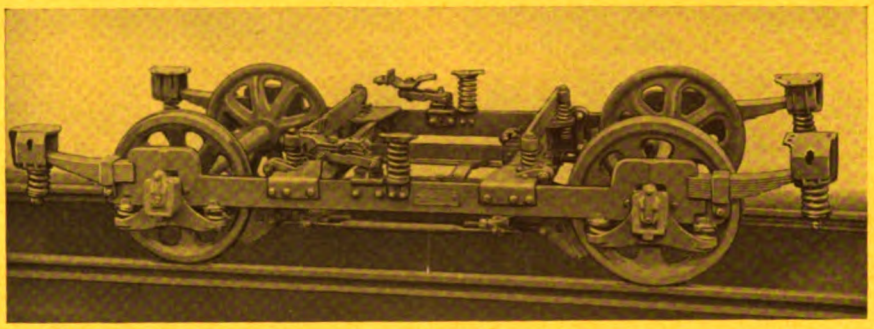
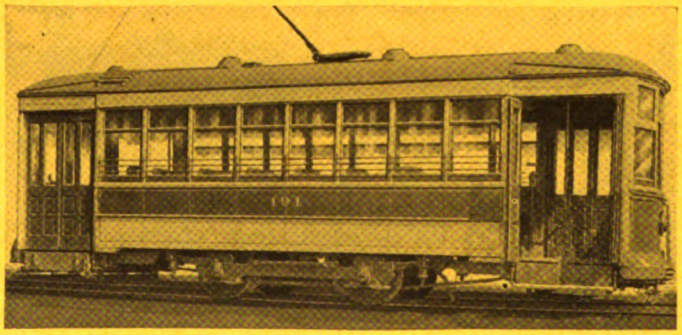
A New Type of Brill Truck



Introducing No. 79-EX Truck for the Heavier Types of Short-Length Cars

Equipped with large diameter wheels and arranged for hand-brakes, this new member of the Brill truck family will replace older types of single trucks no longer equal to the service requirements. Its longer effective spring base prevents "galloping" and results in a steadier and more comfortable riding car.



Ninety percent of the carbody weight is supported on castings swing-linked to the ends of quarter elliptic springs at the four (4) corners of the Brill No. 79-EX Truck.

Fully described in Brill Bulletin No. 268.

THE J. G. BRILL COMPANY
PHILADELPHIA, PA.

AMERICAN CAR CO. ST. LOUIS MO. — G.C. KUHLMAN CAR CO. CLEVELAND, OHIO. — WASON MANF'G CO. SPRINGFIELD, MASS.

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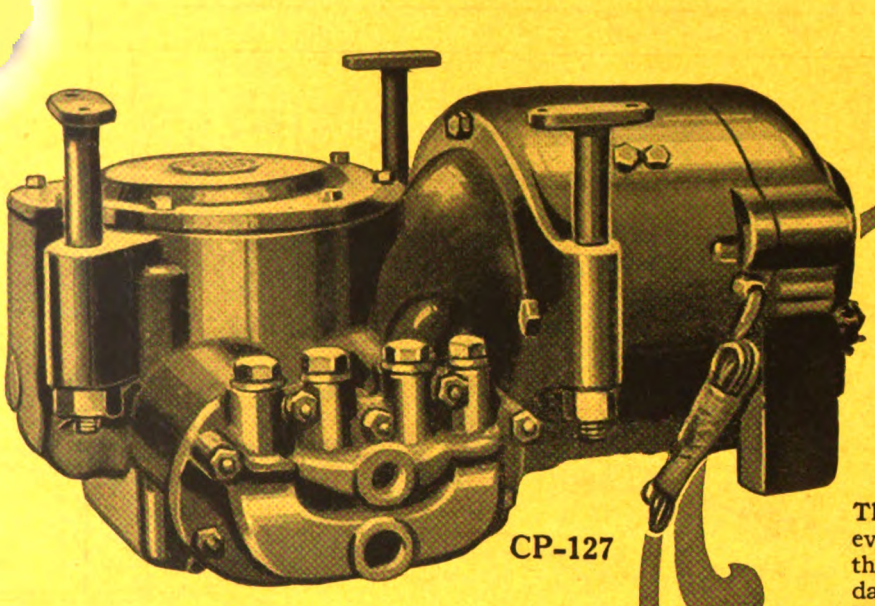
Type CP—*the Low-Maintenance Compressor*



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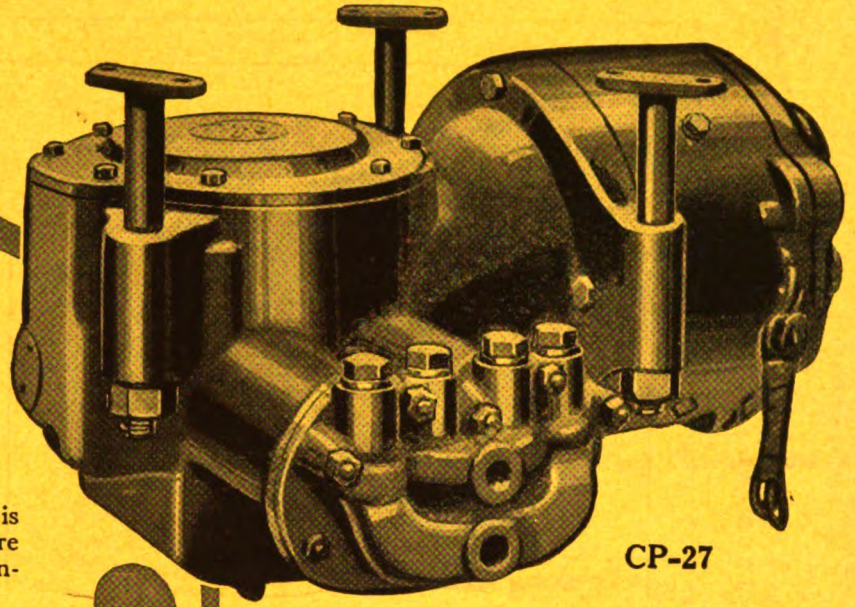

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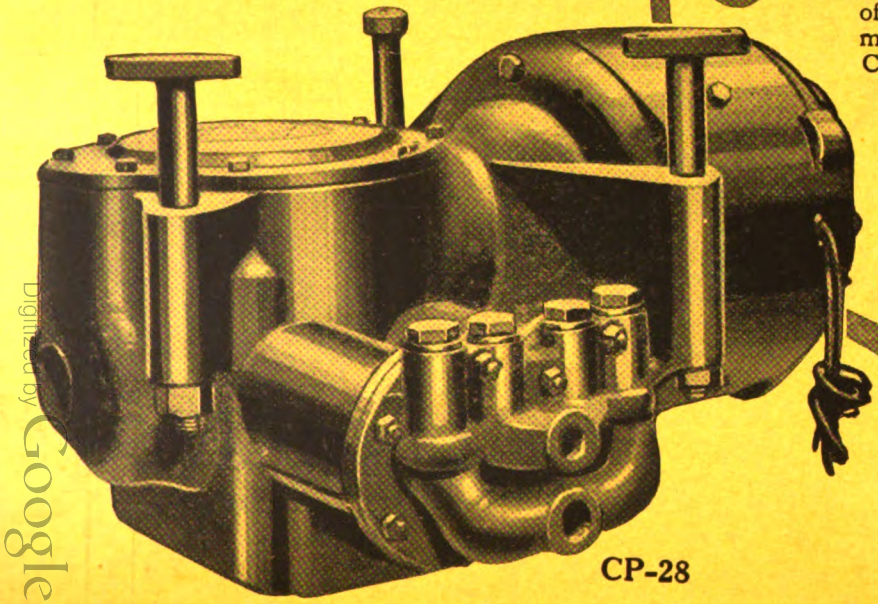

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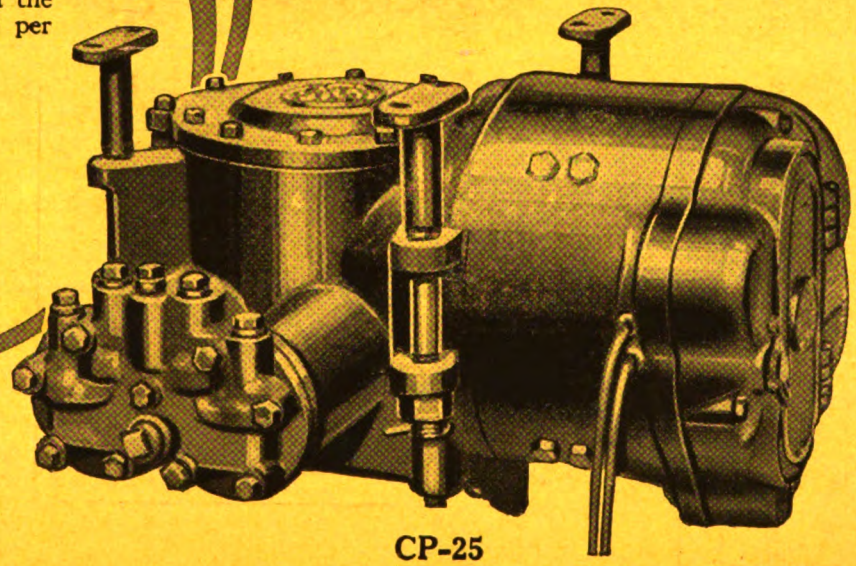

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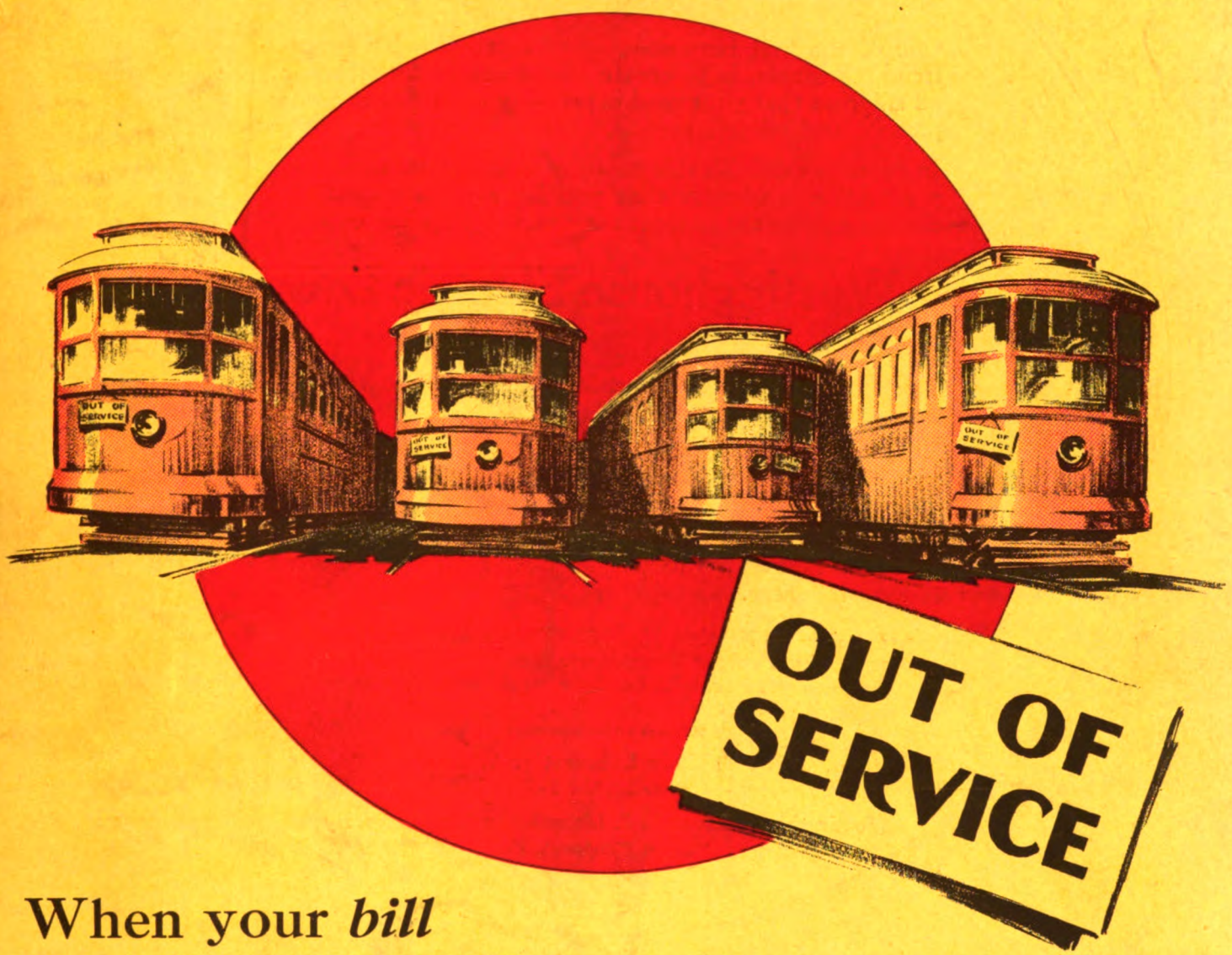

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ELECTRIC RAILWAY JOURNAL

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Company, Inc.

HENRY W. BLAKE and HARRY L. BROWN, *Editors*

Volume 61 New York, Saturday, April 7, 1923 *Number* 14

New Interurban Provides a Service Demanded

IT HAS become a more or less popular indoor sport to predict the early demise of the interurban railway. Prophets sometimes think that motor trucks and buses will entirely replace this form of transportation. It is refreshing, therefore, to read reports of recent interurban construction, such as that of the new Dallas-Terrell interurban, which is given in this week's issue of the JOURNAL. It takes courage to invest some two millions of dollars in an enterprise like this. The fact that the promoters have faith in it is shown by the solid type of construction which has been adopted throughout. Many early interurban roads had grades as high as 5 or 6 per cent, but here is a line where the maximum grade, except for a short overpass, is restricted to 2 per cent. This is almost in line with steam railroad practice. The wisdom of it undoubtedly will be seen in low operating costs. Another interesting feature is the type of light-weight car adopted, the weight being lower than is customary for many city cars. This, also, should be conducive to economy. This design of car is quite appropriate on a 30-mile line.

A question that may be raised concerns the construction of a new road paralleling an existing steam railroad. Would it not have been better, from an economic standpoint, for the steam road to put up a trolley wire, and give the kind of service which the interurban now is furnishing? Even though the traffic on the steam road were such that additional trackage would be necessary, the total cost would be less than for the construction of an independent and competing line, and the financial results would be better. This instance is rather typical of the lack of aggressiveness that has always existed on the part of the steam railroads in territories where better local service is demanded by the public.

Taxation Is a Problem of Serious Import to Utilities

IT IS a basic principle of government that it must be supported by its citizens. It is only in a state such as Monaco, with its world-famous Monte Carlo, that others can be induced to finance it. The principle of taxation is just as old as organized government itself. Taxation is either direct or indirect, depending upon whether the citizens pay directly to the government or through some collecting agency. Utility taxation is in this latter classification. So long as the public can be induced to pay, this is a fairly efficient means of collecting revenues for the support of the government. But when the government gets more than the owners of the property, it becomes a question as to whether this is the correct method of collecting taxes. For instance, in a study made of taxation in New York State, it was shown that fifty-six electric railways paid over half of their net incomes for taxes to the State of New York and to localities within the State.

State Senator Frederick M. Davenport of New York is a deep student of the problem of utility taxation. The report of his committee to the National Tax Association, abstracted in this week's issue, takes up utility taxation in its broader national aspect. The principle of basing taxes on ability to pay is entirely logical and can be questioned by few. The method proposed, consisting of a graduated tax on gross and net incomes, seems to be a satisfactory general solution of the problem. By properly adjusting the rate the burden may be made to correspond in fairness with the property tax of other taxpayers, remembering, of course, that much intangible property, and also a good deal of tangible property, escapes under the general property tax. A thorough understanding of the utility taxation problem, such as that given in Senator Davenport's analysis, will do much toward improving the relations of the utilities and the public that they serve.

Electrolysis Situation Is Clearing

READERS of this paper will appreciate the explanation of the fundamentals of stray current distribution which are given in an article by E. R. Shepard, published elsewhere in this issue. Recent researches made with the earth-current meter have made possible the statement of these fundamentals in a way which was not possible earlier; hence the present timeliness of this article. The author is qualified to state the modern concept of the subject because for many years he has been devoting his time and thought to research in this field.

Much of the misunderstanding regarding the corrosion of underground pipes, caused, or alleged to be caused, by electric railway currents, has been due to ignorance as to what actually goes on in the soil. Pipes corroded and electric railways were in the vicinity, hence, argued the owners of the pipes, the burden of proof was upon the railways to show that they did not cause the damage. This was difficult to do, and in many cases the proof was impossible because the facts were against the railways. However, the mysterious character of the return circuit made any kind of convincing proof difficult to produce.

Fortunately, the electrolysis muddle is clearing up. The American Committee on Electrolysis is proceeding systematically, although deliberately, to formulate the knowledge which is available on the subject. Electric railways are getting their return circuits into better shape so as to minimize the escape of return current. Pipe owning interests are coming to see that they have responsibility in the matter. The possibilities and

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extent of corrosion without stray current are increasingly appreciated. Investigations are constantly under way for the purpose of determining the facts, which means that ultimately the procedure to be followed in protecting buried structure will be fairly well standardized.

When the Bus Will Replace the Urban Railway

SO MUCH idle talk is getting into the newspapers these days about the coming replacement of the street railway by the motor bus that it behooves the industry to see to it that the general public is given information that is more substantial, so that it may have the basis to think for itself and not merely follow the leadership of these over-night transportation experts. We may expect the bus to replace the railway when the total cost of service is less, when it will cause less street congestion, when it will carry the people faster, when it will provide greater comfort, when it can provide more dependable service or greater safety. In how many of these requisites does the bus surpass the railway?

No one yet has demonstrated that the motor bus can be operated to supply regular all-day service for less total cost per seat furnished than the electric railway, except where traffic is light. In fact, the higher cost of one-man bus service as compared to one-man single-truck safety car service is shown in practically every bonafide statement of operating costs, in spite of the very great excess of investment necessary in the railway.

As to its value in reducing congestion, H. A. Littledale, writing in the New York *Evening Post* on New York City traffic congestion, recently attributed New York's congestion primarily to the presence of street cars. No doubt these street cars do add to congestion, but Mr. Littledale neglected to give his readers any information as to how the substitution of buses would solve this problem. While the ability of the bus to load and unload at the curb and pass traffic obstructions which delay rail service is an advantage, he failed to show that, to transport the equivalent number of passengers, each street car would have to be replaced with three single-deck buses. The principal point of traffic delay is at the street intersections. Common sense would tell any one that to multiply by three the number of vehicles necessary to carry the passengers in each direction across an intersection would greatly increase the congestion rather than ease it.

Nor is it demonstrated, after considerable experience, that buses can provide a faster service than street cars. Under equivalent traffic conditions, the street car is able to make a little faster schedule than the motor bus because with modern railway equipment, as against the modern bus, the street car can accelerate faster than the motor bus, and its free running speed is at least equivalent. It may be admitted, however, that Manhattan street cars are hardly a fair sample of modern railway equipment.

On the point of comfort, however uncomfortable a street car may be with the crowding of its space that must be tolerated, there is only one basis on which the motor bus can possibly be considered more comfortable and that is when the loading is limited to a seat for every passenger—a condition which it would be impossible to meet if the motor bus were the only means of transportation available. With the loading that must be permitted under city conditions, and with the narrower aisle and smaller dimensioning generally of the bus, this matter of greater comfort popularly attributed to the bus is largely an illusion. It has come out in several instances that where the people have at first been very enthusiastic about bus service, they have later with experience been disappointed and have turned their attention back to the street car.

There has not yet been sufficient experience to determine that the motor bus is more or less dependable than the street car, but it may be said that the motor bus will have to "go some" to equal the record commonly established by the street car. And taking into account the influence of weather conditions throughout the year, one would be safer to stake his wager of dependability on the tried and proved trolley car.

On the element of safety, it is again hard to find wherein the motor bus can possibly excel the street car, from the point of view of the passenger. Any one who has driven an automobile knows with what risk a rubber-tired vehicle is handled when pavements are wet or icy. In addition to uncertain traction, there is the hazard which the railway does not have of holes and humps in the pavement. Then there is the dangerous operation on hills, from which, it is feared, we shall have to go through a course of serious accidents before the safety of the motor bus mechanism can be considered on a par with that of the street car.

All of this is not losing sight of the fact that the bus has its place, as has been repeatedly pointed out in these columns.

The "Journal" Is an Independent Institution

INSTANCES occur, seemingly more frequent of late, in which persons not very familiar with the ELECTRIC RAILWAY JOURNAL or the American Electric Railway Association confuse them to the extent that they consider that the American Electric Railway Association publishes the ELECTRIC RAILWAY JOURNAL. Close association of the two institutions in the minds of some may not be surprising. Both were started about the same time, and as the primary purpose of both has always been to help the electric railway industry by the exchange of information, though in different ways, their relations have always been close and friendly. Nevertheless, it is distinctly to the benefit of the industry that there is such a publication as the ELECTRIC RAILWAY JOURNAL which is completely independent of the association.

One reason for this is that the detached position of the magazine gives it, if not a broader outlook at least a different one, and permits it to take a more advanced position in some directions than the association would be warranted in doing. Again, as the JOURNAL'S subscribers include many foreign roads and many persons entirely outside of the industry, as well as many railway men not members of the association, its clientele is very much larger than the association would want to include in its membership. In consequence, the strength of these outside groups is added to the forces aiding in the development of the industry. The ELECTRIC RAILWAY JOURNAL gains and the industry gains from the fact that as an enterprise the JOURNAL is quite apart from the American Electric Railway Association.

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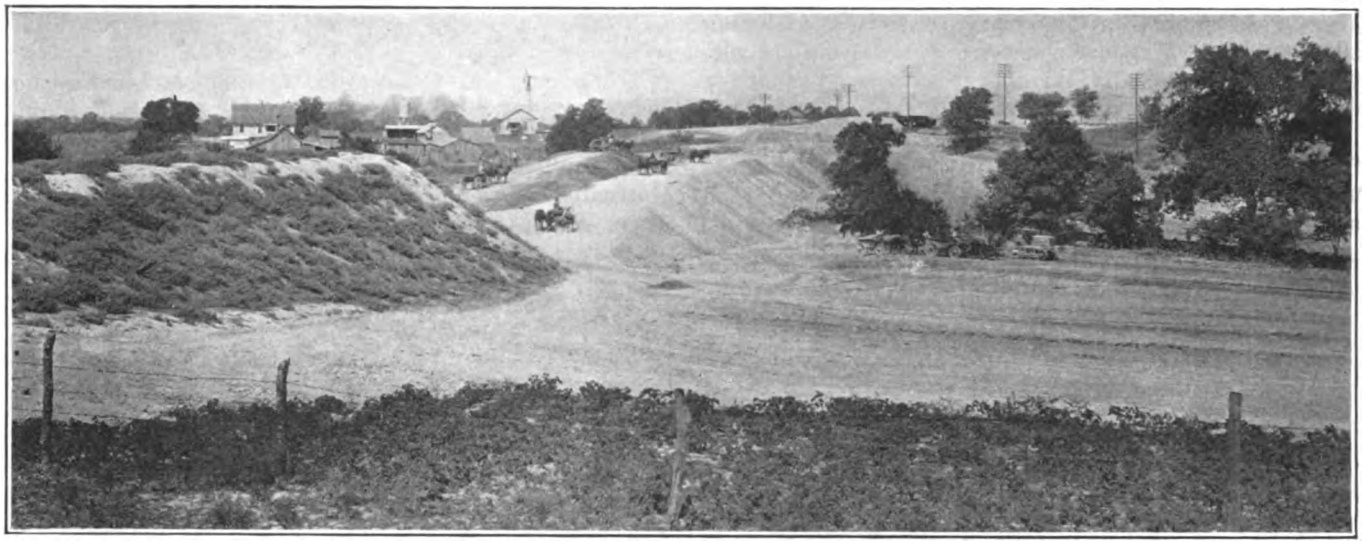
Northern Texas Has New Interurban*

Texas Interurban Railway's Dallas-Terrell Line Most Recent Example of Interurban Construction—Methods, Materials and Equipment Described—Automatic Substations and Light-Weight One-Man Cars Are Features

By Sam R. Fowler
Superintendent of Construction Texas Construction Company



Closing the Last Gap in the Roadbed Grading

DUE to various economic considerations interurban development has been dormant for several years. The Dallas-Terrell interurban line, opened on Jan. 14, is one of the few examples of recent construction. This road was projected more than ten years ago, and preliminary work was done by the Stone & Webster Engineering Corporation in 1912-1913, the writer making the preliminary surveys, final location and reports. Financial considerations in 1914 caused the temporary abandonment of the project.

In connection with the new franchise granted the Dallas Railway in 1917 by the city of Dallas, it was agreed that the owners would construct certain interurban railways, among which was this one. Although thus assured, financial arrangements were not completed until early in 1921.

The route parallels the Texas & Pacific Railroad practically all the way. It is nearly due east for 31.5 miles from Dallas to Mesquite, Forney and Terrell, with populations respectively of 1,000, 1,500 and 12,000. Including these the tributary area has an estimated average population of 1,200 per mile of line. The territory consists mainly of fertile farms in the black land belt, similar to that traversed by the four other interurban lines centering in Dallas. The original route was followed, except for necessary relocations through Mesquite, Forney and Terrell, caused by improvements in these towns.

An hourly passenger service is maintained with a running time of one hour and twenty minutes with a ten-minute layover at each terminal. Two express trains are run each way daily. At Terrell the Texas Interurban Railway has arranged close connections with the Texas Midland Railroad, a north and south steam road, so that its passenger trains use the interurban depot. Both the Texas Midland Railroad and Texas Interurban Railway sell through tickets to points on the other road at short-line rates. They also have co-operative advertisement service. The Texas Midland Railroad has accommodated its schedules to the new interurban line and soon will operate gasoline motor cars with greater frequency than is possible at present with steam equipment. Ultimate plans contemplate the electrification of the Texas Midland Railroad.

The Texas Construction Company was organized to build and equip the line, with Richard Meriwether as vice-president and general manager. B. R. Brown, chief engineer, had supervision over all designing, purchasing and construction of the line. The writer, as superintendent of construction, had charge of all construction work. W. R. Burns, assistant secretary and treasurer, handled the financial matters. B. Frank Cooke superintended the building of substations and installation of electrical equipment. H. N. Clagett and B. H. Hart were resident engineers.

A ruling grade of 2 per cent was maintained. The only variations in excess of this grade are the approaches to an overpass of a steam road and to follow the existing grades of streets traversed. This necessitated some short 3 per cent grades. The maximum degree of curvature in high-speed territory is 3 deg. In the 26 miles not included in the limits of incorporated towns there are but 116 deg. of curvature. The total curvature in the 29.3 miles constructed is 490 deg. Actual surveys of drainage areas were made where they were less than 500 acres. Talbot's formula was used for determining the size of waterways. The track outside the corporate limits of the towns served

*A brief description of this line was included in the report of its opening in the ELECTRIC RAILWAY JOURNAL for Feb. 3, 1923, page 218.

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is on private right-of-way 100 ft. wide, with additional width where required.

ROADBED GRADING AND TRESTLING

During the several months required for preparing and acquiring the right-of-way deeds, 2 miles of the grading was done by a small outfit. On Nov. 1, 1921, a general contracting firm began the grading, trestle bridging and drain pipe laying. On March 1 following, 95 per cent of the distance and 90 per cent of the roadbed was complete. In moving the 194,000 cu.yd. of excavation and 306,000 cu.yd. of borrow, nearly every kind of grading apparatus was used, including slips, fresnoes, Western wheelers, Maney wheelers, elevating graders and steam shovel with wagons and a dragline.

The minimum width of roadbed excavations was 26 ft., and slopes one and one-half to one. Embankments up to 20 ft. in height have an 18-ft. crown. For each additional 5 ft. in height the crown was made 2 ft. wider. Embankments made with wagons were carried out in 6-ft. layers. A 10-ft. embankment through bottom lands was built with a dragline shovel in three layers, each lift being thoroughly rolled with a 10-ton roller. Several heavy rains and a 6-ft. overflow have done this part of the embankment no serious damage. No material was wasted from excavation, overhaul being paid on it to adjacent embankments.

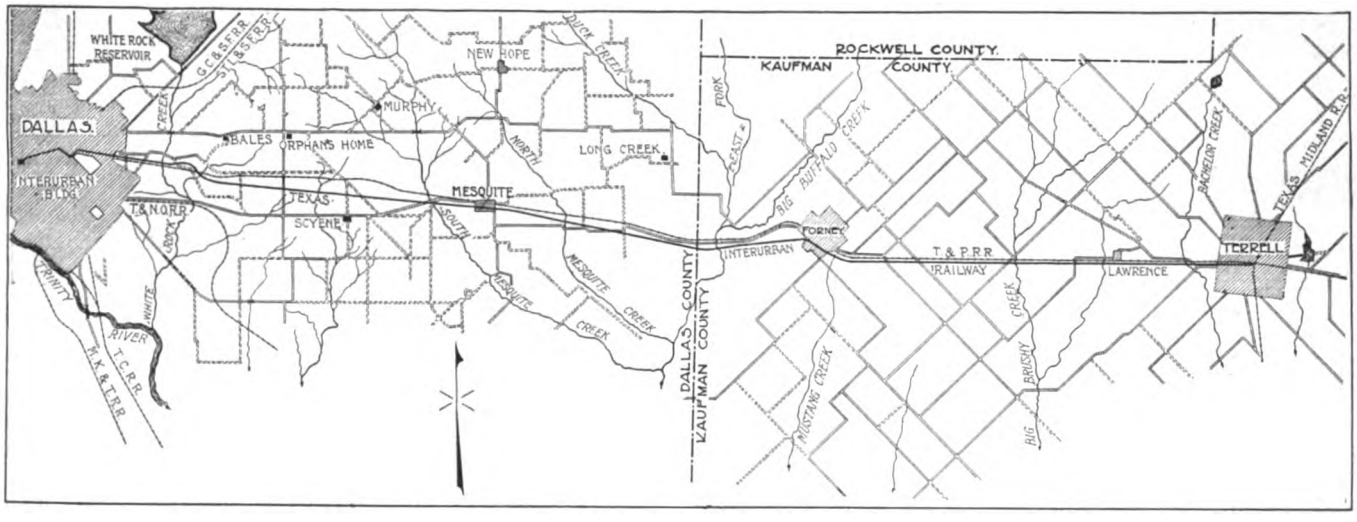
It required 2,940 lin.ft. of reinforced concrete pipe of 24 to 48 in. diameter to care for the small drainage through the roadbed. One 6-ft. x 7-ft. reinforced concrete box, 143 ft. long, was constructed. Galvanized, corrugated cast-iron pipe, 18 in. to 30 in. in diameter, was used under road crossing ramps, etc., 1,600 ft. being required.

There are 4,886 lin.ft. of trestle on the line. Bents are at 14-ft. centers having four long-leaf yellow pine piles (12-in. butts), and averaging 12-ft. penetration. The piles had 12-lb. full-cell treatment, the creosote oil being applied at about 190 deg. F. A final vacuum was applied for cleaning the surface of the piling. Where penetration could not be obtained concrete footings and 12-in. x 12-in. posts were substituted. Two-ply chords were used in the deck, and ties spaced with 16-in. centers. All decking was of untreated 90 per cent long-leaf yellow pine.

The three steel structures were designed for Cooper's E-30 loading. This construction work started on Nov. 1 and was completed in four months. The substructures contain 465 cu.yd. of reinforced concrete, and the superstructures weigh a total of 189,000 lb. One 85-ft. pony truss on reinforced concrete piers spans the east fork of the Trinity River. One span of 52-ft. through girders on reinforced concrete abutments overpasses the Dixie Highway. The railroad overpass consists of three spans. Fifty-two-feet through girders on steel pedestals and concrete footings clear the tracks and the approaches consist of 35-ft. deck girders spanning to reinforced concrete abutments.

TRACK LAYING AND BALLASTING

Trackwork started on Aug. 1, 1922, and ballasting two weeks later. The rail, of 70-lb. A.S.C.E. section, was laid with $\frac{5}{8}$-in. x 5½-in. spikes, standard four-hole 24-in. angle bars, and $\frac{3}{4}$-in. x 3$\frac{3}{4}$-in. Harvey grip bolts. Untreated white oak 6-in. x 8-in. x 8-ft. ties spaced at 24-in. centers were used. All curves were tie plated with Sellers type "G," 6-in. x 8-in. x $\frac{3}{8}$-in. anchor-bottom tie plates. The outer rail was elevated on curves for a car velocity of 35 m.p.h.



Route of New Texas Interurban Railway

In carrying out the construction work on the track and overhead, two widely different methods were used. One was to build the track first and then do the trolley work, the other to build the overhead and follow with the track laying. Steam locomotives and flat cars were used in laying 19 miles of track extending west from Terrell. The cars of rail were carried in front of the engine and the tie cars behind. Three wagons were used to haul the ties ahead. A mule on each side, with a short chain and snatch hook attached to its single-tree, dragged forward the rail as it was thrown off the cars. With a gang of thirty-five men, an average of 530 ft. per hour was laid, half tied and quarter spiked. Full tying, spiking and lining were kept within a mile of the end of the track.

The remaining portion was laid with two-car electric work trains out of Dallas. The ties were carried ahead on the flat car and the rail on the motor car. Specially-constructed work cars were built in the Dallas Railway shops for this purpose. The motorman's cab was at the center of the car and elevated 15 in. above the floor to permit stacking the steel on the car. The ties were carried ahead by hand and mules dragged the rail, as in the other instance. This method, using thirty-eight

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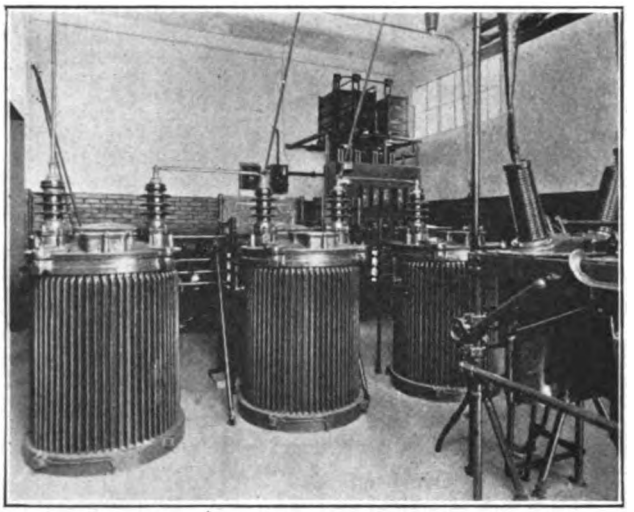

At Left, Type of Building Construction Used for Automatic Substations. At Right, Mesquite Substation Layout

men nine hours per day, averaged 1,584 ft. full tied, spiked and lined per day.

Ballast for the eastern 14 miles was hauled from Terrell by steam engines in center-dump ballast cars, averaging twelve carloads per day. The gravel ran about 60 per cent aggregate with very little clay, 1,850 cu.yd. being used per mile to make a 6-in. raise. Ballast for the remaining portion was hauled from Dallas by three electric Differential, side-dumping cars, averaging four trips each per day. This gravel ran about 50 per cent aggregate, 35 per cent sand and 15 per cent clay. The same amount of this was used for a 6-in. raise. A Doone scraper (go-devil), attached by a cable to a small street car, pulled the ballast into the center of the track.

In addition to the 29.3 miles of first main track, 1.13 miles of second main track, three sidings, three wyes and three spurs were laid. In Dallas ¾ mile of the double track is in hard surface paving, with concrete base. On private right-of-way the main-line track occupies double-track position, the pole lead being on the center line of the right-of-way.

Power for the line is furnished by three substations, one of which, located in the city of Dallas, is manually operated. The two others are automatically operated and are located 14 miles and 27 miles from Dallas. A 800,000-circ.mil feeder and No. 0000 grooved trolley are used as conductors. The substation equipment was furnished by the General Electric Company. The automatic stations are supplied with power at 22 kv. from the high-tension line of the Texas Power & Light Company serving this territory. This voltage is stepped down to 445 through three single-phase transformers and is converted into direct current by means of a 300-kw. synchronous converter.

In addition to the power transformers and converters, each station is equipped with a.c. and d.c. arresters for lightning protection, one 5-kva. control power transformer, instrument transformers and automatic switching equipment for performing the starting and stopping operations ordinarily done by the station operator in manually-operated stations. Various protective devices safeguard the station against damage by abnormal conditions or irregularities occurring on the system or within the station.

The Ohio Brass Company furnished the line material for the overhead system, which is of the catenary type with five-point suspension, supported by single poles set 7 ft. deep and spaced 150 ft., except around curves and in streets, where double-pole direct suspension is used. Pole spacing in streets was reduced to 100 ft. Lightning arresters, feed-in taps and ground taps were placed six per mile.

Long-leaf yellow pine 35-ft. poles, 7 in. to 8 in. tips, gained and roofed before being creosoted, were used in the lead. All poles were treated by the Lowry

Work Car and Trailer Used in Line and Track Construction

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Track and Overhead Construction Texas Interurban Railway

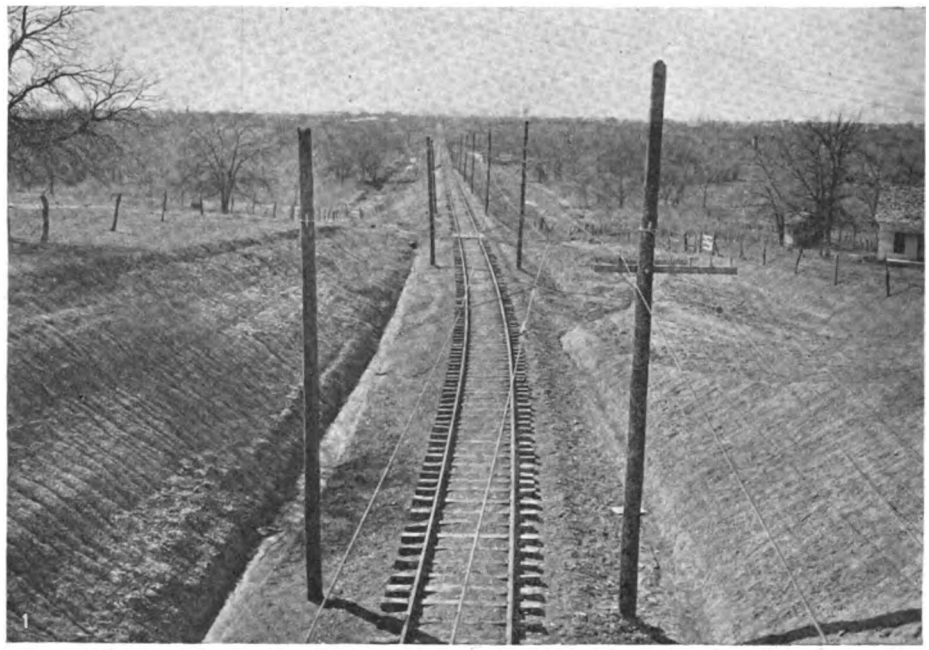
No. 1—Arrangement of catenary in passing from curved to tangent track.

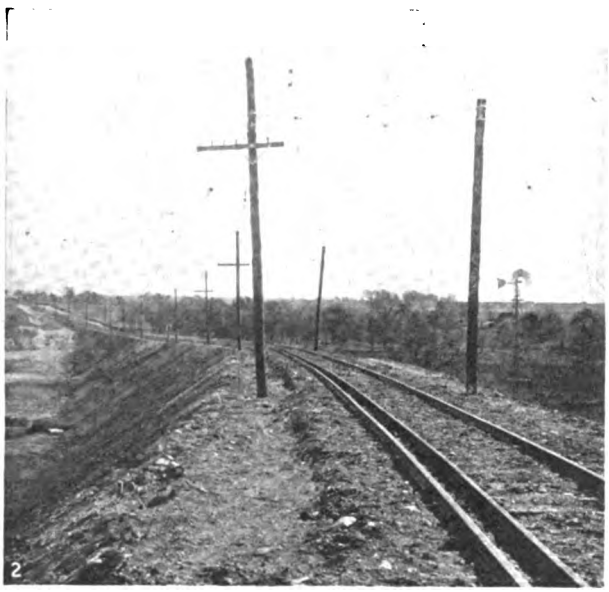
No. 2 — Typical track and trolley construction on curve showing heavy fill.

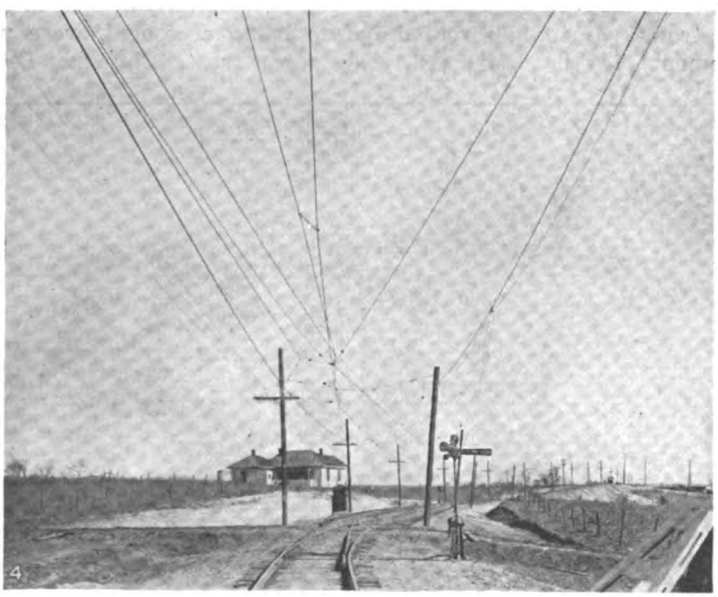
No. 3—Overpass of T. & P. Railroad near Dallas.

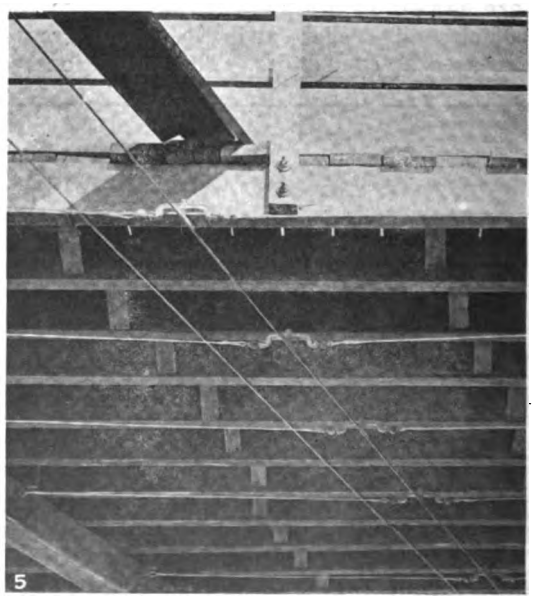
No. 4 — Overhead construction at siding.

No. 5—How catenary is carried under public road overpass.









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At Left, Station at Terrell, Tex. At Right, Typical Wayside Waiting Shelter

process using English oil (grade No. 1, American Wood Preservers' Association) with specific gravity of 1.03. The 30-ft. poles used for stubs and span construction were made by cutting 5 ft. off the ends of stock poles. Where this was done, the cut surface was treated with creosote preparation applied cold.

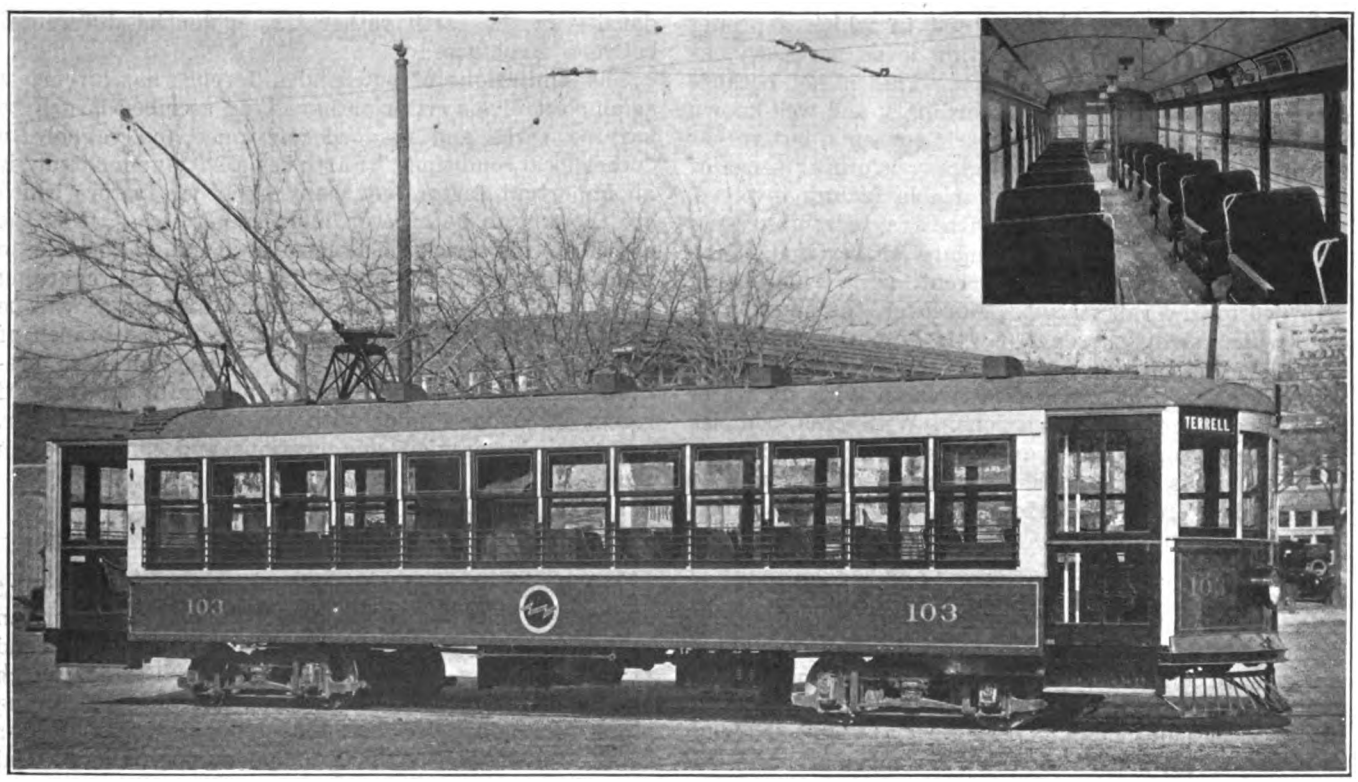
The 5-ft. ends cut from stub poles were used for back-guying at storm guys, which were placed every half mile on tangents and at each end of curves. Special curve hangers were used by stringing the messenger sufficiently outside the center line of the curved track to hold the trolley to the proper position. By bringing the messenger back to true line at the strain plate in the storm guy at each end of the curves the trolley was held in proper alignment. The trolley was made "hot" as each mile or so was completed.

All rail joints were bonded with No. 0000, Type A. W., Form 2 arc-weld bonds. At all feed-in taps No. 0000, Type A. W., Form 3 cross bonds were used. Two portable electric welders were operated by the day shift and two heavier ones, mounted one on each end of a work car, bonded at night.

On the eastern half of the line, the pole gang of eighteen men used a gasoline motor car and trailer for transportation. Three days were devoted to hole digging, and poles were set every fourth day with a steam train and derrick. This required but half of the day and averaged eighty poles. Gravel for tamping the poles, which was done on the same day, was taken from the track ballast as it had not been dressed off. Bracket arms were placed, messenger, trolley and feeder were strung and pulled with the steam train by a gang of six linemen and a foreman. They averaged 0.8 mile per day for the 17 miles built in this way.

On the western portion of the line, the gangs and tools were carried out of and into Dallas by trucks. All poles and fixtures, gravel and wires were hauled and placed by trucks, excepting the feeder, which was strung with a line car after the track was laid. The pole gang on this end of the line, consisting of fifteen men and a truck, erected 480 poles in forty-one working days.

Two metallic-return telephone lines were strung on the same crossarms with the feeder. A single pin on the track side of the pole carries the feeder, and pins on the outside carry the four telephone wires. Transposition pins occur every 1,000 ft. Under normal conditions one circuit cares for dispatching and other com-



One-Man, 30,000-Lb. Car Used by New Texas Line. Inset, Comfortable Seats, Wide Aisle and Observation Compartment Are Features of the Interior

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mercial business. These two lines are arranged at all telephones, with the necessary two-way knife switches, so that in case of trouble on a circuit any section of either line can be cut out and the other circuit used in dual service. At passing tracks and substations, 4-ft. x 4-ft. telephone booths are provided.

Depots and Waiting Sections

Brick veneer depots were built at the principal stations. Those at Mesquite and Forney are 20 ft. x 32 ft. and that at Terrell is 20 ft. x 64 ft. Track wyes are provided to serve the express room. At Dallas the line uses the joint interurban passenger and express terminals in common with the other interurban roads.

Shelters have been placed at seventeen public road crossings. They are 6 ft. x 10 ft., with one open side.

Rolling Stock

The rolling stock consists of five passenger cars and two express cars, which were designed under the personal supervision of J. L. Brown, master mechanic of the Dallas Railway, and built by the American Car Company. These cars are 45 ft. in length and 8 ft. 6 in. in width over all. They are mounted on Brill 77-E trucks at 25-ft. centers. They are equipped with 26-in. rolled steel wheels, having 3-in. treads and 1½ in. flanges, 1⅛ in. high. The equipment consists of four 35-hp. G. E. 265 motors, with K-35-G2 controllers, Electric Service Supplies Company's compensating lighting fixtures, and 150-watt headlights of the Golden Glow type, with dimming device. The cars are painted medium Malori green, with ivory finish.

The passenger cars are of the one-man type. A door in the rear vestibule permits a car to be used as a two-man car when traffic requires. The doors are of the sliding type, operated pneumatically. The cars seat fifty-four passengers, having 37-in. seats upholstered in green plush and a 27-in. aisle. Grab handles are of aluminum to avoid hand sweating and tarnishing. The cars complete weigh 30,000 lb.

One two-car work train, with a tower for line work, and two Buda No. 19-L air-cooled gasoline motor cars are provided for section work. This equipment also was used in the construction work.

No shops or carhouse facilities have been provided, as the cars will be cared for at the carhouses and shops of the Dallas Railway, which has ample facilities for handling the work.

Some New Light on Electrolysis

Earth Potential Gradients Main Factor in Determining Electrolysis—Many of the Assumptions Heretofore Made in Regard to the Flow of Currents in Pipes Are Erroneous—The Earth Current Meter Has Yielded Data of Great Value

By E. R. Shepard

Consulting Electrical Engineer, Chicago; formerly Electrical Engineer United States Bureau of Standards

THERE are few technical problems in which the interpretation of experimental data is so baffling and difficult of analysis, and in which a proper sense of judgment and proportion is so necessary, as that of stray current electrolysis. This is not because stray currents fail to obey the ordinary and well-known laws relating to the flow of electric currents, but rather because of the difficulty in obtaining a proper sense of proportions of the numerous variable factors involved. In the first place, in dealing with stray earth currents we are concerned with a secondary or residual effect, the major portion of the current, as a rule, being returned on the rail circuit. Moreover, the shunt path over which stray currents flow is a most complicated one, including underground structures in various ramifications as well as the limitless earth with its water courses and geologic variations. With this complex circuit involving variable and unknown resistances and relations, it is not surprising that great difficulty is often encountered in determining the course and effects of stray currents.

Potential Difference Data

Potential difference measurements between underground piping systems and adjacent electric railway tracks have long been used to indicate electrolysis conditions, although practically all engineers have known that such measurements do not afford a reliable criterion as to the actual hazard to which the pipes are exposed. The need for a better method of determining electrolysis conditions has long been recognized and led to the recent development of the earth current meter by the Bureau of Standards, an instrument which measures the current density in the earth rather than potential differences between structures.

The limitations of potential difference measurements as an electrolysis criterion have been ascribed largely to varying earth and roadbed resistance and vaguely to "other local conditions." Earth resistivity undoubtedly is an important factor, but there are other factors which are thought to be of even more importance. It is the object of this article to discuss these and, if possible, to modify or clarify the prevailing conceptions regarding the flow of earth currents in such a manner as will be helpful to those who are interested in this branch of engineering and research. The conception here presented is largely the result of a careful analysis of recent intensive studies with the earth current meter, supported by previous observations and experiences in the field.

Usual Methods of Representing Stray Currents Misleading

The usual elementary explanation of stray current electrolysis as set forth in the report of the American Committee on Electrolysis and numerous papers and articles includes a diagram similar to Fig. 1. which shows current leaving the tracks and flowing to the pipes in areas remote from the supply station, and after being transmitted along the pipe through the neutral area, discharging to the rails in the vicinity of the supply station.

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This diagram, while not altogether incorrect, gives a false and exaggerated idea of the extent to which pipes as a rule transmit stray currents. Such a condition as thus graphically depicted may prevail under special or exceptional conditions as, for example, where a welded steel main or other low-resistance and continuous conductor in direct contact with the earth parallels an electric railway for a considerable distance and has few or no laterals or services. Under simple conditions of this kind, the pipe will perform in accordance with the usual diagrams and explanations, and current collection or discharge at any point will be approximately proportional to the magnitude of the potential difference between the pipe and the track.

The usual condition, however, is quite different, involving pipe networks, either continuous or discontinuous, with many services and laterals, and is so different from the simple example just cited that the usual explanation fails utterly to account for following commonly observed phenomena:

ELECTROLYSIS ANOMALIES

1. Attempts to locate currents on pipes in neutral or positive areas almost invariably meet with negative or insignificant results unless the pipes are metallically bonded to the railway return circuit. It is a matter of frequent comment and experience that pipe currents of magnitude are not found where they logically should be expected.

2. Severe electrolytic damage is often observed on service pipes crossing under electric railway tracks where no appreciable damage has occurred on the main, although the main may be positive to the rails.

3. Earth current measurements often reveal a discharge from mains strongly biased toward parallel electric railways, that is, when the angle between the pipe and the track approaches 45 deg. In many instances such mains have been found to be collecting current on one side and discharging on the opposite side, although potential difference measurements show them to be strongly positive to the track. An example of this kind was observed in New Orleans in 1922, and is illustrated in Fig. 2. A 6-in. castiron main 3 ft. deep and paralleling an electric railway track at a distance of about 4 ft. was 1.65 volts positive to the track. The main was uncovered and the end of the trench squared up. A polar diagram of current discharge was obtained by

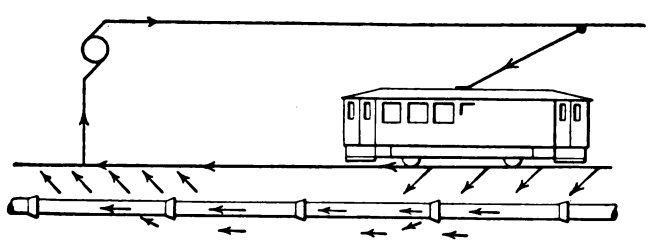

Fig. 1—Common but Misleading Method of Representing Stray Currents

taking readings at 15 deg. intervals with the nonpolarizing electrodes and the earth current meter. The main was found to be collecting current on one side and discharging it toward the track on the other side. The current density at different points is shown in the diagram in milliamperes per square foot of pipe surface. This condition is typical of many other observations made on pipes paralleling electric lines.

An extreme and striking case has recently developed in which a cast-iron main, 7 ft. from a track and positive to it by about 4 volts, was found by the earth current meter to be collecting current. The main was in good condition, but the services which extended under the track were badly corroded and were found to be discharging heavily.

In attempting to explain these various phenomena, it will be necessary to present certain ideas which, though not contrary to usual conceptions, may be stated in such

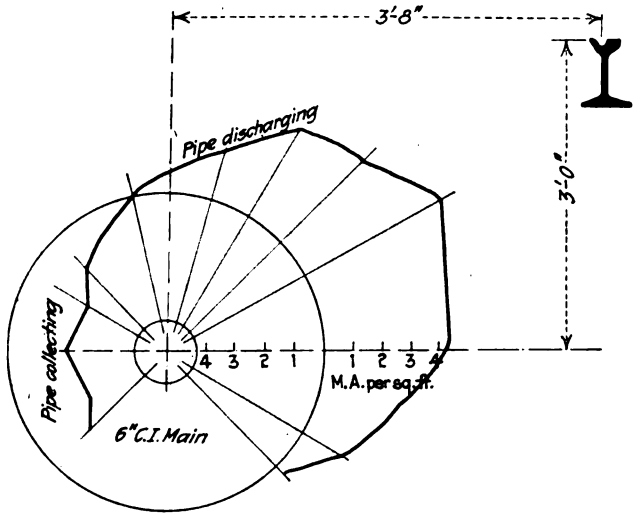

Fig. 2—Polar Earth Current Diagram Showing Transverse Electrolysis. Pipe 1.65 Volts Positive to Track

a way as to seem at variance with them. The ideas which it is desired to present are but partially and inadequately embodied in the following statements:

LATERAL VERSUS TRANSVERSE POTENTIAL GRADIENTS RESPONSIBLE FOR ELECTROLYSIS

1. Lateral, as against longitudinal, potential gradients in the earth are directly responsible for stray current electrolysis.

2. The function of underground structures in the longitudinal transmission of stray currents is small and almost negligible in comparison with the part played by the earth, unless such structures are electrically drained to the railway return circuit.

3. Piping systems in general assume the average potential of the earth in which they are buried and limited portions of such systems should be considered as equipotential bodies and not subject to the same potential gradients that exist in the earth.

4. Potential gradients in the earth are in general very much smaller in a direction parallel to street railway tracks than at right angles to them.

5. The familiar over-all voltage curves showing the potentials of tracks, earth and pipes are misleading, as such potential profiles cannot be made to apply to the earth as a mass nor to the structures as a network without rigid qualifications. Such profiles are applicable only to line conductors such as a wire or an electric railway line.

The significance of these statements will be better understood by the following explanations and illustrations:

Consider an electric railway line for which the overall potential curve is shown as *A* in Fig. 3. Because of the fall of potential along the track, current will leave the rails in the area remote from the supply stations and return to them near the supply stations as indicated by the arrows *B* and *C*. The stray currents in the earth will in general assume long, sweeping stream lines which

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will be substantially perpendicular to the track for a considerable distance and which will reach great distances before they again converge to return to the track. The potential gradients in the earth will, therefore, be steep in a direction perpendicular to the tracks and slight in a direction parallel to the tracks. Another way of expressing this idea is by saying that most of the over-all potential drop through the earth is consumed in discharging the current at one end of the line and collecting it on the other end and relatively little in transmitting the current longitudinally through the earth.

The potential gradient curves in the earth in a direction perpendicular to the tracks at the two ends of the line are shown as *D* and *E*. The curve *D* is drawn from the extremity of the over-all track potential curve which represents the potential of the rail at that point. It is steep, close to the track, and becomes almost horizontal at a remote location. The curve *E* at the supply station is even more steep and rises to almost the same level as that assumed by *D*. The distances from the tracks at which such curves will become practically flat will depend upon the earth and roadbed resistances, but in general there will be very little change in earth potential at distances greater than 200 to 300 ft. from the track. This means that the over-all potential drop

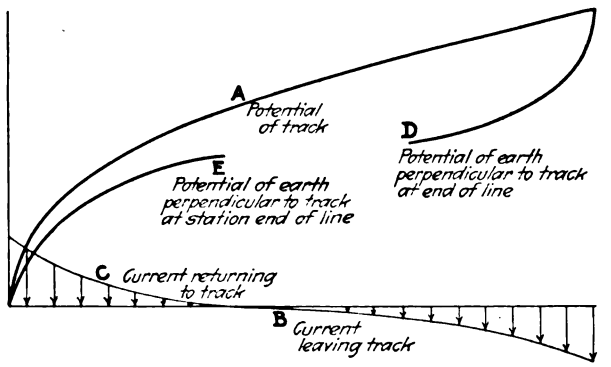

Fig. 3—Potential Curves of Track and Earth

in the earth will be very small if the reference points are taken several hundred feet from the two ends of the railway line in question. It follows, therefore, that pipe networks through which electric railway lines extend will have but little tendency to transmit current from one region to another, although high local gradients may exist on them in a direction perpendicular to the track, causing local currents and consequent collection and discharge of current at different points.

The difficulty of attempting to draw a curve to represent the potential of the earth at various points along the track is at once obvious when it is seen that the form of such a curve would depend entirely upon the distance from the track of the reference line.

Electrolysis Conditions in Different Forms of Pipe Networks

Various conditions which obtain in practice will be discussed with reference to the possibility of stray current electrolysis.

In Fig. 4 is shown a potential gradient curve in the positive area which represents the potential of the earth at the depth of the pipes, say 4 ft., and in a direction perpendicular to the tracks. The base line to which it is referred is the track potential at that point. Consider a very small piece of iron, or other metal, *A*, buried in the earth. It will assume the potential of the earth at that point and will neither collect nor discharge current. A metal bar placed horizontally in the earth will be an equipotential body or nearly so and will, therefore, assume the average potential of the earth in which it lies as shown at *B*. One end of such a bar will collect current and the other end will discharge it, the magnitude of the current depending upon the length of the bar and the steepness of the gradient in the earth.

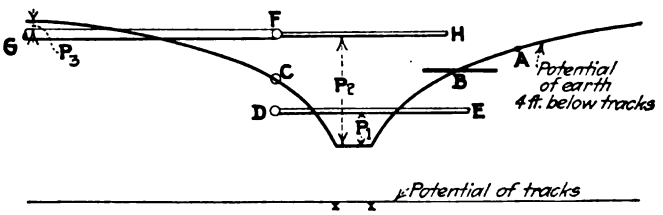

Fig. 4—Positive Area Near Power Supply Station

A sphere or a cylinder of appreciable size, as for example a pipe, will assume a potential as shown at *C* and will be subjected to slight transverse electrolysis. That is, it will collect current on one side and discharge it on the other. This condition prevails in the case of a main paralleling an electric railway and having but few services or laterals. However, if such a main line is close to the track and parallels it for a considerable distance the longitudinal gradient will tend to make one end positive to earth and the other end negative. In such a case the magnitudes of the potentials will be governed largely by the distance between the mains and the track.

Consider now a main parallel to and a few feet distant from an electric railway and carrying services which extend under the track. The main and services will comprise an equipotential system and will assume an intermediate position, such as *DE* in the earth potential field which they occupy. In this case the services will be positive to the track and also to the earth, while the main itself being at the same potential as the services will also be positive to the track, but may actually be negative to the earth and collecting current from it. Such a condition has recently been observed under conditions similar to those just described. The main had few laterals but a large number of services which controlled its potential to a large extent. In the case referred to, the piping system was from 3 to 4 volts positive to the tracks. The earth current meter showed the services to be discharging heavily to the earth under the tracks, and the main to be collecting slightly.

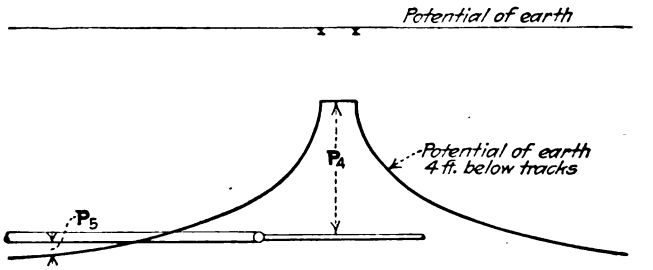

Fig. 5—Negative Area Near End of Line

Still another and the most common condition is illustrated by the piping system *GFH*. The main *F* extends parallel to the rails but is connected to numerous laterals *FG* which have a greater influence in determining its potential than do the small services *FH*. The system will, therefore, assume some such potential as that indicated in the diagram, in which the network in general

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will be negative to the earth and the services strongly positive to it. The main in question may be either positive or negative to the earth, depending upon its position with respect to the track as well as the location of that portion of the network which controls its potential. Or it may be, and often is, subject to transverse electrolysis, collecting current on one side and discharging it on the other.

In a negative territory, the condition will be that shown in Fig. 5. Here the pipes collect current under a high potential difference shown as P_1 and discharge it from a relatively large area at a small potential difference, P_2. The area of discharge is ordinarily so large and the current density so small that electrolytic damages are not discernible. Contrary to this, in the positive territory the current is collected over a relatively large area at a small potential difference, P_3, and discharged near the tracks at a high potential difference, P_4. Naturally there will be some current transmitted along the piping system from the negative to the positive area, but in many instances, and particularly where long feeding distances are concerned and not very dense piping systems, this amount will be small in comparison to the total amounts of current discharged and collected by the pipes.

Potential Difference Not a Criterion

It is evident from the foregoing that potential difference measurements between pipes and tracks give practically no information as to the density of current discharge or collection at any particular point of the pipe surface. However, they do indicate the possibility of danger to that portion of the piping system, usually the services, which most closely approaches the tracks in the area under consideration. It is possible that a fairly definite relation exists between current density at pipe surfaces and potential differences for a given set of conditions involving earth resistivity, roadbed construction, size of pipe and distance between pipe and track at nearest approach. While these factors are variable and some of them often indeterminate, thereby preventing an accurate evaluation of their quantitative significance, it may safely be assumed that high potential differences between pipes and tracks are accompanied by damage to some portion of the piping system.

The foregoing also explains why small potential differences between adjacent piping systems or between pipes and cable sheaths are not indicative of current discharge between such structures. As a rule, measurements of this kind merely show the change in the earth potential between the points occupied by the two structures. If, however, by drainage or by any other means, one system is caused to assume a potential greatly different from that of the adjacent earth, there will be a local gradient in the earth near the drained structure which may cause local electrolysis at points of intersection with other systems. The potential difference observed between grounded systems may, therefore, be considered as active only at the points of nearest approach of the two systems and not throughout their course generally.

No attempt has been made here to consider the numerous variables which enter into the electrolysis problem. The sole object has been to present a proper conception of the directions and relative magnitudes of potential gradients in the earth, with the thought that it may be of value to others in analyzing and interpreting electrolysis phenomena.

Central Station for Interurban Lines at Kansas City

Proposed Building Provides Excellent Terminal Facilities and a Modern Office Building—It Will Be Located Near Center of Retail District—Construction to Be Begun May 1

ARRANGEMENTS have been made to underwrite $2,950,000 of bonds for the proposed central station for the interurban lines entering Kansas City, and construction of the building and station will begin May 1. It is expected that the electric lines will use it immediately on completion, which will be within a year.

The station is to be erected by the Interurban Central Station Company, which has the following officers: President, C. C. Peters, secretary Emery-Bird-Thayer Dry Goods Company; vice-president, R. A. Long, head of the Long-Bell lumber interests and owner of a modern office building one block from the station; secretary and general counsel, W. C. Scarritt, attorney, interested in the Scarritt Building, within two blocks of the station, and interested in much Kansas City residence and business real estate. The architects are Wight & Wight of Kansas City.

The following electric railways entering Kansas City are under franchise obligations to use the new station, and contracts for such use exist with them: Kansas City, Clay County & St. Joseph Railway; Kansas City, Kaw Valley & Western; Missouri & Kansas ("Strang Line"); Kansas City Western (Leavenworth Line); Kansas City, Lawrence & Topeka. The Kansas City Railways is, of course, a party to contracts with the entering lines and with the central station company.

The site of the station is at the northeast corner of Tenth and McGee Streets, the company owning 304 ft. on McGee and 128 ft. on Tenth, and also a strip in the center of the block through to Oak. The building will be erected on the corner with 200 ft. frontage on McGee Street. The ground floor will be used for the passenger station, except for stores and a restaurant on the street frontages. The concourse and waiting rooms will have the height of two stories, a mezzanine floor around the waiting room being used for beauty shops, writing rooms, etc. The main building will be ten stories in height on the McGee, Tenth and trainshed sides, with an open court above the concourse and west side of the building. This will provide light and air for the offices, the concourse having a skylight. Public entrances will be on both McGee and Tenth Streets.

Building Will Have Many Good Features

The building will be high class in every respect. The concourse or main lobby will be finished in marble with marble columns and tile floors. It will contain the ticket offices, baggage and parcel windows. Entrances to the restaurant and the various stores will also be included. There will be a large general waiting room, and a separate waiting and retiring room for women will be provided.

The trainshed will have six tracks, each of which will hold six cars. North of the trainshed will be a building for the trainmen and an emergency hospital.

All trains will enter the station over the tracks of the Kansas City Railways via Tenth and Oak Streets. They will loop through the station and leave by way of McGee Street.

The location of the station downtown, at the very

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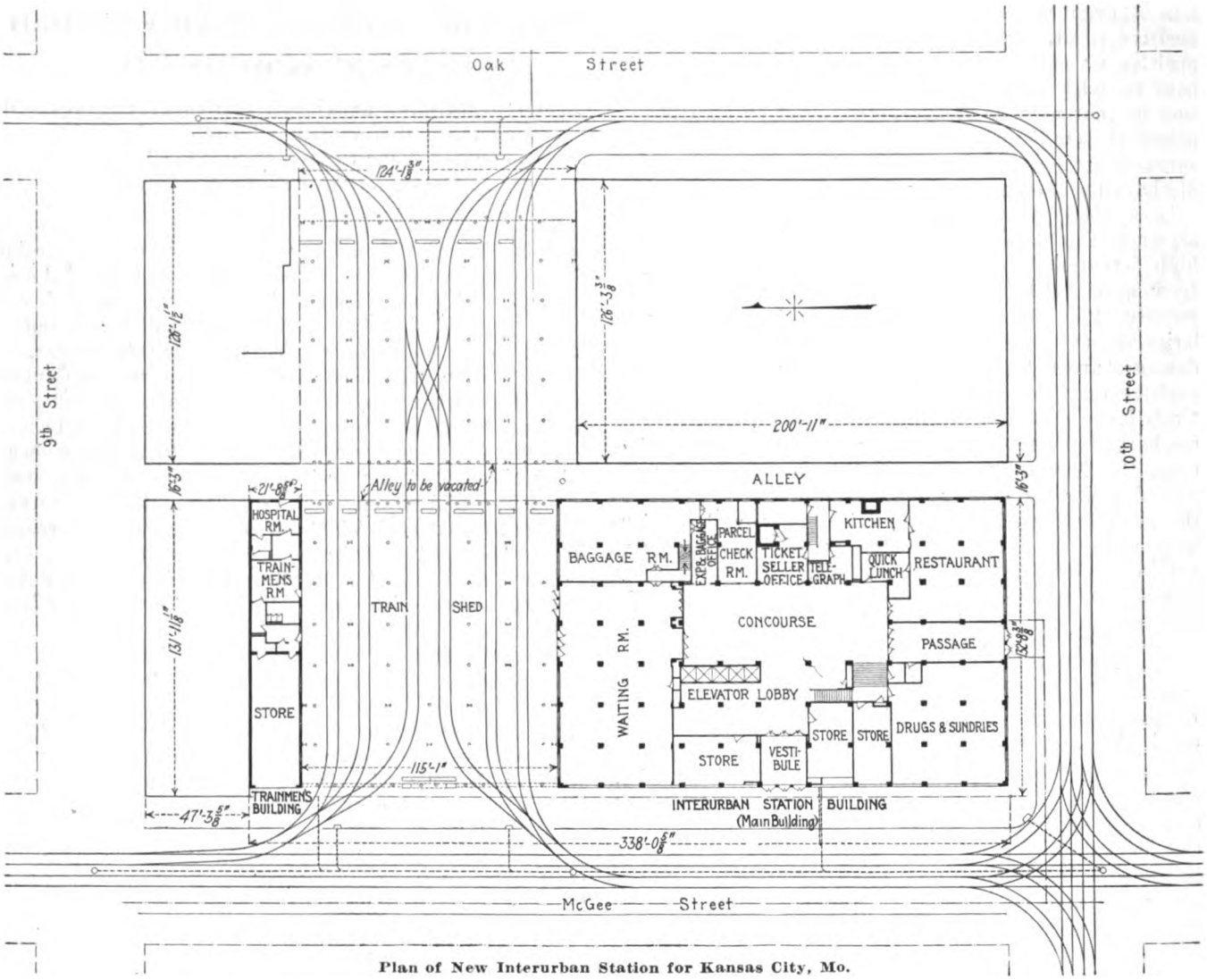

Plan of New Interurban Station for Kansas City, Mo.

edge of the high-class shopping district, is considered significant. This was a factor in the decision to produce a particularly fine type of building, which should assist in development of the downtown district. The location will, it is said, also greatly encourage traffic because of its convenience, visitors leaving trains close to the business center. The fact that trains and waiting rooms are on the same ground floor also is expected to encourage traffic.

About 4,000,000 passengers now come into Kansas City annually over the electric lines. The station, it is estimated, will accommodate 7,000,000 annually. Officers of the central-station company suggest that use of the new station will encourage the construction of new electric lines.

The preliminary engineering work toward the location of the central station was done by Robert P. Woods, now vice-president and general manager of the Kansas City, Clay County & St. Joseph Railway. Mr. Woods made possible trackage layouts at various locations, studying them in their relation to connections with local and entering lines, and with reference to the city's physical and commercial development. These studies were considered by the interurbans prior to the organization of the company which financed the purchase of the site, and which now has completed steps toward financing the building. Howard E. Huselton and Leslie E. Baird, who were given the task of selecting the site and who enlisted Mr. Woods' aid, were instrumental in securing the franchise and in organizing the central station company.

Compulsory Motor Insurance

A SERIES of arguments on the need of compulsory insurance to cover accidents caused by automobiles has recently been made public by Jonas Rice, general manager of West Chester Street Railway, Philadelphia, Pa., and has been attracting considerable attention in Pennsylvania. Mr. Rice advocates the plan of making the insurance policy apply not to the driver but to the car and requiring the showing of such a policy before a car is licensed. The Philadelphia *Evening Bulletin* has printed Mr. Rice's arguments at length, with the views of various representatives of automobile interests on the subject, and, in general, they support the plan. A summary is also printed under the heading "A Word for Compulsory Motor Insurance" in the *Literary Digest* for March 24, 1923.

During 1922 the London County Council Tramways carried 726,000,000 passengers, this being the highest number on record. The total shows an increase of 36,000,000 passengers over 1921, which is ascribed to improved service and lower fares. The average speed of cars has been increased so that it is now the highest tramway speed attained in Great Britain.

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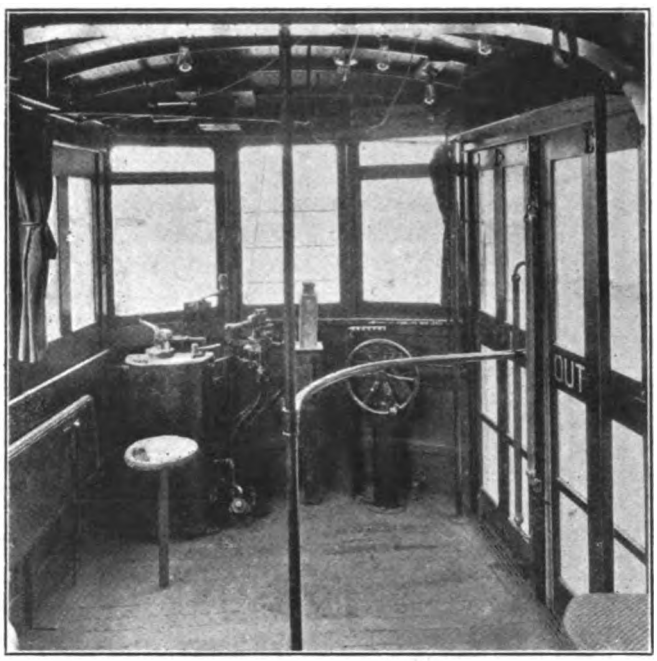
One-Man Cars Desirable

At a Hearing in Washington, Statistics and Other Testimony Show the Value of One-Man Operation from Safety and Other Standpoints

AT A HEARING held before the Public Utilities Commission of the District of Columbia on the subject of one-man cars on Feb. 21 some interesting testimony was brought out. The hearing was held because of complaints by several citizens that the reconverted one-man cars recently put in service by the Washington Railway & Electric Company were objectionable. The complainants admitted that the cars had a place in transportation service, but claimed that their service should be confined to the suburban sections. The company has seventy of these cars in operation.

W. F. Ham, president Washington Railway & Electric Company, was the first witness. He said that on a basis of 1,523,823 car-miles, the one-man cars had had 4.20 passenger accidents per thousand car-miles, whereas the two-man cars, on a basis of 9,991,704 car-miles, had had 9.58 passenger accidents per thousand car-miles. Certain accidents, such as occur in boarding and alighting, have been greatly reduced with the one-man car. For accidents of all kinds the one-man cars had shown 29.92 per thousand car-miles as against the two-man car figure of 30.04. This includes every accident, even trivial ones. Other figures were given to show the greater immunity from accidents with the one-man car. The only serious accident which has been experienced was when a controller flashed and some of the passengers became panic-stricken and tried to get out quickly by the windows instead of the rear door. To prevent a recurrence of this trouble, since that time a line switch has been installed, and a painted handle to indicate the means of opening the emergency exit door. The accompanying view of the interior of the car shows this emergency handle at the right of the vestibule and over the ratchet brake wheel. The emergency handle is painted with stripes, and lettering appears just above it reading "emergency door lever." It is true, Mr. Ham continued, that the car has only the front entrance, but this he considered an advantage as the emergency exit would not be blocked. The most serious accident the company ever had was with an open type of car where there were twenty-eight exits, fourteen on each side. Data on comparative accidents with one and two-man cars as given in the accompanying table were presented.

The patronage in Washington did not indicate that the cars weren't popular there. On the lines on which these cars were being operated, during the last five months there had been a slight increase in traffic, whereas on the whole system there had been 1.14 per cent decrease. Mr. Ham brought out that the discontinuance of one man on seventy cars during the year, even at the higher wage paid for one-man car operation, would save the company $157,000 a year. The income of the company during 1922 available for a return was $739,620, which was $315,886 short of 6 per cent on the value of the property as determined by the commission. If the one-man cars operated had not been available this income would have been reduced by $71,879. Particulars were also given of the extent of the one-man car service in other cities.



Front of One-Man Car, Showing Emergency Door Lever with Painted Handle

The cost to convert the cars was about $1,800 a car. The cost of a new car would be $7,702, about the same as for a two-man car. Views of the one-man car operated were shown.

Henry G. Bradlee, Stone & Webster, the next witness, then gave some particulars of the thirty street railways operated by that organization and the development of the Birney car in 1916. The success with this led to the development of the larger double-truck one-man car. The Stone & Webster organization now operates about 500 Birney cars, both single and double truck, and 100 converted cars. Records kept by Stone & Webster show that on their properties during a recent twelve-month period 18,000,000 car-miles were run by one-man cars and 14,000,000 by two-man cars, with accident records per 10,000 car-miles for the one-man cars 3.8, and for the two-man cars 5.76, or 34 per cent less for the one-man car. Serious injuries had decreased 51 per cent with the one-man car. Mr. Bradlee attributed the reduction of accidents principally to the decrease in step accidents, because passengers board the car under the eye of the operator. He pointed out that in Philadelphia the Chamber of Commerce of that city had investigated the conditions on this type of car in 136 cities and approved the operation of the car for Philadelphia.

In St. Joseph, Mo., at the request of City Council, the city engineer had carried on extensive experiments to determine the value of the safety devices on the one-man type of car and had reached the conclusion that the car with these safety devices was safer than the ordinary two-man car. In the course of these experiments a Birney car was started at the top of an

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11 per cent grade after the trolley had been pulled down and the air and hand brakes had been disconnected, but the motorman was able to stop the car within 120 ft. by reversing the motors. In Seattle the municipality had continued and extended the use of one-man cars on the recommendation of Peter Witt. In Detroit one-man cars had been forbidden until the city engaged in street railway operation, when a number of Birney cars were immediately ordered.

Mr. Bradlee said that sometimes the charge was made that there was excessive physical and mental strain to the operator of a one-man car. That this is incorrect is shown by the fact that companies have no difficulty in securing volunteers among their operators to take these cars because of the slight bonus paid, and by the fact that accidents are reduced, which would not occur if the operator was subject to undue strain.

Tests have shown that it takes a group of passengers somewhat longer to board Birney cars than two-man cars, perhaps a quarter of a second longer per passenger, but the Birney cars have no trouble in making the two-man schedule, because of their more rapid acceleration. The records of the J. G. Brill Company show that in percentage of all cars built at its works one-man cars constituted in 1917 28 per cent, in 1918 42 per cent and in 1919 77 per cent.

COMPARISON OF INJURY ACCIDENTS WITH TOTAL ACCIDENTS DIVIDED AS TO ONE-MAN CARS AND TWO-MAN CARS FOR 1922

	One-Man Car Accidents			Two-Man Car Accidents		
	Injury Accidents Number	Total Accidents Number	Per 100,000 Car-Miles	Injury Accidents Number	Total Accidents Number	Per 100,000 Car-Miles
Passenger Accidents:						
Boarding	4	12	0.79	79	271	2.71
Alighting	5	15	0.98	126	423	4.24
Fell from car	0	0	...	3	18	0.18
Fell in car	7	17	1.12	58	143	1.43
Stealing ride	0	0	...	0	0	...
Brake handle	0	0	...	11	11	0.11
Collision of cars	2	20	1.31	7	91	0.91
Non-Passenger Accidents:						
Collision, vehicles	10	361	23.69	74	1,686	16.87
Collision, persons	10	13	0.85	51	122	1.22
Car off track	0	0	...	4	5	0.05
Assaults, ejec., etc.	0	1	0.06	0	24	0.24
Property damage	0	3	0.20	0	32	0.32
Miscellaneous	8	14	0.92	95	176	1.76
Total	46	456	29.92	508	3,002	30.04

Notes: 10.1 injury accident per 100 one-man car accidents.
16.9 injury accidents per 100 two-man car accidents.
One-man car-miles, 1,523,823; two-man car-miles, 9,991,704. Accidents in favor of one-man cars per 100,000 car-miles, 5.38.
Percentage of one-man accidents to two-man accidents involving personal injuries, 9.0. Percentage of one-man mileage to two-man mileage, 15.2.

The speaker then gave some statistics in regard to the practice of the Eastern Massachusetts Street Railway with one-man cars, 95 per cent of its service now being of this type, and said that in all New England there are 455 single-truck and 417 double-truck cars for one-man operation. The one-man car is used with every kind of service except where train operation is advisable, that is to say, it is used in city service, in suburban service, in one-fare zones, in more than seven zones, and in the subway in Boston. Since 1917 nineteen states have approved one-man car operation, Montana being the latest.

The one-man car is the effort of the industry to adapt itself to modern economic conditions. In 1898 the cost of operation of the two-man car was practically 50 per cent of that today, and the one-man car prevents the cost going as high as it otherwise would, as each car saves from $2,000 to $3,000 a year.

He considered the Washington Railway & Electric Company's car with its double-door front entrance better than a car with a single entrance for Washington conditions. He did not know of any city in which service was given by Stone & Webster where serious opposition had developed against one-man car operation.

C. E. Morgan, Brooklyn City Railroad, was another witness. He said that in Brooklyn there are 206 single-truck Birney cars, fifty double-truck converted one-man cars with a single passageway, and 175 cars whose platforms had been lengthened to provide for double passageways and to permit either one-man or two-man operation. The company has sixty-eight lines, thirty-eight of which are operated with one-man cars. In January, 1923, the double-truck two-man cars made 3,332,920 car-miles, the Birney cars 594,337 car-miles, and the double-truck one-man cars 260,005 car-miles. The one-man cars are used in all sorts of service, including that on the Brooklyn Bridge, and are operated on Fulton Street in the most congested part of Brooklyn, where, on this trunk line, they are mixed in with other cars and trains, all operating on a nine-second headway in the evening rush hour. Their average time for loading and unloading is no greater than any other car operated in Brooklyn, the average stop being five seconds. On Nassau Avenue these cars run on a two-minute headway, in one direction pay-as-you-enter and in the opposite direction pay-as-you-leave. It is the practice in Brooklyn to make frequent traffic studies and change the schedule in accordance with the needs, but there is only one route, Jamaica Avenue, where additional running time is required because of increased traffic and the one-man car.

Mr. Morgan also pointed out that traffic officers particularly favor the one-man car because when they give the signal to start to the motorman he does not have to wait for the conductor's signal. One case where there has been objection to one-man cars in Brooklyn is the Nassau Avenue line, where pay-enter had not previously been used, and the objection was more to the change in the method of collecting fares than to the car itself. If it were not for the one-man car, eleven lines in Brooklyn would not be paying their way. The average schedule speed in Brooklyn for all cars is, average per day, 9.7 m.p.h.; rush-hour, 9.204 m.p.h.

Brooklyn has often had to increase the number of cars on a line to handle the traffic. The figures on accidents per 100,000 car-miles, as reported by 109 companies to the American Electric Railway Association, are forty-four for the one-man car and eighty-three for the two-man car; for collisions 196 for the one-man car as against 207 for the two-man car. There have been no accidents in Brooklyn due to the use of only one man on the car. The experience in Brooklyn did not indicate that there were any ill effects to the operator from the operation of the one-man cars or that the work was considered more arduous. In fact, the men preferred the one-man cars because, as one man said, "He was his own boss." Of the surface car mileage operated in Brooklyn 20.4 per cent is furnished by means of one-man cars.

VENTILATION PROBLEM SETTLED

The next witness was William A. Pine of Chicago, vice-president of the Railway & Utility Company, manufacturer of the "Honeycomb" ventilators used on the cars of the Washington Railway & Electric Company. He explained that the ventilator was used extensively by street and steam railroads. He presented a chart showing the cubic feet of free air discharged per hour from a railway car at different wind velocities. He pointed out that at 10 m.p.h., the average speed of the

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Washington cars, 17,000 cu.ft. of air per hour per ventilator would be changed in the car each hour with the windows and doors open. With the doors and windows closed the six ventilators would exhaust 75,000 cu.ft. of air per hour, equivalent to thirty changes per hour. The ventilator is used on 20,000 street and electric cars in the United States. It is particularly well adapted to one-man cars because a car with closed ends does not have the natural ventilation that one does with both ends constantly being opened.

One of the operators then testified. He had been running a car for one and a half years and thought it safer than a two-man car, and he had found no trouble in performing his duties and had noticed no ill effects on his health. The men choose one-man cars in preference.

J. H. Hanna, vice-president Capital Traction Company, said he had had very slight experience with the one-man cars, but was very glad to see the commission approve them and would object if the commission attempted to curtail the use of these cars, as some of his lines could be operated with satisfactory results with the one-man cars. He would probably purchase some today if he was in the market for new equipment.

Better Methods for Taxing Utilities

Special Committee of National Tax Association Recommends Graduated Gross and Net Earnings Tax as Most Equitable Method, and Favors Abandonment of Property Taxes for Utilities

AT THE conference of the National Tax Association in 1920 a committee was appointed to make a study of the taxation of public utilities engaged in interstate commerce. This committee was composed of Hon. Frederick M. Davenport, member of the New York State Senate, chairman; J. G. Armson of the State Tax Commission of Minnesota, Fred R. Fairchild of Yale University, F. N. Fletcher of the Nevada Public Economy League, and M. T. Sanders of the Northern Pacific Railway. This committee has just presented a report covering this subject.

In his capacity as chairman of the New York State joint legislative committee on taxation and retrenchment Senator Davenport has paid particular attention to the subject of utility taxation. The ELECTRIC RAILWAY JOURNAL at various times has published the results of his work. In the issue of Feb. 4, 1922, a voluminous report to the Legislature of New York is abstracted, covering utility taxation in this state. In the issue of Feb. 17, 1923, is the abstract of an address by Senator Davenport on the same problem presented at the mid-year meeting of the American Electric Railway Association in Washington, D. C., Feb. 16, 1923.

The committee states that it has made investigations covering the past two years. The following is an abstract of its report, just presented to the National Tax Association:

There is great confusion in the taxation of property of interstate public utilities, resulting from an extraordinary variety of taxes and of methods being pursued in different states. There is duplication and confusion arising from the decentralized taxation of property by local jurisdictions and there is also lack of any guiding principle in the taxation of public utilities and in the placing of taxes in the tax system as a whole.

From the bewildering collection of tax methods the committee finds it possible to select three outstanding types. These are (1) the *ad valorem* basis; (2) the capitalization basis; (3) the earnings basis.

Under the *ad valorem* basis the tax is imposed upon the value of the property of the corporation. It is most widely employed. About half the states use it exclusively for the taxation of steam roads and nearly as many for the exclusive tax on telephone and telegraph companies. About a dozen states use it as the only method for taxing electric railways and water, gas and electric properties. This method as employed in the more progressive states involves expert valuation of the property of the corporation as a whole. It is also used in connection with other methods in many other states.

The capitalization basis involves the imposition of a tax upon the securities of the corporation. Sometimes the stock only is taxed, while in other cases the bonds are also included. This is generally unsatisfactory and is of declining importance. It is only used alone by a few states, perhaps a half dozen combining it with other methods.

Next to the *ad valorem* method, the earnings basis is in widest use. The tax is a certain percentage of the earnings, the rate being fixed to make the tax correspond roughly with the property tax generally. This form of tax is almost always based on the gross earnings of the corporation.

The committee states that the lack of any guiding principle is evidenced by even a cursory study of present methods of taxation. This is not merely a result of difference of opinion regarding the means, but it represents a lack of agreement on fundamental matters and principles.

In formulating its recommendations the committee has assumed the general plan of taxation outlined by the committee on a model tax system of the same association. In this three taxes are included: (1) An individual income tax; (2) a property tax on real estate and tangible properties but not on intangibles; (3) a business tax. The committee feels that taxation of tangible personal property is destined to hold a less important place in the future.

ECONOMIC RELATIONS OF PUBLIC UTILITIES

Utilities are distinguished from other business enterprises by two important characteristics: (1) They are in possession of certain special privileges granted by the government; (2) they are under obligation to render service and make reasonable charges therefor. This double obligation is enforced by public regulation.

There are three theories of taxation of utilities: (1)

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Heavy taxation to be passed to the consumer; (2) no taxation; (3) taxation on an equality with other business. The committee states that the first is unsound, making high rates for service necessary, but the tax will take all over a fair return. The utilities thus act as tax gatherers for the government. The committee considers this unsound. It calls for unequal distribution of taxes on account of unequal use of the facilities by the public. If the rates are as high as the traffic will bear it is futile to attempt to shift taxes in this way.

The second theory, that of no taxation, is also untenable, as the utilities are granted certain privileges from the government like any other property owners. Such governmental service must be regarded as one of the costs of service.

The third basis the committee declares to be sound, as the general principle of equality in taxation will be questioned by few. The committee fails to find any valid argument for departure from this principle in the case of the taxation of public utilities.

The committee emphasizes two points in this connection. First, it should be recognized that equality of taxation does not require uniformity of methods or of rates, but refers only to the burden of taxation. Second, the equality must be real and not merely formal. For example, the development of an efficient process for the centralized assessment of public utility corporations may produce gross inequality because equally efficient methods of assessment are not applied to other taxpayers.

To fit utility taxation into the model tax system, it must be remembered that a fair measure of the contribution to be demanded is the essential, but that the methods used may vary. The individual income tax does not enter into corporation taxation. The burden of the property tax should depend on the amount of real estate, i.e., land and buildings. The basis of the assessment must be the same as for other taxpayers. A business tax should be levied similar to that from other business.

The committee feels that a special tax treatment is required because of the character of the property and on account of rate regulation. The property is peculiar on account of its highly technical character, since its value can be appraised only as a whole, and on account of the widespread locations of the property in many tax jurisdictions.

The assessment of public utilities is a special problem. Local assessors generally are not qualified for this work, while central assessment brings the danger that the property will be fully valued, whereas property in general is largely undervalued or overlooked. These peculiarities already have met with a breakdown of the old general property tax as applied to public utilities.

Proposed Method for Taxing Utilities

Rate regulation and taxation must go together and supplement each other. The utility should in the long run be enabled to earn a fair return on all its properties and secure fresh capital, if required, for proper maintenance and development of the enterprise. The return must permit abnormal profits in good years to offset smaller profits or losses in other years. Taxation should take part of these extra profits made under unexpectedly favorable conditions or by the more fortunate corporations.

Experience shows that the choice of the taxation basis practically is narrowed down to the *ad valorem* basis, which is open to the serious objections already pointed out, and an earnings basis. The thing that really gives worth to a corporation is its earning power. An earnings tax involves the fewest theoretical difficulties, and is comparatively simple and inexpensive to administer. It usually fluctuates with the prosperity of the corporation and generally is equitable between corporations.

The next question has to do with the relative merits of net earnings and gross earnings as the basis of the tax. The committee considers the net to be the fairest and most accurate measure of ability to pay taxes, but the gross earnings method has the advantage of greater certainty and simplicity, gross earnings being a matter of fact about which there seldom can be a difference of opinion. The determination of net income involves the deduction of a great variety of expenses, requiring exercise of judgment and possibility of disagreement and evasion.

The decision really rests upon the fundamental question as to whether the obligation to contribute to the support of the state is to be limited to those corporations that make profits. If so, the net earnings tax is indicated. If all corporations are to contribute, and if taxes are one of the necessary costs of business, the gross earnings tax is the proper method. Obviously the government must function in years when business is poor, as well as in years of prosperity.

This practical consideration seems to preclude complete adoption of the net earnings basis. In the opinion of the committee the dilemma may be met by a combination of gross and net earnings taxes. The tax should be upon the net at a certain rate with the proviso that the tax should never be less than a certain per cent of the gross. This is the same as providing two taxes, one on the gross at a moderate rate, the other on the net at a higher rate, with the proviso that the tax collected is the higher of the two. For example, a tax might be provided at 10 per cent of the net or 2 per cent of the gross, whichever were greater. Such a combination tax is a reasonable compromise between the gross earnings and the net earnings basis.

Virtually the same result could be obtained by a progressive gross earnings tax, starting with a moderate rate where the net earnings bear a small ratio to the gross or are non-existent, and advancing with the increase in ratio of net to gross. Such a combination tax is a reasonable compromise between the gross earnings and the net earnings methods. Based primarily on net earnings the tax takes account of the varying abilities of the several utilities to pay, while the requirement of a minimum contribution meets the public requirement of regular and dependable revenue. By a proper adjustment of the rates the burden may be made to correspond fairly with the property tax on other taxpayers, remembering that much intangible property and also a good deal of tangible property escape under the general property tax. The yearly fluctuations of this utility tax may be reduced by taking as a base the average of the earnings of several years instead of a single year. Additional tax on the net may serve to take some part of the profits from the more favorably situated utilities. The committee is inclined to favor such a tax.

The committee is firmly convinced that with the alternative gross or net tax as an exclusive tax no further taxation of the utility's property, either real or personal,

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need be required. Probably most states will see fit to continue taxation of real estate at least, in which case the amount of such tax should be allowed as a deduction from the earnings tax, or adequate allowance should be made in fixing rates for the earnings tax.

Doubt is sometimes expressed as to the constitutional power of a state to impose a tax measured by gross earnings derived from interstate commerce, but the committee states that this can arise only from misapprehension of the decisions of the United States Supreme Court.

As to the apportionment of taxes on interstate utilities, the committee states that in view of the scope of the problem and the issues involved, it requests an opportunity to study the subject further.

"Move Up Front"

VARIOUS methods of inducing passengers to move to the front of the car after they enter at the rear platform have been tried by railway companies, with varying degrees of success. The Georgia Railway & Power Company, which operates the Atlanta system, is using a new method. This consists of a series of car

One of the Cards Urging Passengers to "Move Up Front"

cards which tell the advantages—to the passenger—of following this commendable practice. These car cards read alike except for the second line. This is varied to give the reason.

One of these cards is reproduced herewith. The others are like it except for the second line, which reads as follows:

"You Help Yourself and Others."
"You Keep Your Seat Longer, Women Will Not Move Up Front."
"You Stand More Comfortably."
"You Get a Seat More Quickly."

Speeding Up Swiss Railway Electrification

THE director-general of the Swiss Federal Railways states that the railway electrification program of the government is to be pushed rapidly. The administration has been hampered by high costs of materials, which reached a peak of 130 to 140 per cent above normal and are still 70 to 80 per cent higher than in 1913. However, bituminous coal costs twice as much as in that year, hence the incentive to electrification is strong.

At present 238 miles of the federal railways are in electric operation, as follows: Sitten-Iselle, 46½ miles; Berne-Scherzligen, 21 miles; Lucerne-Chiasso (Gotthard), 140 miles; Lucerne-Zug, 16 miles; Zug-Goldau, 10 miles; Immensee-Rotkreuz, 4½ miles. The Zug-Zurich section was also due to be completed within the past few days.

According to the program of 1918 other lines of a combined length of 695 miles were to be electrified in fifteen years, including the following: Lausanne-Geneva, Solothurn-Olten, Lausanne-Berne, Basle-Brugg, Zurich-Olten-Berne, Zurich-Winterthur, Winterthur-St. Gall and Thalwil-Chur.

The electrification program will require more than 750,000,000 francs, of which 300,000,000 francs had been expended up to the end of 1922. In addition 23,000,000 more will be required for the reconstruction of bridges.

Recently the schedule has been advanced with a view to completing the above program by 1928, or at the rate of about 118 miles per year.

To provide electrical energy for the electrified lines, the power of the Barberine River will be developed first, in the plants at Vernayaz and Chatelard. The cost, included in the above, will be about 42,000,000 francs. Connections will be arranged with the St. Gotthard and Canton of Valais power plants. Substations will be constructed at Coppet, Bussigny, Yverdon, Fribourg, Biel, Burgdorf, Basle, Brugg, Oerlikon, Eglisau, Winterthur, Gossau and Sulgen.

Altogether 400 electric locomotives and motor cars will be required, of which 141 have been delivered to date. Of the total expenditure one-quarter will be made abroad.

St. Louis Will Save $189,900 in Power Bills

THE use of an Economy meter in each of the cars of the United Railways of St. Louis will result in a total net saving for the first year, after paying for the equipment, of $69,000, according to figures given out recently by Col. Albert T. Perkins, general manager for the receiver. The company will save a gross total of $189,900 in power bills during this first year. He states that the decision to equip all the cars with these meters was based on two considerations: First, to save expense; second, to conserve current so that the company could increase the car service without making provision for additional power. He said that the results show two additional economies not at first considered—safer operation and better care of the equipment.

According to the instructions given the motormen, there are four ways in which power can be saved. These are: (1) By running on schedule and not losing time on the road; (2) by not running on the resistance points of the controller; (3) by not running with the power and brakes on at the same time; (4) by coasting every foot possible without using power.

Colonel Perkins stated that motormen are told that running on schedule saves power, as it is then not necessary to make quick getaways and short stops to pick up lost time. They are told that much of the power taken from the trolley is wasted in the resistance while running on the resistance points, and that running with brakes and power both on means that power, brakeshoes and wheels are wasted. Colonel Perkins said that throughout the instruction given the motormen it is emphasized that safety of passengers is the first consideration, with schedules second and power saving third.

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The Personal Touch in Public Relations

Some of the Ways in Which P. F. Sheehan, Manager Fall River Division Eastern Massachusetts Street Railway, Is Succeeding in Getting Railway Patrons to Appreciate the Utility Point of View

ABOUT a year and a half ago P. F. Sheehan was transferred from the managership of the Brockton division of what still persists in the minds of the old-timers as the Bay State Street Railway to the Fall River division. He succeeded A. J. Boardman; in fact, he and Mr. Boardman swapped places.

Mr. Sheehan, who is familiarly and affectionately known as "Pat" by his fellow Rotarians and his business compeers generally, his Christian name being Patrick, began his local career in Fall River by establishing friendly relations with the public as promptly as possible. His philosophy is that the public reflects the temper of the railway management. Thus if a helpful reaction from patrons is expected there must be an aggressive cordiality from the manager and his confrères. In other words, believes Mr. Sheehan, the public has the mirror-like characteristic of reflecting what it sees in its purveyor of public service.

In coming to his new post, Manager Sheehan found a substantial foundation of good feeling left behind by his predecessor. He proceeded at once to build on this. He addressed a letter to every considerable employer of labor in town asking him about the transportation requirements of his employees and requesting such co-operation as would enable the company to have cars on hand in sufficient numbers where and when they were needed. The response was gratifying, and the patrons expressed satisfaction that it was proposed to consider and meet their individual requirements.

The next step was to write to local merchants, asking them to collect for the benefit of the service such criticisms as their employees cared to make, or to pass on from the numerous customers with whom they came in contact. The result of this rather risky procedure was that although the matter was canvassed thoroughly by the merchants among their employees practically no criticism developed.

Mr. Sheehan finds that his relations with the public are greatly facilitated by what is known as the "Home Rule Committee." This comprises six men, including the president of the Board of Aldermen and the city solicitor as ex officio members. The four other men are picked by the Mayor to represent different lines of business, including labor. At present the membership includes a mill agent, a dry-goods merchant and a cotton broker. The terms of the four men are indefinite. Mr. Sheehan serves as secretary, although not a member of the committee.

The Home Rule Committee was inaugurated by the Chamber of Commerce about three years ago. Its function is to study the local street railway situation with respect to service, etc. It meets twice each month. It is helpful both to the public and the railway in serving as a means of inspiring confidence in the service. For example, when the company put into operation a reduced fare plan under which it sells for $1 a twenty-trip ticket which any number of people can use, the Home Rule Committee backed up the company as to the reasonableness of retaining the 10-cent cash fare for those who do not wish to invest $1 at one time. The company, however, made a concession in selling a divisible ticket which two people can use separately although it must be purchased as a unit.

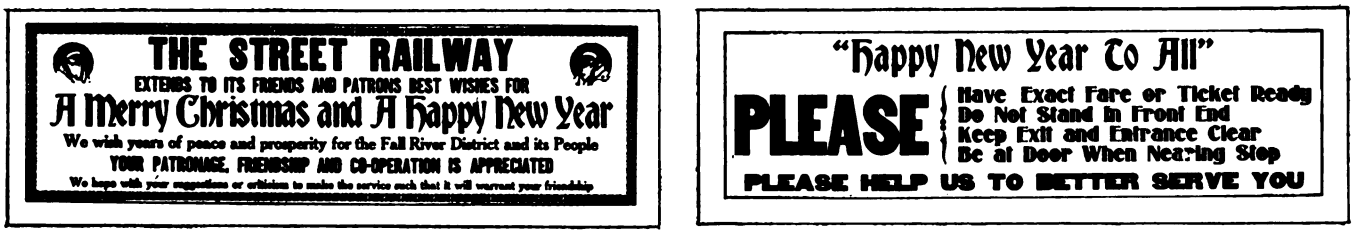
TELLING THE PUBLIC ABOUT IT

The Home Rule Committee recently requested Mr. Sheehan to furnish for the benefit of the public a statement with regard to the work performed in the Fall River district during 1922. This gave him an excellent opportunity to explain the different jobs that had been carried out which had been made possible through the "contributions of the stockholders" without the issuance of additional securities. He showed that 23,880 ft. of track had been rebuilt, several thousand feet overhauled and several pieces of special trackwork put in. In the performance of this work there were in constant service five welding machines and six grinding machines. There were seam-welded 2,745 joints, surface-welded 6,445 joints and ground 8,899 joints, while 23,458 ft. of corrugated rail was surfaced. In new and overhauling work 14,872 creosoted ties were installed. The total cost of the trackwork was about $190,000. A fourth Russell sweeper was added to the equipment as well as three cars equipped with Root scrapers. Many other improvements were mentioned in this report

Mr. Sheehan finds the liberal distribution of timetables for all of the local lines a good form of publicity. A folder is distributed for each line, containing first the time points and timetables for all lines, with special information for the individual line on the last page.

Last Christmas the railway did a number of public institutions a good turn by sending around town a car with a Santa Claus on the roof for the purpose of interesting possible contributions of gifts for these institutions. The merchants co-operated in this effort with the result that the institutions were liberally remembered on Christmas Day.

Fall River is one of the important divisions of the Eastern Massachusetts Street Railway system. As has been mentioned it has been greatly improved physically during the past months. This, together with the efforts of the management to develop a friendly attitude on the part of the public, ought to be fruitful in still further strengthening the position of the division in the local system.



Car Cards Used Last Holiday Season to Promote Good Public Relations

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Midi Electrification Making Rapid Progress

Direct-Current Operation Was Inaugurated Last October and by the End of 1923 Enough of the System Will Have Been Electrified to Demonstrate the Expected Economies

THE Midi Railway, in southern France, has made a substantial start in its program of electrification of 1,950 miles of line, designed to permit it to utilize the abundant water power which is available in the Pyrenees, the Cévennes, and the "Massif Central." Simultaneously with the new work, which is being carried out at 1,500 volts d.c., the single-phase already installed is being replaced by direct current.

Since the fall of last year, electric trains have operated between Pau and Montrejeau, and in 1923 Toulouse in one direction and Dax in the other will be reached. The electrification will be rapidly extended until within twenty years, unless the present program is modified, only the Bordeaux-Cette line and its branches will be steam operated.

The power supply for the Midi electrification will be from hydro-electric stations, with three-phase, 50-cycle transmission at 60,000 volts. Part of this power will be used at 60,000 volts, and the remainder will be raised to 150,000 volts to feed into a super-power system for the benefit of the large power-using communities within reach.

In the railway substations the power will be transformed, in rotary converters in some cases, in mercury-vapor converters in others, to 1,500 volts d.c. The supply for lighting and power purposes in the stations along the line of the electrification will be at 10,000 volts. This year the 150,000-volt lines will supply the requirements for power as far as Bordeaux and soon thereafter the benefits will be extended to Toulouse. Plans for five transforming stations (60,000 to 150,000 volts) are definitely planned and another is under consideration. In three of these stations large synchronous condensers will be installed. The stations will be of the outdoor type, except for apparatus that would be injured by the weather.

There will be seventeen traction substations, mostly containing 750-volt rotary converters, two in series per group. Three of the substations will contain 1,500-volt rotaries, and five mercury-vapor converters. The capacities of the substations will vary from 1,000 to 6,000 kw. None of them at present will be provided with automatic control.

Double-Catenary Contact Line Adopted

The contact line will be double catenary, as used on the New Haven, New York, Westchester & Boston, Erie and other roads in this country. There will be a steel messenger wire of 140,000 circ.mil area, an intermediate or secondary copper wire of 198,000 circ.mil area, and a copper contact wire of 198,000 circ.mil area. The lower two wires will be fastened together by clips placed, on the average, about 10 ft. apart. The spans on the tangent track will be about 300 ft. and the hangers connecting the intermediate wire and the messenger will be spaced about 30 ft. apart. High-speed circuit breakers will be placed in the substations to protect the rotaries from the effect of short circuits. There will be reactance coils in the 1,500-volt d.c. line, with condensers shunted with resistance connected between the line and ground. This will be done to protect the d.c. apparatus.

The neutral of the three-phase high-tension line will be grounded, and both 60,000-volt and 150,000-volt lines will be protected by circuit breakers controlled by maximum current, reverse current and differential relays.

The motive power for trains on the Midi electrification will comprise both locomotives and multiple-unit cars. The weight of a locomotive equipped is about 80 tons, and the capacity is 1,400 hp. for one hour. Multiple-unit cars will be equipped with two motors each, on one truck and connected in series, the horsepower per car being 500.

Details of this electrification have been given from time to time in the ELECTRIC RAILWAY JOURNAL. *L'Industrie des Tramways, Chemins de Fer et Transports Publics Automobiles* devotes a large part of its January, 1923, issue to the Midi electrification.

The Need for Industrial Standardization

BY ALBERT W. WHITNEY
Chairman American Engineering Standards Committee

STANDARDIZATION has two effects. It produces greater efficiency; by a reduction of the multiplicity of processes and products it allows for concentration on those that are worth while; the resulting increase in efficiency is effective all along the line, not merely in manufacturing but in selling and in buying.

In addition to this it frees the human spirit for making further advances. If there were no standardization the creators of ideas would have to be continually recreating and would have no time for further advance. Whenever a bolt or an I-beam or a generator was needed it would have to be a matter for design. Standardization allows such needs to be taken care of through routine process and the creative spirit is relieved for fresh first-hand adventures.

Instead of killing invention and initiative standardization is the very basis upon which it rests. It is standardization that makes further invention possible.

To a remarkable extent both the body and mind are standardized. If our bodies were not essentially alike we could have no surgery or medicine, for a surgeon in operating for appendicitis might find a heart when he was looking for an appendix. If our minds were not essentially alike we could have no organized education; education would have to be an individual process.

The similarity of our bodies and minds affords the underlying basis on which we can construct social life and civilization, and yet it is the departure from the standard which gives the touch of individuality and which not only gives the charm to our social contacts but which makes the cutting edge of progress.

There is a danger in standardization, the danger of too early and too drastic standardization, but there is a danger connected with the use of any powerful instrument. The problem of civilization and progress is to a very great extent a problem in the wise use of standardization.

I have used the term standardization in the broadest possible sense. Every factory, for instance, is carrying on its own standardization; every industry is carrying on its own standardization. Some of this work is on

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a very large scale. But there is a standardization which transcends these in that it endeavors not only to operate on a national scale and to cover all industries but to bring all points of view, those of the manufacturer, the consumer and the public, to a common focus.

There are three organizations that are bearing the brunt of this work, the United States Chamber of Commerce, the Department of Commerce of the federal government and the American Engineering Standards Committee.

The United States Chamber of Commerce is doing a valuable work in interesting manufacturers in standardization and particularly in simplification. It has been the direct cause of considerable work that has been done in this field that is of a national character.

The Department of Commerce is advancing standardization in two ways; in the first place, through the Bureau of Standards, a very valuable adjunct to the government. The Bureau of Standards, both as a research institution and as a co-ordinator of government activities in standardization and as a co-operator with industry itself, is doing a most valuable work.

In addition to the Bureau of Standards, Mr. Hoover has initiated a new department known as the Division of Simplified Practice which is engaged on the non-technical side of the field of standardization. It endeavors to bring manufacturers together through their trade associations in adopting plans to reduce the unnecessary variety that is found in industry.

The third national standardizing body is the American Engineering Standards Committee. This body serves as a clearing house for standardization. It does not initiate standardization projects, nor does it do standardization work itself. It encourages standardization and it provides a general outline of procedure which if followed will entitle the standard to be listed as an approved American standard. This standard is in no sense mandatory, but in actual practice it does to a very considerable extent, because of its intrinsic merit and the representative way in which it was produced, become the American standard in its field.

The process is this: When there has been brought to our attention in a convincing way the fact that there should be standardization in a given field, a conference is called and to this conference are invited all national associations and other representative bodies that are known to be interested. This conference decides whether standardization should be undertaken, and if the decision is in the affirmative it makes a recommendation to that effect to the American Engineering Standards Committee, and also with regard to the national association or other representative body which shall act as sponsor in the preparation of the standard.

The sponsor chosen by the American Engineering Standards Committee creates a sectional committee. This sectional committee is not a committee of the American Engineering Standards Committee but directly represents the bodies that are interested in the particular standardization project. When the sectional committee has completed its work the standard is turned over to the American Engineering Standards Committee for approval. The American Engineering Standards Committee does not pass upon its technical details but solely upon the question of whether the work has been performed in a thoroughly representative way.

The American Engineering Standards Committee has more than 120 projects under way at the present time, twenty-eight of which represent standards that have been approved. On the last count, I believe twenty-two national associations were working on sectional committees represented by some thousand individuals. Thus a large part of our industries are represented.

The Readers' Forum

Reasons for Trial of Chrome-Nickel Steel for Special Trackwork in Milwaukee

149 BROADWAY, NEW YORK, March 30,1923.

To the Editors:

The abstract of Mr. Hibbard's paper before the E. M. B. A. Technical League in Milwaukee, appearing in the March 17 issue of ELECTRIC RAILWAY JOURNAL, discloses important and interesting experience in the use of chrome-nickel cast steel in special work. It is apparent that so far as four years of experience can disclose, an advance in special work manufacture was undertaken when chrome-nickel steel castings were applied to this weakest of railway engineering structures.

Not so much for the purpose of historical accuracy, but rather to point out how experience in other branches may influence railway engineering, it may be of interest to indicate the origin of the application of chrome-nickel steel for the purpose under discussion. While initial cost of castings played some, but a minor, part in determining on the experimental use of chrome-nickel steel, it was not the deciding factor in the writer's mind when advising the use of this material. He based his determination on the following factors: (a) Castings which could be repaired by welding were desirable; (b) castings which could be machined with ordinary machine shop tools were wanted; (c) castings possessing inherent toughness while sacrificing some kinds of hardness might give a longer life in service than the manganese steel castings theretofore largely used; (d) information in our possession indicated that the Krupps had been making laminated armor plate of a composition not greatly different from that later adopted for special work; (e) there were in the process of manufacture in the Milwaukee district chrome-nickel steel ingots for naval gun jackets requiring subsequent forging and machining to final dimensions. The steel was, accordingly, readily available for experimental work.

The then relative costs of manganese and chrome-nickel castings gave an additional incentive. The fortunate experience resulting from this material is clearly set forth in Mr. Hibbard's paper.

At least two years prior to beginning of the use of chrome-nickel steel, instructions were issued to the engineering division of the way and structure department to study and develop new designs for special work foundations and supports, hoping thereby to minimize the breakages in special work and the disturbances in pavement resulting from failure of foundations and supporting ties. The new foundation design was completed in time to permit its use with one of the first complete sets of chrome-nickel steel crossings. The comparative wearing values of chrome-nickel and manganese steels cannot be accurately determined unless they be tested under identical conditions. Probably chrome-nickel steel contributed more than the new type of foundation to the lower rate of wear of the new special work, but ultimate useful life in service is likely to prove to be a composite result of material of castings and character of foundation.

J. D. MORTIMER.

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Association News & Discussions

American Welding Society to Hold Annual Meeting

ANNOUNCEMENT regarding the program of the annual meeting of the American Welding Society, the headquarters of which are at 33 West Thirty-ninth Street, New York City, are being sent out by acting Secretary M. M. Kelly. The meeting will be held at the Engineering Societies' Building in New York City on April 24-27.

During the morning, afternoon and evening sessions on April 24 reports will be received from the committees on training of operators, resistance welding, electric arc welding and welding of storage tanks.

The morning of April 25 will be taken up with a business session and brief papers regarding new developments in electric, gas, resistance and thermit welding. At 1:30 p.m. an inspection trip will be made through the welding department of the Third Avenue Railway System, members and guests assembling for this purpose at Sixty-fifth Street and Third Avenue. The annual dinner will be held at 7 p.m. on April 25 at the Park Avenue Hotel.

The American Bureau of Welding will "have the floor" on the morning of April 26, and during the afternoon of this day the board of directors of the American Welding Society will meet. Simultaneously there will be a report of the committee on specifications for steel to be welded. A technical session of the Welding Society will be held in the evening also.

The morning session on April 27 will be devoted to a report of the gas welding committee, and the convention will close with an inspection trip in the afternoon.

Five Transportation Committees Appointed

THE United States Chamber of Commerce has decided to appoint five committees to discuss different phases of the transportation problem. These committees will probably be able to make progress reports at the eleventh annual meeting on May 7-10. They will work under the direction of a general committee, which will be appointed after the return of President Barnes of the National Chamber from the Rome meeting. The names of the committees and their chairmen follow:

Committee on "Relation of Highways and Motor Transport to Other Transportation Agencies," A. H. Swayne, vice-president General Motors Company, chairman.

Committee on "Proper Co-ordination of Rail and Waterway Services," W. L. Clause, chairman of board of directors Pittsburgh Plate Glass Company, chairman.

Committee on "Railroad Consolidation," Carl R. Gray, president Union Pacific Railroad, chairman.

Committee on "Governmental Relations to Transportation," George A. Post, New York, chairman.

Committee on "Readjustment of Relative Freight Rate Schedules," Fred A. Delano, New York, chairman.

The personnel of the three committees first mentioned has been published, and shows that Philip H. Gadsden, vice-president United Gas Improvement Company, is one of the members of the committee first mentioned.

Reports on Rail and Ballast at A.R.E.A. Meeting

ABSTRACTS of many of the reports presented at the annual meeting of the American Railway Engineering Association were given in the issue of this paper for March 24, page 523. Supplementing this are the following notes on important points, from the electric railway engineer's standpoint, in the reports on rail and ballast.

RAIL

The committee on rail appeared to be principally concerned in rendering its statistics on rail failures more reliable. The committee felt the need for a common and universal description of rail failures, so that the railways would know exactly what they were reporting upon. A new plan was, therefore, devised, under which reports will be asked for on the following basis: Miles of track laid in a given year; miles of this track in service during the year for which failures are recorded; number of failures for the year in question, and rate of failures per 100 miles of track. With the data for each year of the life of the rail in hand, the committee plans to work out the rate of failure per 100 year-miles for each year, and for each year to date. A comparison of these rates shows the quality of service being given by the rail.

For example, a 100-lb. P.S. rail rolled in 1910 and laid on the Fort Wayne division of the Pennsylvania System showed after five years of service 37.18 failures per 100 year-miles during 1915 and 30.21 failures for the period. The corresponding figures for 1922 were 333.33 and 72.24 failures respectively. The ratio in each case is a measure of the rail's present serviceability. The average life of the above rail in 1922 was 9.42 years.

The committee presented for approval specifications for heat-treated track bolts and for nutlocks, and stated that work is being done on the design for a 150-lb. rail section, although there is as yet nothing definite to report. While the committee expressed no opinion as to the proper length of rail over 33 ft., it submitted its belief that a rail length greater than this is desirable. A length of 39 ft. seems to be favored by roads which have tried out such rails.

As to rail canting, the Canadian Pacific, New Haven, Boston & Maine, Lehigh Valley, Erie and Southern Pacific appear to comprise all railroads which have standardized this feature, although a dozen other roads are co-operating in experimental work. The first five mentioned have standardized on a canting of one in twenty, the Erie on one in forty and the Southern Pacific on one in forty-four.

BALLAST

The report of the committee on ballast contained valuable cost data covering the application of ballast, with particular reference to the relative cost of mechanical and hand tamping. The data show substantial economies due to the use of air and electric tamping as compared with hand. Specifications for ballast shovels were also submitted.

An appendix to the report contained suggestions as to the care and handling of mechanical tie tampers. A detailed account of the method followed on the New York Central Railroad along these lines was given. The difficulty of formulating hard and fast rules, however, was explained by means of the statement that four representative railways that have gone somewhat extensively into the use of mechanical tampers have four widely divergent methods of handling.

A.E.S.C. Reports on A.E.R.A. Standards

UNDER date of April 2 the American Engineering Standards Committee has issued a report as to the status of proposed standards submitted by the American Electric Railway Association. The approval of six standards has already been reported. (See issue of this paper for Feb. 24, page 341, and editorial in same issue, page 316.) Regarding the others the following information is given by the A.E.S.C.

Specifications for galvanizing or sherardizing on iron and steel, specifications for 600-volt direct-current overhead trolley construction, and specifications for wood poles and tubular steel poles have been referred to special committees for their recommendation as to approval by the A.E.S.C.

Specifications for 7-in., 80-lb. and 7-in., 91-lb. girder rails, and specifications for materials for use in the manufacture of special trackwork have been referred to a sectional committee. The sponsorship for these three projects has been assigned to the American Electric Railway Association.

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American Association News

Executive Committee

THE executive committee of the American Association met at Association headquarters, New York, April 6, with the following present: President C. D. Emmons, W. H. Sawyer, A. A. Hale, G. T. Seely, L. S. Storrs, B. I. Budd, Barron Collier, F. R. Coates, J. G. Barry, S. M. Curwen, J. N. Shannahan, P. H. Gadsden, C. E. Morgan, J. P. Barnes, R. I. Todd, C. R. Ellicott, L. E. Gould, M. B. Lambert and Secretary Welsh, and the following guests: J. H. Hanna, L. H. Palmer, W. F. Ham, L. W. Shugg, H. R. Hayes and C. C. Peirce.

Mr. Hanna reported the official outcome of the mid-year meeting. Including all expenses, there was a deficit of $632. This compared with a loss at the Indianapolis mid-year meeting of $2,254 and at the Chicago meeting of $4,072.

Reporting for the committee on policy, Mr. Budd presented the recommendation that the establishment of a medical and surgical section be not approved, but that the Claims and the Transportation and Traffic Associations should plan to have medical and surgical committees. This plan was approved by the executive committee.

On report of Mr. Shugg, chairman of the committee on exhibits, the executive committee approved a price of 65 cents per square foot for exhibit space at Atlantic City in October.

Secretary Welsh presented the report of the committee on national relations which brought to the attention of the members that the Interstate Commerce Commission had informed the Chicago, North Shore & Milwaukee Railroad in its case with respect to Section 15-A of the Transportation Act, that unless advised to the contrary it would not be required to file reports under the provisions of this act. It was brought out that it was extremely important that all interurban railways file briefs with the commission on Section 15-A, as the North Shore decision would be a criterion of whether the act applied to other interurban lines only if they filed briefs.

The executive committee approved the report of the committee on subjects and meetings presented by Mr. Shannahan, as it appears in this issue under the report of that committee.

The committee approved the plan of the publicity committee for conducting a campaign dealing with costs of operation. Mr. Budd discussed the necessity of taking a more aggressive attitude about railway publicity, suggesting that this should deal with accomplishments and the great work being done rather than to apologize for shortcomings or to continue a defensive attitude. Considerable discussion followed about the agitation for 5-cent fares, and against commission regulation and use of one-man cars. Plans were set on foot to endeavor more effectively to meet these situations.

The chartering of a new company section on the Chicago, North Shore & Milwaukee Railroad, which starts off with 165 members, was approved, as well as the form of charter for use in such cases. The executive committee approved the recommendation of a special committee that the electric railway association join with the power, telephone, railroad and telegraph interests in forming an American Committee on Inductive Co-ordination.

An invitation from the N. E. L. A. to appoint representatives to sit in the meetings of a new committee of the latter association on customer ownership of securities, looking toward a standard handling and understanding of this type of financing, was accepted. Two members of the executive committee are to be appointed by the president to sit with this committee.

The committee voted "Aye" on referendum 41 of the United States Chamber of Commerce.

Mr. Gadsden discussed the forthcoming transportation meeting of the United States Chamber of Commerce and told of the manner in which the electric railway industry will be represented in the general investigation of "Transportation Needs" of the country. He considered this one of the greatest opportunities that has ever come to the interurban railways to establish their place in the transportation facilities of the country. Under the direction of Mr. Gadsden considerable information and data are being worked up at Association Headquarters to be incorporated into the report of the chamber committee on the relation of highway transportation to other forms of transportation. The executive committee approved a motion to give Mr. Gadsden whatever assistance he might need.

At the request of E. F. Wickwire the executive committee approved a convention meeting of the manufacturers, looking toward a furthering of the co-operation of manufacturers in telling the story of the electric railways.

The next meeting of the committee will be held in New York on May 25.

Valuation Committee

THE committee on valuation met at association headquarters, New York, on April 4, with Chairman J. P. Barnes, E. J. Bechtel, W. H. Maltbie, J. A. Emery, Frank Silliman, Jr., H. A. Clarke, W. Findlay Downs, G. W. Gillespie and Prof. A. S. Richey in attendance.

There were presented reports of the two sub-committees—one to make a study of the value of price trend curves in valuation work, and the other to study the relative weight to be given various methods of making valuation. The sub-committee on price trend curves presented a suggested report for inclusion in the final report of the committee, which dealt largely with the economics of the problem and reached a general conclusion which tended to discredit the use of price trend curves as an element in valuation work, except in a very limited way.

It was planned during the meeting to amplify the committees' work by getting price trend curves covering specifically electric railway materials, as some of the committee members had found that while the trend of these materials followed along very closely with the trend of the general commodity curve up to 1920, it has since varied widely from it. Since 1920 the electric railway materials curve is very much higher than the general commodity curve, presumably because of the very large demand for railway equipment and construction materials.

The sub-committee on weighting of various methods of valuation reported that it plans to make a compilation of the views of various state commissions and the I. C. C. on the weighting to be assigned to each method, and then to consult with the various commissions on what the committee has found as the indicated views of each commission, and from all of this to draw conclusions. The committee was tentatively of the opinion that first weighting as a rate base should be given to the method which bases valuation on the fair reproduction cost with prices as of the average of the future period during which the rate is likely to be effective, rather than as of any past period or specific date.

The committee also decided to undertake to develop an example showing how to use the yardstick method of valuation. This would be of particular value to small properties, where this example could be interpreted for local use.

Subjects and Meetings

THE American Association committee on subjects and meetings met in Association headquarters April 5 and laid out a tentative program for the annual convention. Preliminary to planning the subjects the committee decided to hold three morning sessions of the American Association and one evening session. It was also decided that the presentation of committee reports on the floor of the convention should be limited to those having really general interest to the membership, and that those presented would be abstracted only, as the plan will be to print and distribute the reports in advance. On this basis the time will be devoted to discussion of reports rather than presentation. Each three-hour session will be given over for the first hour and a half to committee reports and the remaining time for special papers or addresses and discussion.

The subjects tentatively agreed upon were as follows:

First session, president's address, and the co-ordination of bus with railway:

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second session, a program surrounding the Federal Electric Railways Commission report, and customer ownership of utilities; third session, the irreducible costs of operation, and the human side of management. At the evening session the plan will be to have two speakers of national importance with some special features of particular interest and value to the membership.

Those present at the meeting were: Chairman J. N. Shannahan, President C. D. Emmons, G. T. Seely, Colonel J. E. Hutcheson, L. H. Palmer, W. F. Ham, C. R. Ellicott, H. V. Bozell, H. C. Clark and Gen. G. H. Harries.

Coal Supply Special Service Discontinued

THE special services of Col. John P. Jackson, representing the joint fuel committee of the three national utility associations, in assisting electric railway companies to secure coal supply, at the Washington office of the Association, were discontinued on April 1, 1923. The extreme emergency has passed and the number of cases requiring attention has diminished greatly during the past few months.

The association maintains its Washington office under the direction of Charles L. Henry, chairman of the committee on national relations. P. W. McGovern, the local representative of the association, 949 Munsey Building, will handle any matter concerning coal supply.

Storrs and Gadsden Candidates for Directors U. S. Chamber of Commerce

TWO past-presidents of the association, L. S. Storrs and P. H. Gadsden, have been placed in nomination as members of the board of directors of the United States Chamber of Commerce for election at the next annual meeting to be held in New York City, May 7-10, 1923. Mr. Gadsden is a candidate from the second election district, comprising New York, New Jersey, Pennsylvania, Delaware, Maryland and the District of Columbia, while Mr. Storrs is a candidate for election from the Department of Transportation and Communication.

Both Mr. Storrs and Mr. Gadsden are very familiar with the activities of the Chamber of Commerce in view of their past official connection with it, and are particularly well fitted to serve on its board of directors.

Boston Meeting of Way Committee

THE committee on way matters of the Engineering Association met in Boston on March 22 at the Engineers' Club.

On the standardization of frogs and car-clearance easements, a sub-committee reported that it had been unable to agree on a method of standardization and wished the entire committee to decide upon the best procedure. The sub-committee was directed to continue its work, although there will not be time to prepare a final report on the subject for the convention. The committee, therefore, will recommend a continuance of the study of this subject.

After discussion of the design of substitute ties, the committee voted to arrange if possible for co-operation with the American Railway Association committee which is studying the tie problem. Co-operation was also suggested with the A.R.A. committee on the design of small bridges, culverts and trestles.

A comprehensive report on the design of track construction for paved streets, prepared as a result of correspondence between H. H. George and the appropriate committee of the American Society for Municipal Improvements, was next considered. After slight revision the report was approved and Mr. George was requested to present appropriate specifications at the next committee meeting.

Regarding the welded rail joint tests, W.W.Wysor reported the result of the Washington meeting of the committee on welded rail joints, and of plans for motors and equipment for the circular joint-testing machine. The discussion by the way committee showed appreciation of the necessity for conducting the contemplated tests and the importance of hastening the work.

As to revision of existing standards and recommendations of standards to the American Engineering Standards Committee, R. C. Cram reported that six out of nine specifications submitted had been approved, and that three unapproved ones had been referred to the sectional committee for action. The last named included specifications for 7-in., 91-lb. and 80-lb. plain girder rails, and materials for manufacture of special trackwork.

The committee voted to recommend the advancement of the present practice of designating compromise joints to "standard practice." The chairman announced that W. W. Wysor would succeed W. R. Dunham, Jr., as chairman of the sub-committee in charge of this subject.

E. B. Entwisle reported for the committee on revision of specifications for manganese steel switch pieces that only slight revisions need to be made in the present specifications. His sub-committee was asked to continue the preparation of specifications for manganese crossings for electric over steam railways, and also to submit at the next meeting a design for use as a basis for such specifications. Victor Angerer was asked to co-operate with the A.R.A. committee and endeavor to secure the adoption of one specification for both associations.

On the revision and correction of the Manual, the committee expressed the hope that all engineers interested would co-operate with R. C. Cram and the sub-committee in charge of this work in assisting in correcting and revising the Manual before it is bound in permanent book form.

C. A. Alden reported that the special committee on wheel contour and curved treads had held a meeting and that he had been requested to submit designs for consideration by the special committee. The way committee agreed with Mr. Alden that the special committee should decide the matter of wheel and head contours first.

In closing its meeting, the committee expressed appreciation of the hospitality of H. M. Steward and of the New England Street Railway Club.

The meeting was attended by the following members: W. F. Graves, chairman; H. H. George, vice-chairman; R. C. Cram, sponsor; C. A. Alden, V. Angerer, W. R. Dunham, Jr., E. B. Entwisle, R. B. Fisher, H. Fort Flowers, C. F. Gailor, E. M. T. Ryder and W. W. Wysor. H. M. Steward, Boston Elevated Railway; S. G. Hughes, Differential Car Company, and H. F. Heyl, Taylor-Wharton Iron & Steel Company, also attended as guests.

Committee on Insurance

THE committee on insurance of the American Electric Railway Association met in New York on March 22 with the following in attendance: John T. Staub, Baltimore, chairman; G. H. Bourne, New York; W. H. Daniels, Boston; J. H. Moran, Boston; H. A. Nicholl, Anderson; F. J. Spaulding, Brooklyn. The committee first reviewed briefly the activities of the previous committees on insurance and then decided to send out a questionnaire to all railway member companies asking for details of the amount of fire insurance carried, premiums paid, losses, etc., annually from 1916 to 1922. Various sub-committees were then appointed, as follows: Rates and insurance statistics, C. B. Scott, chairman; H. A. Nicholl, P. N. Wilson, and Williston Fish; standardization of insurance form, J. H. Moran, chairman; W. H. Daniels and G. H. Bourne; fidelity bonding rates, G. H. Bourne, chairman; C. E. Morgan and J. H. Moran.

Delegates to Chamber of Commerce Meeting

THE American Electric Railway Association has the right to appoint a national councillor and nine delegates, with alternates, to the annual meeting of the Chamber of Commerce of the United States. The list of appointments has just been given out, and consists of the following:

National Councillor: J. N. Shannahan, Hampton, Va. Delegates: C. D. Emmons, Baltimore; J. G. Barry, Schenectady; H. W. Blake, New York; Edward Dana, Boston; P. H. Gadsden, Philadelphia; C. E. Morgan, Brooklyn; J. H. Pardee, New York; L. S. Storrs, New Haven; C. S. Townley, New York.

Alternate National Councillor: J. H. Hanna, Washington. Alternate Delegates: Harlow C. Clark, Newark; H. J. Kenfield, Chicago; M. B. Lambert, East Pittsburgh; L. H. Palmer, Baltimore; J. W. Colton, New York; E. C. Faber, Chicago; W. H. Sawyer, East St. Louis; Raymond H. Smith, New York; C. C. Peirce, Boston.

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Maintenance of Equipment

Automatic Control for Compressor Built from Car Parts

A HOME-MADE device for automatically starting and stopping a GE-90, 50-hp. motor, driving an air compressor at the rock quarry of the Market Street Railway in San Francisco, has been giving effective service practically without repair for six years. Except for the small cylinder actuating the contactor switch, the mechanism was made up entirely from standard parts used on street cars and was therefore built without the purchase of any new equipment. The idea was developed by John L. Gaylord, now garage foreman for the company, who devised the automatic control to do away with the necessity for having an attendant at the compressor plant.

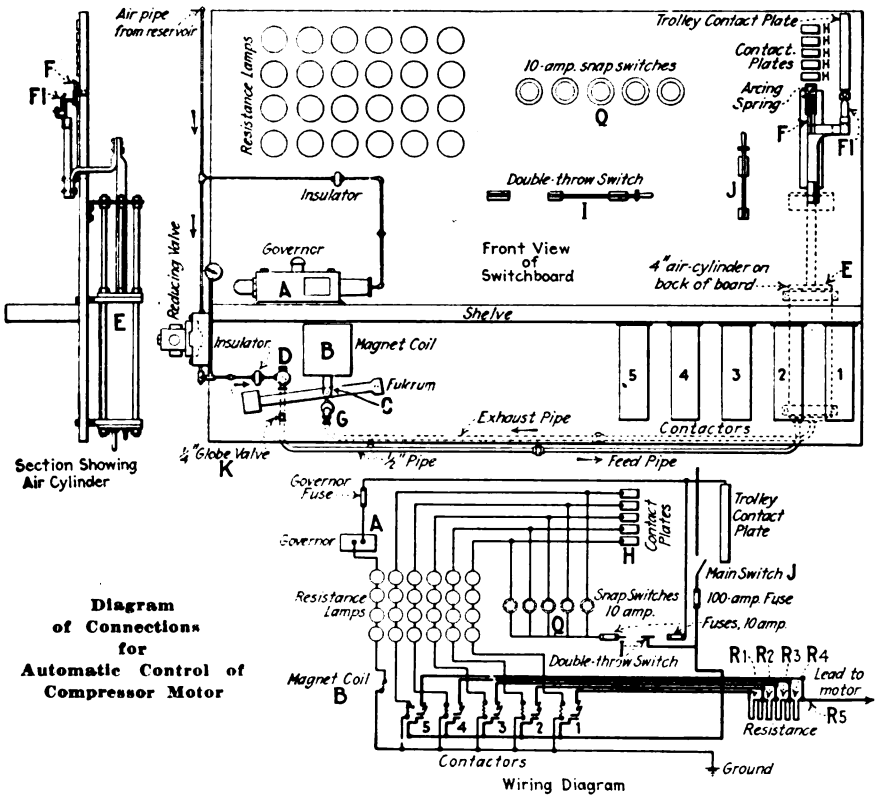

Diagram of Connections for Automatic Control of Compressor Motor

Wiring Diagram

Drills in the quarry are supplied with compressed air from a reservoir, which in turn is served by a motor-driven compressor. As originally installed, except for starting and stopping, the compressor plant required no more attention than could be given at an inspection made once or twice a week. The motor, however, had to be started and stopped frequently to maintain the reservoir pressure between the desired limits of 100 and 85 lb. per square inch. Mr. Gaylord undertook to accomplish this automatically and did so successfully with the mechanism outlined in the accompanying diagram.

When the pressure in the air reservoir drops to a predetermined minimum the governor *A*, which is the ordinary device used for controlling the compressor motor on a street car, closes and energizes the magnet *B*. This raises the plunger and lever *C*, opening valve *D* and allowing air to flow into cylinder *E*. This raises the piston with the switch *F* and *FI* slowly across the contacts *HH*, allowing current to pass to contactors 1, 2, 3, 4, 5, which in turn gradually close the circuit to the motor and, by cutting out resistance gradually, start up the motor slowly. The valve *K* is used to regulate the speed of piston *E*, thereby eliminating the need of a dashpot or similar device.

When pressure in the air reservoir reaches the predetermined maximum the governor *A* is opened, current to *B* is shut off, plunger and lever *C* drops, valve *D* is closed and the opening of valve *G* allows air to exhaust rapidly from cylinder *E*, so that a spring in *E* forces the piston (and *F* and *FI*) down quickly, shutting off the current and stopping the motor. The valves *D* and *G* are those ordinarily used for controlling a compressed-air whistle line.

In case the current is suddenly shut off, the action of this mechanism opens the motor circuit the same as when the maximum pressure in the air reservoir is reached, and when the current again comes on the process of slowly starting up the motor automatically takes place. Should it be necessary to start up the motor when there is no pressure in the reservoir, the snap switches *Q* and the double-throw switch *I* are used until the reservoir pressure becomes great enough (about 20 lb. per square inch) to actuate the governor *A*. Ordinary 16-cp. carbon filament lamps are used for resistance.

Stop Warning Sign on Safety Car Doors

NUMEROUS accidents have been due to the fact that the door of the ordinary Birney safety car opens outward. Many an automobilist passing close beside a car, and not expecting it to stop, nor to have a door swing suddenly out in front of his machine, has crashed into the door and damaged it. The danger from this sort of accident was particularly great on the Valley Road line of the Public Service Railway of New Jersey until warning signs were placed on the cars.

Valley Road, Montclair, is a street of only moderate width and is traversed by a single-track trolley line with turnouts. Between a car on the turnout and the street curb there is scarcely room enough for an automobile to pass. If an attempt is made to pass a car with the door open an accident is almost sure to occur. Frequently the driver of the automobile, after smashing a safety car door, claimed not to have noticed that the door was open. As a result of this situation, George Schwetje, super-

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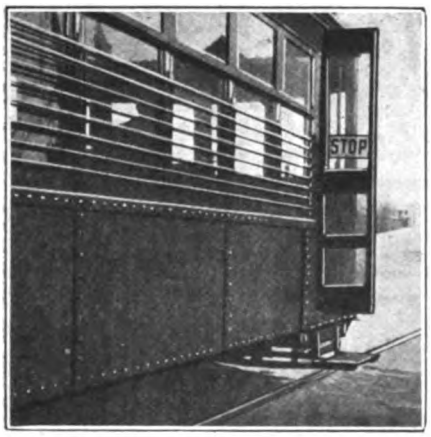


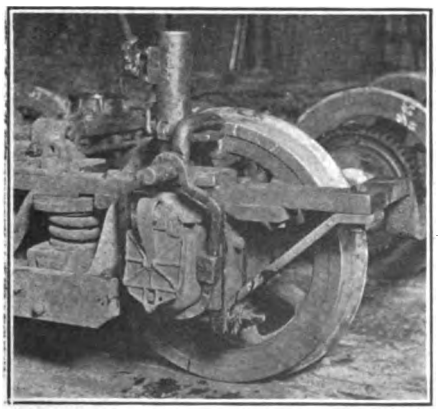
"Stop" Warning Sign on Doors Prevents Accidents

visor of Montclair carhouse, made the suggestion that a large "Stop" sign be placed on the doors of safety cars where it would be readily visible to a motorist on the right-hand side of the car.

This sign is lettered in red on the glass of the rear half of the door just above the middle by a decalcomania process, at an almost negligible cost. When the door is closed it is inconspicuous, but when the door is opened at right angles to the side of the car, the word "Stop" stands out prominently before an approaching automobile driver. The Public Service Railway first tried the idea in the early summer of 1922, and more recently every safety car operated by the company has been equipped with the "Stop" signs on the doors. Since the inauguration of the scheme the company reports that not one single door has been knocked off safety cars operated in the Essex division.

Removing Pedestal Bolts

AN INGENIOUS apparatus has been devised in the shops of the Metropolitan West Side Elevated Railroad, Chicago, to facilitate the removal of pedestal jaw bolts. An especially designed yoke, a lever bar and a hydraulic jack are the parts comprising this apparatus. The yoke is forged out of 1⅛-in. x 1⅛-in. wrought iron with lugs welded on each side in order to hold the yoke centrally on the journal box. The lever bar is of an exaggerated D-shape construction forged out of 2-in. round wrought iron. Any conventional truck jack with a lifting lug near the bottom may be used in conjunction with this device.



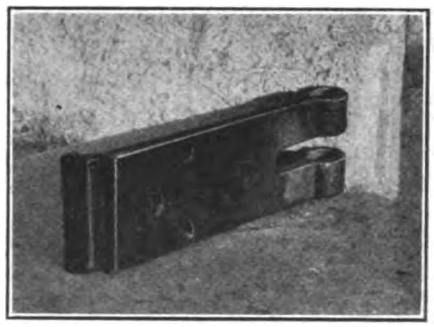
Showing Apparatus in Position

As will be seen from the accompanying illustration, raising the jack will relieve the journal box pressure on the pedestal jaw bolts, allowing this bolt to be removed with ease. The advantage and feature of this new apparatus lies in the fact that it is a great labor saver. Previous to its installation the bolts were removed by placing a crowbar underneath the rim of the wheel and blocking up on the truck frame in order to form the fulcrum. Four or five men on the other end of the bar, which oftentimes had to be extended in order to make room for the men, would form sufficient leverage to depress the equalizing springs. Removal of the bolts by this new method has proved highly satisfactory, inasmuch as it can be operated by one man with extreme safety.

Forged Steel Fulcrums Replace Castings

THE cast steel brake fulcrums in use on the cars of the San Francisco Municipal Railway are not as satisfactory as another design made of forged steel which was developed in the shops of this system and which is being substituted for the older type as fast as renewals are required. Not only is the old design considered too light for the duty required, but, being a steel casting, when bent or broken by accident, the only repair feasible is by replacement of a new part. The new design is heavier and breakage is rare, but when damaged by collision, etc., the wrought iron plate can be heated readily and reshaped.

In making up the new design a 1 x 8-in. rectangular hole is first punched in a ½-in. steel plate 5 in. wide and 2 ft. long. The plate is then heated at its middle and the two halves are folded together around a 1⅛-in. diameter pin placed across the middle of the plate in the position to be occupied later by the fulcrum pin. To fasten the two halves rigidly together, without the necessity for drilling and bolting, an electric weld is made along each edge, thus uniting the two parts brought into contact by the fold.



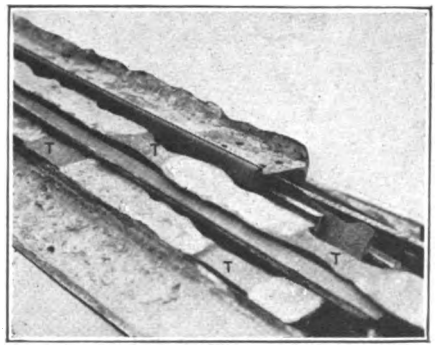
Brake Fulcrums Made from Steel Plates

One of the plates has about ¾ in. at the end bent up at right angles, to fit over the brake beam and give a firm hold against the pull of the brake rods. The fulcrums are firmly secured to the brake beams by three ⅝-in. bolts.

These new plates, designed by William C. Bendel, master mechanic of the San Francisco Municipal Railway, are not costly to build and have given such satisfactory service that they are now being specified on new equipment.

Rail Bases Destroyed by Corrosion

THE accompanying illustration shows the badly damaged condition of 8-in. T-rail bases after twenty-nine years of service on an electric railway system in the West. The corrosive action was most rapid in the part of the rail resting on the ties; the illustration shows two rails, bottom up, with points where the base rested on the tie marked "T." At these points the rail base had been eaten away, both in width and thickness, much more than at other sections. The part of the line from which these rails were removed was in filled ground which was always



Rails Eaten Away by Corrosion
Points marked T indicate bearing of rail base on tie. Action was more extensive at these points.

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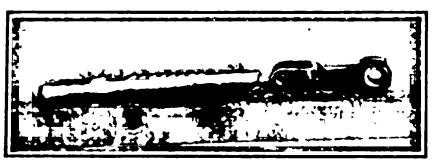
wet. Damage was fairly uniform all along a ½-mile double-track line.

Damage to the rail head and web was comparatively slight, the serious disintegration being confined to the base. These rails were taken out of service on account of the destructive corrosive action, i.e., neither the wear on the rail head nor the necessity for substituting another rail section would have required the removal of the rails at the time they were taken out of service.

Cutting Keyways for Small Diameter Shafts

TO CUT keyways in the ¾-in. holes in steel castings used for opening gates at the forward end of cars, William C. Bendel, master mechanic of the San Francisco Municipal Railway, uses a specially designed tool with which the keyway is punched on the hydraulic press.



Cutting Tool and Casting Slotted for Key
Cutting tool is at the left, with lower or entering end near the casting. The keyway in the casting shows in outline.

The tool consists of a ¾-in. shaft of case-hardened, cold-rolled steel, in which a slot carries a series of cutting teeth shaped to cut parallel to the axis of the shaft. After the hole is drilled in the steel casting, the end of the cutting tool shaft is inserted in the hole and pressure is applied to the upper end of the tool by the hydraulic press. As the tool moves downward the first tooth cuts a square cornered groove or keyway 3/32 in. deep and is followed by the second tooth, which increases the depth of the groove by a like amount, each successive tooth adding 3/32 in. to the depth of the keyway.

As an experiment the plan of speeding up the work by punching two castings at once was tried. This proved to be too great a strain on the cutting tool and two teeth were broken out near the top, as shown in the illustration. Since the break, however, the punching of single castings 1¾ in. thick has been done successfully with the tooth at the top making a cut 3/32 in. deep.

This method of slotting keyways has long been used in brass and bronze castings and the tool shown was made to apply the same idea in working the harder metal.

New Equipment Available

Repairing Arms of Iron-Bound Special Work

THE Metal & Thermit Corporation, New York, N. Y., calls attention to the method of making repairs to broken or loose arms in iron-bound frogs, mates or switches through the use of thermit welding. These repairs are made without removing the broken or loose parts from their location in the track. One or two yards of paving around the defective parts are removed and just enough concrete or paving foundation is cut out from under the rails to allow the application of mold boxes. A certain amount of the cast-iron metal is chipped away to permit the thermit steel to flow between the rail and the casting and thus to amalgamate with both parts. The accompanying illustration shows the required procedure for welding. The cost of repairs made according to this method have averaged as follows:

Thermit welding material, about	$30
Labor, about	20
Total	$50

The quantity of material required, of course, depends to a considerable extent on the size of the rail and other circumstances. This method has been used in Joliet, Ill., and in Providence, R. I., with economical results.

Repairing Arms of Iron-Bound Special Trackwork by Thermit

New Type Commutator Slotter

THE Martindale Electric Company, Cleveland, Ohio, is marketing the "Imperial Undercutter," which is a new device for slotting commutators. The slotting machine, as shown in the accompanying illustration, is driven through a flexible shaft from an electric drill and may be purchased with or without the motor, as desired. The cutter sets in a recessed portion of the tool, and V-shaped milling cutters are used instead of the usual square-toothed saw. This produces a "V"-shaped slot which is recommended as being self-cleaning, and also avoids the necessity for scraping the strips of mica from along the edges of the commutator bars. A movable block with a guide for riding in the adjacent slot is provided at the left of the cutter, and a micrometer screw adjustment on the shaft of the cutter enables one to locate the cutter in the exact center of the mica. There is also an adjustable "V"-shaped rest for regulating the depth of the slot and to insure uniformity.

New Type Commutator Slotter

The handle shown at the left in the illustration is hollow, so as to permit the attachment of compressed air lines to blow away the dust from the front of the cutter and thus to enable the operator to see his work clearly at all times.

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The News of the Industry

Transit Bills Pass

New York Senate Approves Reorganization of Public Service Commission and Five-Cent Fare Proposition

By a strict party vote the Democratic Senate passed on April 4 the Smith-Hylan New York City transportation bill, which now goes to the Republican Assembly for concurrence. Two other measures of the Governor's public utility series were also disposed of by the Senate.

The bill to reorganize the Public Service Commission by substituting a commission of three members, removable by the Governor, for the present five commissioners, who can be removed only by a two-thirds vote of the Legislature, and the Walker bill establishing a 5-cent fare in all cities throughout the State were passed and sent on their way to the lower house.

The transportation bill, which vests in the New York City Administration absolute control of the city's transit lines, including the right to own and operate bus and traction lines, was passed by a vote of twenty-six to nineteen. The vote for the bill reorganizing the Public Service Commission stood twenty-six to twenty. The five-cent fare bill was passed by twenty-eight to seventeen.

The New York County Republican Committee on April 3 declared that the city should control its transit contracts and construct its subways, that the state should continue to do the regulating and that the people should be spared the blight of municipal operation of subways and buses.

Henry H. Curran, chairman of the transit committee appointed by the county committee six weeks ago, read the report. Mr. Curran's committee makes the following recommendations:

1. That the whole of the public's power to agree with a transit company on a modification of a transit contract be vested in the city. This is home rule—and a 5-cent fare if the city so determines.
2. The planning and building, by contract, of new subways should be done wholly by the city. This breaks the deadlock between state and city that has stifled subway development.
3. Our city should be spared municipal operation of transit. This recommendation holds city government to its proper sphere of work, and insures the use of the city's limited funds for schools, parks, docks and other pressing needs. As to buses, the city has now and always did have the power to arrange responsible private operation of buses on the city's own terms.
4. The regulation of transit operation—a difficult, intricate work that is quasi-judicial in its nature and requires continuity of control—should remain in the Transit Commission. This leaves regulation where it belongs—a function of the state.
5. The Transit Commission should be retained, in particular, to perfect its plan for a city-wide and city-owned unification of our transit system as it now exists, for a 5-cent fare. By our first recommendation the plan may not be put into effect without the city's consent.

The policies thus announced are expected to guide the Assembly, which is Republican, in its handling of the New York transit legislation.

Pennsylvania to Have Public Utility Information Bureau

A movement has been started by the public utility companies operating in Pennsylvania to put their case more forcefully before the public. At a meeting at Philadelphia on April 4, it was the unanimous opinion of executive officers of the gas, electric light and power, water, electric railway and telephone companies that publicity was the most effective way to create and maintain cordial relations with the public.

Officials of all of the utility companies in Philadelphia and from Pittsburgh, Scranton and other cities and towns throughout the State attended the meeting. A temporary publicity committee was organized, with P. H. Gadsden, vice-president of the United Gas Improvement Company, as chairman. Among the railway men on the committee are C. B. Fairchild, Jr., of the Philadelphia Rapid Transit Company; and C. L. S. Tingley, second vice-president American Electric Power Company, the successor to the American Railways.

Mr. Gadsden said every large State in the Union, with the exception of Pennsylvania, has a committee functioning along the lines it is purposed to lay out for the Pennsylvania committee.

It is expected the committee will choose a director in the near future.

$4,000,000 Is Being Spent by Chicago Elevated Roads

Estimates of the cost of improvements contemplated by the "L" roads in Chicago this year in addition to ordinary expenditures, total nearly $4,000,000. The largest single item is for 105 new cars, at a total cost of $2,400,000, delivery on which is expected to begin early in May and be completed by fall. The cars will be placed in service as fast as they are received.

Some of the more important improvements and the estimated cost of each are:

New cars (105)	$2,400,000
Extending platforms for 8-car train operation	496,500
New Uptown Chicago Station, Wilson avenue	155,000
Roosevelt Road station and alteration of structure due to street widening	161,000
"L" share of alterations on account of new Union Station	137,500
Extension Douglas Park line to Oak Park avenue	60,000
Express tracks Wilson to Lawrence avenue	88,500
Alterations on Oak Park "L" for Ogden avenue widening	26,000
Total	$3,524,500

$52,000,000 Released for Subway Work

Governor Pinchot of Pennsylvania on April 3 signed the Daix bill which releases the "frozen money" held as unexpended balances of loans authorized for specific purposes under the Taylor rapid transit plans for Philadelphia.

Voters of Philadelphia, under provisions of the Daix bill, now will have the opportunity of deciding on transit projects. The situation heretofore was that $52,000,000 of bonds voted for transit improvement was earmarked in such a way the money was tied up so it could not be used except as had been directed under the plans adopted when A. Merritt Taylor was Director of City Transit.

The Mayor's comment follows in part:

> Apparently Council will have authority to cancel many of the authorizations for high-speed lines voted by the people in 1916. If the people wish to hold what they secured and now have in the way of authorizations and appropriations for such lines as the Broad Street subway and the extensions to League Island, Roxborough, Chestnut Hill, Germantown and Olney, they will have to fight it out with Council.
>
> That is about the way we view the situation here, and, of course, will take opportunity from time to time to keep the people advised.

Another development in the transit situation on April 3 was a conference attended by Mayor Moore, City Solicitor Smyth, Director Twining and A. Merritt Taylor, regarding high-speed transit problems. The part played by the Mayor in the conference was not made known by any of the parties present, but in view of the announcement made on his return that he intended "getting on" with transit plans and advertising bids for the Board Street subway by June 1, it is thought that an attempt was made by him to reconcile the differing views of Mr. Taylor and Director Twining through compromise.

Chicago Democrats Elect Dever Mayor

William Emmett Dever, Democratic candidate, was elected Mayor of Chicago on April 2 over Arthur C. Lueder, Republican nominee, by 103,748 plurality. Judge Dever carried all his associates on the Democratic ticket to victory. Thus Democrats now for the first time in many years are in complete control of the affairs of the second largest city in the United States.

Dever's plurality is the largest ever given a mayoralty candidate, except that of Mayor Thompson, who won his first victory in 1915 by a margin of 147,477. Mayor Dever will have the support of a Democratic City Council, the changes in that body giving the Democrats about four to one advantage. Dever is pledged to the following reforms:

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Municipal ownership and operation of transportation lines, with immediate projection of an adequate subway system.

School board and schools to be taken entirely out of politics.

Erection of school buildings sufficient to provide every child with a seat, full time.

Some commentators on the result of the election profess to see in it the strengthening of William R. Hearst's influence upon the city government. It is understood that Mr. Hearst personally contributed $100,000 to Dever's campaign fund and the Democratic National Committee chipped in with $50,000.

Mayor William Hale Thompson's administration has been a constant target for several years. The Mayor will retire from office knowing his machine turned the city over to the Democrats and left his own party torn by internal dissentions that may not heal for years.

Municipal Operation of Staten Island Lines Attacked

Municipal operation of the Staten Island Midland Railway, under Grover A. Whalen, Commissioner of Plant and Structures of the city of New York was characterized as a complete failure by Alderman Bruce M. Falconer at the meeting of the Board of Aldermen on March 27.

The discussion of the railway came up when Commissioner Whalen requested the board to grant him another $50,000 revolving fund for the line. Since the city took over the line it was said that $450,000 has been sunk in it.

Mr. Falconer was quoted in part as follows:

It is two years and one month since the city acquired control of this railway. The trial of municipal operation which the Hylan administration purposes for all transit in this city, in this instance at least, has proved a complete financial failure. If the revenue is sufficient to maintain service, why does Commissioner Whalen come here asking for more money? His reports omit depreciation of rolling stock and equipment when anybody knows such allowance should be made. There is no reference to taxes that would have to be paid by a private operator. The amount of interest on city bonds is not mentioned, nor are the prospective damages in civil actions computed.

To this criticism Commissioner Whalen is said to have replied:

It is absurd to compare this road with any other in the world. It was defunct for years. It lost $30,000 in its last year of operation and paid no franchise tax to the city for the ten preceding years. It didn't meet any of its paving obligations to the city and the Hylan administration was forced to take it over, not by choice but on account of necessity.

The board voted to grant Mr. Whalen his requested funds.

Scranton Questions to Be Arbitrated

There will be five arbitrators to decide the wage and working conditions issues between the Scranton (Pa.) Railway and its employees. This was decided on March 31. The company was officially notified on that day of the action of the union in voting to accept arbitration as the counter proposal of the company. A draft will be drawn of exactly what phases of the matter are to be submitted to the board. Two arbitrators will be appointed by each side and the four thus selected will determine the fifth man. The men are asking an increase in wages of approximately 10 per cent.

Two Commissions in Detroit Make Joint Report

That the proposed system of subway dips in downtown Detroit as announced by the street railway commission is not satisfactory after a more thorough study by the rapid transit commission and the street railway commission, is evidenced by a joint report by the two commissions to Acting Mayor John C. Lodge. The following recommendations are made in the report:

1. That more immediate relief for surface congestion in the central area be obtained through further rerouting of lines in the downtown district.
2. That the rapid transit commission be specifically instructed to prepare its plans and program for the hub of a rapid transit system serving all of the six main arteries within the central business area.
3. That part or all of such hub plans as may be determined to be wise by the City Administration be submitted to the regular election this fall.

The proposed co-operative effort, and studies by the two commissions and their engineers will, the report stated, place in the hands of the City Administration, within a few months' time, sufficient engineering, legal, and financial data to make it possible to submit a definite rapid transit scheme to the electors of Detroit at the October election.

It is the street railway commission's determination to hold public hearings in the City Hall and discuss the needs of each district, according to Ross Schram, assistant general manager of the department, thereafter beginning work upon these extensions in the order of their immediate necessity, as shown during the hearings. For the sake of discussion, the various districts where extensions are required now or will be in the near future, are divided into eleven sections. This announcement was made in anticipation of the favorable result at the April 2 election.

In addition to these situations, the department plans to take care of out of its ordinary funds, a large amount of minor track changes necessary for rerouting, as well as improvements in downtown loading facilities required immediately, pending the approval of the plans for the subways.

Accidents Decreased in 1922.—In its publicity symposium, the "Truth," published in the daily papers, the Memphis (Tenn.) Street Railway calls attention to the fact that there were 124 fewer accidents in 1922 than in 1921; that outstanding litigation decreased 57 per cent, and that the claim cost was reduced. The number of new suits arising in 1922 showed a decrease of 36 per cent as compared with 1921. People are learning the advantages of dealing direct with the claim department to secure a prompt settlement of just claims.

New Chicago Executive Starts Off on the Right Foot

After G. A. Richardson, recently appointed vice-president of the Chicago Surface Lines, had been filling his new position for a month, he issued a statement to all of the employees on the property, which has met with a very warm reception. The *Union Leader*, official publication of the street carmen's union in Chicago, has referred to the message of the new operating head in most kindly and complimentary terms. In discussing his reference to the need for effective team work, this paper said:

No group of workers realizes the value of team work so well as the organized group. The expression of the new operating executive indicates a progressive viewpoint in aiming to establish the kind of relations necessary to bring proper results, and with this spirit continued and a just regard for the interests of all maintained there is every reason to believe that the team work suggested by Mr. Richardson will find generous response from the employees.

Mr. Richardson pointed out to the employers that "there is no intention on my part of trying revolutionary methods. Like all of those identified with the property I have but the single desire to assist in developing the surface lines to the highest efficiency in service. Perfection in a property may not be possible, but improvement is always possible, and that is what we want to work for here."

In commenting on this thought, the union paper stated that it represented "a healthy indication of the broadening viewpoint of up-to-date executives in the electric railway business." On this point the editorial said:

Too often in the past the man accepting an executive position in the electric railway business, eager to make a showing, has wrecked his opportunities for service by attempting innovations that were unfitted for the environment, and therefore proved impracticable. In many cases these innovations have been arbitrarily established, with detriment to the interests he represented.

Mr. Richardson had some comments to make on courtesy:

In our business, as in others, one of the most valuable assets is courtesy—and courtesy is also the best evidence of a man's good faith in making for the company's success. Answering questions pleasantly; exercising care in insuring the safety of those boarding and leaving cars; being careful not to run by waiting passengers; courteous explanation in cases where transfers appear to be irregular; a little bit of help now and then to the aged and infirm—all of these things are easy to do, and they form the very foundation of successful public service.

The *Union Leader* pointed to this paragraph as one of the things which the Amalgamated Association and its official journals have continually emphasized. Its final characterization of the message of the new vice-president was that it "is a common sense, practical talk. It carries neither ice nor sugar and is free from the formal stiffness that marks the usual pronouncements of this character. It will be accepted in good spirit by the employees, and so long as Mr. Richardson shows a disposition to maintain just relations, he will find the members of Division 241 doing their share to bring about the fullest measure of team work to produce a service that will be beneficial to all interests concerned."

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Electors Approve Franchise Amendment

The voters of Jackson, Mich., on April 2 approved an amendment to the grant of the Michigan United Railways which will mean a cancellation of the obligations on the part of the company to do future paving between tracks. As a result of the vote paving will be done between the tracks and 18 in. to either side by the Michigan United Railways on West Ganson Street at a cost of $61,000, and Page Avenue will also be paved at an estimated cost of $80,000.

John F. Collins, vice-president, general manager and receiver of the company, was recently granted permission by Judge Simons in the District Court to borrow $141,000 for these paving jobs provided the amendments to the charter were adopted in Jackson. The proposal of the company, which was in the form of a binding contract approved by the Federal court, was that the company would borrow money and increase its investment in Jackson $141,000 on condition that when Ganson, First and Page Avenue were fixed up the company would not thereafter be bound by franchises and ordinances to pave between the tracks of its city lines.

Can Youngstown Afford Railway and Jitney Service

The Youngstown (Ohio) *Vindicator* has raised the question: "Can Youngstown afford both street car and jitney service?" In concluding a long editorial that paper said:

> The question must be faced squarely. Youngstown cannot go on letting the jitneys run wild and the railway pile up a deficit every month. If that condition continues we shall soon have no street cars, and the jitneys, of course, do not pretend to meet our transportation needs. They take only the cream and leave the railway the unprofitable business. The only way the company can get back on its feet is to reduce fares and get more passengers. But there will always be riders who will pay 10 cents for a jitney ride even though the jitney keeps the railway car fare high and prevents others from riding at 6 or 7 cents.
>
> This is the situation. Does Council have the brains and the courage to lift us out of it? And will the city back Council in a manly search for a solution?

Texas Governor Kills Bill to Permit Bus Operation by Railways

Governor Neff of Texas has vetoed the bill which was passed by the Legislature at its recent session authorizing electric railways and interurban lines to operate motor buses. Under the provisions of the bill city railways, suburban or interurban lines would be permitted to acquire, own, maintain and operate automobiles, automobile buses and automobile bus lines for the transportation of passengers or property, and to be so authorized in future charters.

The Governor used this language in its disapproval:

> The public policy of the state of Texas has been to restrict private corporations or quasi-public corporations to be incorporated for one purpose. The enlargement of the powers of a railway or an interurban railway as provided in this bill is an infringement of this public policy, as declared by our laws, and should not be allowed unless the benefits to the public are self-evident.
>
> The permission for a city railway or an interurban railway to own, maintain and operate automobiles, automobile buses and automobile bus lines, as given in this bill, is an extension of corporate power that would permit the strangling of competition and ownership of independent bus lines. This measure, to say the least, has in it many potential objections.

Mr. Doremus Elected Detroit Mayor

$17,000,000 in Bonds Authorized for the New Railway Work and for the Construction of Power Plant

Frank E. Doremus was elected Mayor of the city of Detroit on April 2 by the largest majority in the history of the office, defeating Dr. James W. Inches, former police commissioner. Mr. Doremus, former congressman from the Detroit district, had outlined his policy towards municipal ownership and asserted that the application of horse-sense and patience was essential in handling the matter. Unofficial returns indicated that Mr. Doremus received 89,391 votes to 34,649 cast for Dr. Inches. The vote cast, a little in excess of 124,000, fell behind the vote of 1920 and 1921, but exceeded that of the spring election of 1922.

The $5,000,000 bond issue for extensions and improvements to the municipal railway, twice rejected at previous elections, and also the $12,000,000 bond issue for the construction of a municipal power and lighting plant, were carried. More than three quarters of the output of the new power plant will be supplied to the railway.

Pleased Over Passage of Bond Issue

Mr. Doremus expressed himself as pleased that both bond issues had carried although he did not campaign for them. He will take office about April 10, depending upon the time at which the official count of the ballots is made. The new Mayor will have to run for office again in the fall as the April 2 election for Mayor simply filled the vacancy caused by the resignation of former Mayor Couzens to become United States Senator.

As pointed out before the election, the $5,000,000 provided by the bond issue will be expended for extensions to existing street railway lines and in the purchase of 200 additional new cars. The $12,000,000 for a power plant will not all be made available at one time as it is estimated that $2,000,000 will start the project and supply the first year's needs. It has been cited that failure to provide for the power plant would have threatened the present low fares on the municipal lines. A very large saving is expected to accrue to the city annually by supplying its own power as compared with the cost of purchased power when the present contract rates for power have expired.

Both bond issues required a 60 per cent majority. The street railway issue received 61 per cent and the power plant bond issue received 63 per cent.

Substitute Bill to Be Introduced in New York

A dispatch to the ELECTRIC RAILWAY JOURNAL from Albany on the afternoon of April 6 said that Assemblyman George N. Jesse, Republican representing the twenty-third district, New York City, will introduce on Monday night, April 9, in the New York State Legislature the Republican substitute bill regulating utility matters in the city of New York. The measure will restore to the city of New York the right to enter into contracts and franchise agreements with operating corporations, to regulate the rate of fare to be charged and to build and own transit facilities, but will reserve to the state Public Service Commission control over service and capitalization. Assemblyman Jesse has confidence that his substitute measure will pass the lower house and will, in general, be accepted by the Democratic Senate.

Further amendments to the Public Service Commission Law will be offered from the Republican side of the House restoring to municipalities the right to enter into contracts and franchise agreements with local corporations, but will reserve to the State regulatory body supervision over service and capitalization. There is little disposition at the present session of the legislature to change the personnel or manner of appointment of the present State Public Service Commission.

New Wage Scale Being Planned

Employees of the Community Traction Company, Toledo, Ohio, are seeking a new wage scale to replace the present agreement which expires on May 21. The present scale for trainmen is 45 cents an hour up to three months service, 47 cents for the next nine months service and 50 cents thereafter. It is expected that the new contract will be ready to submit to the officials of the company by April 20.

Men Seek New Wage Agreement.—Members of the union recently voted to appoint a wage committee to draw up a new wage schedule with the Boston (Mass.) Elevated Railway. The present scale expires on July 1.

Men Discuss Wage Agreement.—Railway employees of the Cumberland County Power & Light Company, Portland, Me., have had under discussion new working conditions and wage schedules. The present agreement expires on May 1. Last year the men voluntarily accepted a wage cut.

Wages Increased Five Cents an Hour.—Beginning April 1 trainmen of the Harrisburg (Pa.) Railways were to receive a wage increase of 5 cents an hour. First year men will be paid 48 cents an hour, second year men 49 cents and employees who have served more than two years will receive 50 cents an hour.

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Financial and Corporate

$13,827,583 Residue Receipts

Revenues of the Chicago Surface Line Decline with Decrease in Fares —Operating Expenses Also Reduced

MANY interesting features, both financial and physical, are presented in the ninth annual report of Henry A. Blair, president Chicago Surface Lines, to the board of operations. During the year ended Jan. 31, 1923, the system carried 762,629,211 revenue passengers, as compared with 750,515,622 the previous year.

Throughout the fiscal year ended Jan. 31, 1922, an 8-cent fare was in effect on account of a Federal injunction against the order of the Illinois Commerce Commission. The case was reopened and the fare ordered reduced to 6 cents, effective May 1. This order also was held up by the Federal court, the award being on condition that the companies not later than June 15 should charge not to exceed 7 cents, with three tickets for 20 cents and 3-cent cash fares for children between seven and twelve years of age. The fare was reduced June 15, 1922, in accordance with this award. The original order called for the sale of the tickets by conductors on the cars, but this has since been modified, so that tickets are obtainable only at certain designated agencies. This reduction in fares caused a decrease in total revenue from $60,343,733 in 1922 to $56,103,062 in 1923. Expenses were reduced from $46,516,150 to $44,416,070, leaving residue receipts, after taxes and reserve for renewals, of $11,686,992 for the past year, as compared with $13,827,583 for 1922. Complete figures are shown in the accompanying table.

CHICAGO SURFACE LINES

Earnings, Expenses and Division of Residue Receipts for Twelve Months Ended Jan. 31, 1922 and 1923

Earnings	1921-1922	1922-1923
Passenger cars (inc. mail carriers)...	$59,706,413	$55,495,311
Chartered cars ...	12,121	9,594
Newspaper cars..	16,161	15,868
Freight earnings..	2,318	1,864
Hospital car service	4,194	5,078
Advertising	247,184	253,678
Rents of buildings, etc.	106,479	100,240
Sale of power.....	92,371	89,341
Interest on deposits	137,939	119,033
Miscellaneous	18,553	13,055
Gross earnings....	$60,343,733	$56,103,062
Expenses		
Way and structures	$ 3,040,940	$ 2,556,627
Equipment	4,348,373	3,788,171
Renewals	4,827,499	4,488,245
Power maintainance	320,375	316,450
Power operation..	3,128,792	3,175,391
Conducting transportation—trainmen	21,574,699	19,662,636
Conducting transportation—other.	3,208,603	2,912,780
Traffic	34,547	42,093
General and miscellaneous—damages	2,271,224	2,356,329
General and miscellaneous—other	1,568,098	1,859,348
Taxes	2,193,000	3,258,000
Total expenses..	$46,516,150	$44,416,070
Residue receipts.	*$13,827,583	*$11,686,992
Divided:		
Chicago Railways—60 per cent.....	* $8,296,550	*$7,012,195
South Side Lines—40 per cent.....	* 5,531,033	* 4,674,797

*Includes city's 55 per cent of net divisible receipts, as defined by ordinances.

Substantial reductions in expenses were made in way and structures, equipment and power maintenance and in conducting transportation. The renewal fund, which represents 8 per cent of the total gross revenues, was proportionately reduced. Power and damages were higher, presumably on account of the greater car mileage run.

The 80-cent wage scale for trainmen, which had been in effect since June 1, 1920, was reduced 10 per cent, effective Aug. 6, following a strike of the trainmen which tied up the system for six days. A similar reduction in pay was made in other departments.

During the year a number of applications were made to the Illinois Commerce Commission for authority to establish motor bus lines in the city. The commission took the following stand: "In the consideration of motor bus transportation the commission should be cognizant of the fact that it could not be considered to be for the public convenience and necessity of either the whole people of the city of Chicago or those persons immediately dependent upon the surface or elevated lines for transportation that bus line service should be instituted which would either seriously impair the service of present lines of transportation or would ultimately destroy this service entirely."

Betterments of service growing out of the special transportation studies made by John A. Beeler have continued with good results. Investigations by experts within the company's organization are going forward with a view to making improvements in the service and at the same time effecting better economic results.

New Track Constructed

During the nine years of unified operation the companies have constructed 96.56 miles of new single track, at a cost, including paving and overhead, of $4,532,639, and they have reconstructed 399.18 miles at a cost, exclusive of overhead structure, of $18,389,615. The changes in mileage during the year are as follows:

Total miles single track Jan. 31, 1922	1,061.32
Extensions	0.56
Abandoned	0.98
Reconstructed	33.48
Total miles single track Jan. 31, 1923	1,060.90

In connection with work during the year the company laid or renewed 160,831 sq.yd. of paving, principally granite block, which cost approximately $558,048. During the nine-year period of unification the companies have expended for paving the sum of $5,157,882. Additional paving laid in maintenance was 156,840 sq.yd., costing $531,118.

During the year there were 11,843 wreck wagon calls, of which 56 per cent originated from blockades caused by breakdowns of wagons and trucks on the tracks, fires and other causes apart from car operation.

All power is purchased from the Commonwealth Edison Company under contract. For the year the amount purchased (a.c.) was 546,507,077 kw.-hr., which was converted into 499,875,623 d.c. kw.-hr., the difference representing the loss in conversion. The total cost of the energy at the d.c. busbar is given as $4,507,523. This includes operation maintenance, fixed charges and purchased power. Some of these items are not shown separately in the earnings statement.

Changing the trolley wire from 00 to 000 has helped reduce the number of breaks and consequent delays to traffic.

Car Failures Reduced

The number of out-of-order cars pulled in averaged 1,563 per month, compared with 1,961 the previous year, a decrease of 20.3 per cent. During Christmas week over 96 per cent of the cars were available for service.

During the year there were authorized forty-five double-truck one-man cars, to be built at the company's shops; 100 double-truck four-motor cars to be built by outside manufacturers, and sixty-nine double-truck four-motor cars to be built at the company's shops. This last order is to replace a part of the cars lost in the Devon Avenue carhouse fire.

The company spent $691,314 in general overhauling of cars. The total rolling stock on the system now consists of 3,198 passenger cars, 486 work cars and service cars and three locomotives.

The average daily passenger receipts for the year amounted to $154,583, the highest day being Saturday, April 15, when $191,403 was taken in.

A table is included showing names and dates of employment of all persons connected with the company forty years or over. There are ninety-nine of them, including John M. Roach, who is the oldest in point of service, having been with the company and its predecessors since 1872. The number of employees in continuous service for twenty-five years or over is 1,922.

The purchase price of the company, in accordance with the city ordinance, was $160,944,226 at Feb. 1, 1923, as compared with $160,610,561 the previous year.

By the terms of the ordinance, 8 per cent of the gross revenue is reserved for renewals. For technical reasons, a special renewals and equipment fund has been created during the past few

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years. The condition of the reserve funds is as follows:

RESERVE FOR RENEWALS	
Balance in reserve at Feb. 1, 1922	$11,845,768
Sale of unnecessary property and salvage	159,629
Interest earned	360,724
Balance in reserve at Feb. 1, 1923	$12,366,121

SPECIAL RESERVE FOR RENEWALS AND EQUIPMENT	
Balance in special reserve at Feb. 1, 1922	$ 310,562
8 per cent of gross earnings	4,488,249
Interest earned	34,555
Total	$ 4,833,366
Less: Expended for renewals	2,968,431
Expended for new passenger cars	243,367
Total expended	$ 3,211,798
Balance in special reserve at Feb. 1, 1923	$ 1,621,568
Total balances at Feb. 1, 1923	$13,987,689

This balance is in cash, and is on deposit in various banks.

Under the terms of the ordinance, the residue receipts of the company are divided, 60 per cent, or $7,012,195, going to the Chicago Railways and 40 per cent, or $4,674,797, going to the South Side lines.

Chicago Railways Company Report

The report of Henry A. Blair, president Chicago Railways, shows the following distribution of the residue receipts for the year ended Jan. 31, 1923:

Chicago Railways' share (60 per cent) of residue receipts		$7,012,195
Deduct joint account expenses		360,000
		$6,652,195
Deduct 5 per cent interest on capital valuation		4,630,943
Income divisible with City of Chicago		$2,021,252
Chicago Railways' 45 per cent of divisible income		909,563
Five per cent interest on capital valuation		4,630,943
Other income		249,956
Total income		$5,790,462
Interest on bonds	$4,716,680	
Interest on loans	94,785	
Sinking fund	250,000	
Other deductions	173,712	
		5,235,177
Net income		$555,285

The net income of $555,285 is before payment of adjustment income bond interest and before providing for Federal income and excess profits taxes for 1922, or for any additional Federal taxes for prior years.

For the year the rate of return upon the company's capital investment, or city purchase price, was 5.98 per cent; the average rate of return on the purchase price required to meet fixed charges, including sinking fund, is approximately 5.5 per cent.

Because of the inability of the company to finance any of its securities during the year, capital expenditures were restricted as much as possible. The city purchase price at Jan. 31, 1922, was $92,518,537, and capital additions during the year were $180,320, making the purchase price at Jan. 31, 1923, amount to $92,698,857. This value applies to a track mileage of 585.6, which is substantially the same at the beginning and the end of the year.

Further financial and operating statistics contained in this report are given in connection with the Chicago Surface Lines' report.

In conclusion Mr. Blair states: "The vital question now concerning the people of the city of Chicago is that of improved transportation. The most zealous efforts and earnest co-operation of all interests—the people, the city authorities and the companies — are absolutely essential to a speedy and proper solution of this problem."

Chicago City Railway Report

The report of Leonard A. Busby, president, to the stockholders of the Chicago City Railway for the year ended Jan. 31, 1923, shows the earnings, expenses and residue receipts of the Chicago Surface Lines under unified operation and the income account and balance sheet of the Chicago City Railway.

Of the residue receipts of the Chicago Surface Lines 40 per cent, or $4,674,796, went to the South Side Lines, namely, the Chicago City Railway, the Southern Street Railway and the Calumet & South Chicago Railway.

A comparative statement of gross earnings, operating expenses and residue receipts for the past two years follows:

CHICAGO SURFACE LINES	1922-23	1921-22
Residue receipts	$11,[illegible]	$[illegible]27,583
Deduct:		
City's 55 per cent.	$1,685,205	$2,[illegible]14,963
Joint account expenses	62,000*	419,000*
Net receipts	$9,401,785	$10,433,619
Operating ratio	79.17%	77.09%
Return on city purchase price	5.842%	6.501%

*Income taxes and other ordinance deduction.

After payment of operating expenses and bond interest, the property of the Chicago City Railway produced a net income of $1,458,247, a decrease from last year of $301,681. Four quarterly dividends of 1¼ per cent each, or 6 per cent on the $18,000,000 of capital stock were paid, amounting to $1,080,000. The remainder of the net earnings amounting to $378,122 was carried to surplus, which at the close of the year amounted to $1,917,733. During the year the company paid off $286,000 of its loans, which represented capital expenditures in previous years.

Capital expenditures during the year amounted to $210,923, but there was a decrease of $75,631 in the material and supplies, carried in capital account, in accordance with the ordinance under which the company operates. This tended to reduce, by this amount, the charges to capital account during the year, leaving net capital charges of $135,291, making the purchase price at Jan. 31, 1923, $55,084,943.

Mr. Busby says that the officers of the company are firmly of opinion that a unified system of surface, elevated and subway lines, in substantial conformity with the physical plans and recommendations of the Chicago Traction and Subway Commission report of Dec. 15, 1916, is necessary, in order to work out a practical and satisfactory solution of the problem of furnishing adequate local transportation facilities for Chicago.

INCOME ACCOUNT OF THE CHICAGO CITY RAILWAY FOR THE YEAR ENDED JAN. 31, 1923		
40 per cent of the residue receipts of Chicago Surface Lines		$4,674,796
Deduct: Joint account expenses, interest on capital investment of the Chicago City Railway, Calumet & South Chicago Railway and Southern Street Railway		3,668,400
Net earnings of South Side Lines		$1,006,396
City's 55 per cent as per ordinances		553,518
South Side Lines' 45 per cent as per ordinances		$452,878
Less: Southern Street Railway proportion, as per ordinance		24,908
Company's proportion		$427,970
Add: Interest on capital investment		2,750,964
Income from operation		$3,178,934
Other income		54,398
		$3,233,332
Interest on bonds and notes outstanding		1,775,085
Net income		$1,458,247
Add: Surplus at Jan. 31, 1922		1,539,611
Surplus		$2,997,858
Dividends, 6 per cent	$1,080,000	
Miscellaneous	124	1,080,125
Surplus at Jan. 31, 1923		$1,917,733
Percentage of net income to capital stock at par		8.10 per cent

Contract Creditors to Be Paid in Full

On March 10 the committee representing the contract creditors of Richmond Light & Railroad Company, Staten Island, N. Y., addressed a letter to the company's creditors announcing the formation of the committee. Prior to the preparation and sending out of this letter, the committee had caused an investigation to be made of the status of the contract claims against the company. The information so secured led it to believe that the formation of the committee was necessary for the protection of the rights of such creditors. George M. Judd, chairman, says now that the committee has since been advised by the Richmond Light & Railroad Company that it is the intention of the company to pay its contract creditors in full. The misunderstanding with respect to the status of these claims having been cleared up, the committee feels that the purpose for which it was organized has been accomplished and that there is no further need for its activities. It is accordingly dissolving. Control of the utility passed last October to a banking group in which J. G. White & Company are interested. J. H. Pardee of the White company is president of the Richmond Light & Railroad Company.

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Interurban Report Shows Improvement

The Terre Haute, Indianapolis & Eastern Traction Company has filed its report for 1922 with the Public Service Commission of Indiana. It shows an improvement in the company's business as compared to 1921. The main figures of the income report for the year 1922 are:

Railway operating revenue.....	$3,975,795
Railway operating expenses....	2,943,396
Net revenue from railway operations	$1,032,398
Auxiliary operating revenue....	1,761,963
Auxiliary operating expenses...	1,125,247
Net revenue auxiliary operations	$ 636,715
Total net operating revenue.....	1,669,114
Less taxes	366,725
Leaving as operating income....	$1,302,388
Plus non-operating income.....	190,002
Making the gross income.....	$1,492,391

The company paid in interest on its funded debt $300,281. It paid in amortization of bond discount on the funded debt $61,485. The lease rental, bond interest and amortization items total $1,052,008, which leaves a net income balance of $440,383 for the year. This is $138,865 more than the net income on the same properties in 1921. Dividends amounted to $234,958.

Deductions from gross income in the form of rent of leased roads, interest on funded debt and amortization, already referred to and amounting to $1,052,008, left $440,383, as the income balance for the year.

The auxiliary operating revenue given in the table includes $1,214,796 for the light and power department of Terre Haute, $546,385 for the West Tenth Street power plant in Indianapolis and $781 for arcade steam heat in Terre Haute.

The report shows that 22,444,565 regular fare passengers were carried in 1922; that investment in road and equipment of the T. H., I. & E. at the end of 1922 was $15,897,323, and that unmatured funded debt of the T. H., I. & E. amounted to $5,812,750.

The Terre Haute, Indianapolis & Eastern Traction Company owns and operates 420 miles of electric railway in Indiana and 10 miles in Illinois.

The report shows that it paid in 1922 as rent for leased roads $690,241. This amount includes $447,283 of guaranteed bond interest, $234,958 of guaranteed stock dividends and $8,000 of cash guaranty for maintenance of organizations of the leased properties.

Change in Capital Structure Proposed

The stockholders of the Public Service Corporation of New Jersey on April 2 approved the plans recently announced by the company's directors for the changes in the corporation's capital structure. The plans call for the change in the present authorized common stock from $50,000,000 of $100 par to 2,000,000 shares of no par stock and for the exchange of the old common for the new on the basis of two new shares for one old one. The preferred stock capitalization will be increased to $100,000,000 of authorized preferred stock, divided into 250,000 shares of 8 per cent cumulative preferred, 500,000 shares of 7 per cent cumulative preferred and 250,000 shares of 6 per cent cumulative preferred.

Abandonment of City Lines Will Be Requested

In a communication to the City Council of Wheeling, W. Va., M. R. Stern, general manager of the Wheeling Public Service Company, notified that body that in the near future the company plans to ask the West Virginia Public Service Commission for permission to abandon all lines of the City Railway with the exception of the Mozart division. The lines do not pay.

It is proposed to give transfers from the lines of the Bus Transportation Company to those of the Wheeling Traction Company. It was the original intention of the City Railway to accept and to give transfers to and from the lines of the Bus Transportation Company. The transfer arrangement will be carried out under the same price arrangement as originally designated by the City Railway and the Bus Transportation Company. In addition the Wheeling Traction will have a transfer arrangement with the Mozart division.

I. T. S. Merger Approval Asked

Approval was asked on March 31 for a consolidation of the Studebaker utility interests represented by the Southern Illinois Light & Power Company with the properties of Senator William B. McKinley, known as the Illinois Traction System, in a petition filed with the Illinois Commerce Commission.

As indicated previously in the ELECTRIC RAILWAY JOURNAL it is proposed to consolidate these properties under the name of Illinois Power & Light Corporation. The petition states that as a result of carrying out the new plan many different issues by which the properties are now financed will be superseded.

The formal offering of the $30,000,000 of first and refunding mortgage 6 per cent Series A bonds of the Illinois Power & Light Corporation was made on April 3 at a price of 98½ and interest to yield 6.10 per cent. The banking circular discloses that Clement Studebaker, Jr., and associates, through the medium of the North American Light & Power Company, are acquiring a controlling interest in the corporation. The banking group which is underwriting the bonds provided for in the financing plan includes, among others, E. H. Rollins & Sons, Harris Trust & Savings Bank, Halsey, Stuart & Company, Spencer Trask & Company, Blyth, Witter & Company, Marshall Field, Glore, Ward & Company of Chicago and New York and Bodell & Company, Providence.

New Haven Trolleys Doing Well

The *Wall Street Journal* says that the earnings statements of the electric railways controlled by the New York, New Haven & Hartford Railroad will be an encouraging feature of the annual report of the steam railroad to be published on April 18. According to that paper the six electric railways had gross revenues of $24,106,049 in 1922, a decrease of $222,915, or less than 1 per cent, from 1921. Despite this slight loss in gross revenues, the net income of $2,071,465 was an increase of $875,878, or 73 per cent, over 1921. Worcester Consolidated Street Railway alone showed an increase in revenues, $4,399,396, against $4,390,878 the year before. The Springfield Street Railway, Connecticut Company, New York & Stamford Railway, Westchester Street Railroad and Berkshire Street Railway had smaller gross. The net income of the six companies, for 1922, 1921 and 1917, follows:

	1922	1921	1917
Worcester Con. Ry....	$492,298	$375,828	$38,105
Springfield St. Ry.	451,754	264,766	*133,179
Connecticut Co.	1,310,415	725,926	619,848
N. Y. & Stamford Ry...	*18,979	14,744	*59,018
Westchester St. Ry.....	*15,437	*55,678	*106,989
Berkshire St. Ry.	*148,587	*129,988	*234,361
Total net income ..	$2,071,464	$1,195,598	$124,406

*Net deficits.

The Worcester Consolidated Railway paid $450,000 in preferred dividends last year and Springfield Street Railway paid $232,735, compared with $139,641 the previous year. None of the others made dividend payments.

Bond Maturity Extension Authorized

Receiver E. Stenger of the Denver (Colo.) Tramway has been authorized by the Federal District Court to extend to April 1, 1924, the maturity of $788,000 first mortgage 5 per cent gold bonds of the Denver Tramway Power Company which will become due on April 1, 1923, and to offer the holders in return for their consent an increase in the interest rate to 6 per cent. In presenting his petition Receiver Stenger stated that there was not a sufficient amount of money on hand to pay the principal of these bonds, but that the sinking fund instalment of $50,000 and the April 1, 1923, interest coupon could be provided for. Holders of these bonds have been notified of the action taken by the court and will have until April 1, 1923, to deposit their bonds as evidence of their acceptance of the plan. The Guaranty Trust Company of New York City and the International Trust Company of Denver will act as depositories.

The present lien and security of the extended bonds will continue unimpaired as they are secured by a mortgage on the power plant of the company. The original issue of the bonds was for

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$1,500,000, but this has been reduced to $788,000 through the operation of the sinking fund and a further reduction of $50,000 will be made on April 1, 1923. The interest on these bonds, which are one of the underlying issues, has been paid regularly during the receivership.

$2,100,000 of Preferred Stock for Employees and Customers

At a meeting of the department heads from all divisions of the Wisconsin Public Service Corporation, Green Bay, Wis., plans were discussed for the distribution of $2,100,000 of 7 per cent preferred stock among employees and customers of the corporation in the territory served. The proceeds of this stock issue will be used to pay for additional light and power, street railway and interurban, gas, and hydro-electric improvements and extensions. The slogan of the program is "Be a Partner." It is intended not only to give every employee and customer an opportunity to buy an interest in the company, but also to encourage thrift by the saving arrangement. The employees are to be given the first opportunity to buy this stock between the dates of March 26 and April 6, after which the sale to the public will be held, from April 7 to April 21.

Another Move Toward Ending Pittsburgh Receivership

Judge W. H. S. Thomson in the Federal Court at Pittsburgh, Pa., has directed Special Master Henry G. Wasson to file an opinion with the court on the report of the receivers of the Pittsburgh Railways and their request to be discharged. The court also directed that creditors be notified and a hearing held so as to get all possible information on the financial condition of the company. This action is probably the last formal step prior to turning the railway properties back to the stockholders.

Will Apply for Rehearing on Issue of Securities

The Lima-Toledo Railroad will no doubt apply for a rehearing in the matter of its petition to the Public Utilities Commission of Ohio for authority to issue $2,750,000 of securities with which to purchase the interurban railroad extending from Lima into Lafayette Street, Toledo, formerly owned by the Ohio Electric Railway.

The evidence established beyond question that this railroad was of the physical value of more than $3,500,000, about $750,000 in excess of the securities which the company asked to issue for purchase of property.

The Public Utilities Commission at the preliminary hearing indicated in an opinion that notwithstanding that the value of the property was in excess of the amount of securities, it had been sold for less at judicial sale, and because its earnings might not possibly support a return upon $2,750,000, the authority to issue the securities would be refused.

In the event that the commission at a rehearing still refuses the authority the only course then open to the company would be an appeal to the Supreme Court of Ohio.

Auction Sales in New York.—At the public auction rooms in New York there were no sales of electric railway securities this week.

Two Months Net Equals $205,921.—For the two months ended Feb. 28, 1923, the Market Street Railway, San Francisco, Calif., realized a railway operating revenue of $1,531,266. Operating expenses amounted to $1,114,983. The net income for the two months was $205,921.

Railway Shut Down.—The Aberdeen (S. D.) Railway has disposed of the last of its equipment and has been replaced by the Motor Transit System. Up to July, 1922, the railway had been operating for nearly twelve years, but the company was losing money and the voters were called upon to decide whether the city should buy the property and operate it. The result was against municipal ownership.

Dividends Declared.—At a meeting of the directors of the Charlottesville & Albermarle Railway, Charlottesville, Va., held recently, a dividend was declared for the year on the 7 per cent cumulative preferred stock, payable 1¾ per cent on March 31, June 30, Sept. 30 and Dec. 21. A dividend of 2½ per cent was declared on the common stock of the company for the quarter ending March 31 payable on March 31.

Preferred Stock Offered to Yield 7.57 per Cent.—Paine, Webber & Company, New York, N. Y., are offering 3,500 shares Wisconsin-Minnesota Light & Power Company cumulative 7 per cent preferred stock. This issue is priced at $92.50 per share, to yield about 7.57 per cent. The Wisconsin-Minnesota Light & Power Company serves a population in excess of 800,000 in La Crosse, Eau Claire and Chippewa Falls, Wis., and Red Wing and Winona, Minn., and sixty-eight other communities. Included in the system are 25 miles of electric railway.

Property Sold At Auction.—Sale of the Gallipolis & Northern Traction Company's property was made at public auction at Gallipolis, Ohio, recently. The property consisted of electric cars, and rails extending from Gallipolis to Kanauga, together with other minor equipment. The Goldberg Iron & Steel Company of Columbus, Ohio, became the purchaser. There were four bids, $8,000, $8,025, $8,100, and $8,110. The minimum price for which the property could be sold was $8,000. The purchaser is engaged in the scrap iron business and a statement was made immediately after the sale that the property would be junked.

Gross Revenues Fall Off.—The gross operating revenues of the railway department of the San Joaquin Light & Power Corporation for the year 1922 amounted to $123,168, against $137,511 for 1921.

Directors Re-elected in Boston.—Stockholders of the Boston (Mass.) Elevated Railway held their annual meeting in Boston on April 2 and voted to ratify the acts of the directors during the year. The seven directors were re-elected. The road is being operated by the board of public trustees, with Edward Dana as general manager, so that the work of the directors is more or less perfunctory.

Auction Sale Because of Tax Arrears.—The power house and carhouse of the Northern Massachusetts Street Railway in Templeton, Mass., together with the land upon which they are situated, will be sold at public auction at the office of Tax Collector Carleton A. Fletcher in Baldwinville, on April 14, for non-payment of the taxes of 1920. The tract of land consists of about 75 acres. The tax due is $509.

Dismantling Work Begun.—The work of dismantling the line of the Norwich & Westerly Traction Company, running from Westerly, R. I. to New London, a distance of about 22 miles, has been commenced by the Eastern Connecticut Power Company, which recently took over the private right-of-way from Robert W. Perkins, receiver. Traffic over the line has been discontinued except for a distance of about 3 miles at each end.

Stock Offered.—A syndicate composed of Dominick & Dominick, W. A. Harriman & Company, Inc., and Edward B. Smith & Company is offering, at a price to yield 7¾ per cent, $2,000,000 of 7 per cent cumulative preferred stock of the American Water Works & Electric Company, Inc. The par value is $100. The stock is redeemable as a whole or in part, after three years from date of issuance, at $110 per share and accrued dividends.

Change in Capital Structure Assured.—The change in the capital structure of the Columbia Gas & Electric Company, New York, N. Y., as recommended recently by the company's directors, is now assured, officers state, more than 75 per cent of the total outstanding stock having been deposited. Stockholders will meet on April 10, and a formal vote will then be taken to effect the change from 500,000 shares of $100 par value stock to 1,500,000 shares of no par value.

Bond Issue Approved.—Issuance of $36,000 first mortgage 6 per cent bonds by the Eureka Power Company to be delivered to the New Jersey & Pennsylvania Traction Company, Trenton, N. J., in cancellation of $32,885 indebtedness has been approved by the Public Utility Commission. The board also approved issuance of $1,800, par value, of capital stock for cash to the Pennsylvania-New Jersey Railway in cancellation of an equal amount of indebtedness. After the issuance of these securities, said the board, an investment of $44.52 in fixed capital as of Dec. 31, 1922, will remain uncapitalized.

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Traffic and Transportation

Seattle Cannot Invade General Fund

Spring Election on This Point Abandoned—Committee Formed to Confer on Deficits—Many Suggestions Made

With an opinion from the City Corporation Counsel, T. J. L. Kennedy, that the city of Seattle cannot invade the general fund, even if the electorate at the general election on May 8 extended such permission, the City Council has abandoned its plan of presenting this measure to the voters at the spring election. Corporation Counsel Kennedy states that such action would not be legal in view of the injunction now in force against the city, which was issued in the fourteen taxpayers' suit against use of the general fund a year ago. Once having decided to operate as a public utility proposition, the street railway may not become a taxpayers' proposition, and in any event the plant cannot be changed into one which would draw upon the general fund for support, is the substance of the Supreme Court's ruling which Mr. Kennedy incorporates in his advice.

$4,000 A DAY BEHIND

With this contingency removed, the City Council is divided upon plans to meet the daily deficit of $4,000 which is being piled up by the Seattle (Wash.) Municipal Railway lines. Patronage has increased about 2 or 3 per cent, whereas it is agreed that 40 per cent or more is necessary to meet expenses. Various expedients are offered by Council members, including a suggestion that the $1 pass system be tried out; that street car fares be again raised; Mayor E. J. Brown says he is not worrying about the 5-cent fare yet,—that at least four months' trial should be given the lower rate. In the meantime, a special committee headed by Councilman C. B. Fitzgerald has been appointed to confer with Mayor Brown, and try to devise some means of meeting the daily deficit.

In the meantime, local newspapers are lambasting the city councilmen, declaring that the street railway problem has become "too hot for political fingers to handle," and that members of the city administration "have not the strength of character to take up the matter properly." The Council is urged to hand the street railway system back to Stone & Webster, persuading them to give up the $15,000,000 bonds. The Seattle *Times*, a leader in the street car fight problem, states editorially:

> We must give the railroad back to Stone & Webster and make them take it, and we must give it to them without such franchise restrictions and requirements as existed before, so that they can run it at a profit. The harsh terms imposed upon the franchise holders were what forced them to make the impossible contract with the city. Stone & Webster can make a profit out of the railroad if relieved of the heavy franchise requirements existing before the sale was made. We may have to enlarge the rights and privileges of the Stone & Webster Corporation to get them to take their railroad back, yet all that comes under the head of price.

Pass Declared a Success

After seventy weeks in operation the pass system has been declared an unqualified success on the railway lines of the New Brunswick Power Company, St. John, N. B. When the pass was introduced there was some misgiving as to the permanency of the system. It was felt that the introduction was but a trial. For five weeks the purchase of passes at $1 a week was practically a negligible quantity. The system was about to be discarded when the sales started to increase. Every week since then the sales have increased until now more than 60 per cent of the passengers are utilizing passes.

"Pass One" Gives News

Since the installation of the weekly pass system the San Diego (Calif.) Electric Railway has been publishing a pamphlet entitled "Pass One." The

booklet, which appears every week, contains a calendar of events. The cartoon reproduced herewith appeared in the first issue of "Pass One."

Interurban Rates Reduced

A reduction in fares amounting to 33⅓ per cent effective on April 1 has been made to persons riding daily between Beloit and Janesville by the Rockford & Interurban Railway. To gain the advantage of this reduction a commuter must buy a fifty-ride ticket book placed on sale on the first of the month and good only for one month.

The cost of this fifty-ride book is $14, or a fraction more than 27 cents for the one-way fare figured on a straight fare and a daily basis. Previously a fifty-ride book between Beloit and Janesville has cost $21, or 42 cents for the one-way fare.

In addition to the issuance of fifty-ride books between Beloit and Janesville, the company announces a reduction of $2.50 in the purchase price of the 500-mile script book. Previously these mileage books have cost $15, but under the new tariff they sell for $12.50. Mileage books are valid until used up.

Car-Bus Proposal Rejected

Chronic "No" Vote Again Upsets the Constructive Effort to Restore Service in Saginaw

For the second time in a period of five months electors of Saginaw, Mich., on April 2 rejected a street car-bus franchise proposal. The vote at Monday's election was 10,298 in favor and 7,101 against. This is 141 votes less than the 60 per cent required for approval of franchises. However, the majority was 3,197 and is a few more than the majority that disapproved of the Wade-Henning omnibus ordinance that went down to defeat at the primaries on March 7.

The question that confronts the electors of Saginaw now is: "What are they going to do?" For almost every project that is submitted there is the so-called chronic "no" vote. How to break down the "bars" of that vote, which is generally about 41 per cent of the vote cast, is the problem. Supporters of the railway pretend to see the dawn of a new day in the election of a Mayor and two Councilmen who supplant incumbents opposed to street cars and lined up almost regularly with the minority, called by many the "obstructionists."

The new chief executive of the city is Albert W. Tausend, elected over George Phoenix. Mayor-elect Tausend supported the franchise, and although his opponent made no open fight against it, he was not in accord with the measure. Mr. Phoenix is a member of the Council and has two years to serve in that body.

The newly elected Councilmen are George S. Crabbe and William J. Wolf. The latter openly fought for the railway franchise and led the field of four candidates. Mr. Crabbe made no official announcement on the matter and ran second. With a majority of the members of the City Council in favor of street car service it is believed that action will be taken looking to the resubmission of the franchise, probably revised to meet certain objections and backed by the Council elected on that platform, and that the measure may possibly be approved.

It is expected in some quarters, however, that the minority opposition will spring another omnibus franchise, despite the fact that the last one submitted lacked nearly 2,800 votes of the necessary 60 per cent required for adoption. In the meantime, Saginaw will "ride the jitneys."

The proposal which went before the voters on April 2 was a resubmission in an amended form of the Saginaw-Bay City Railway's offer defeated last November.

Want to Try Bus.—At a recent meeting of members of the City Council of Bellefontaine, Ohio, and officials of the Indiana, Columbus & Eastern Traction Company it was proposed by the traction company that the electric car be taken off in Bellefontaine and a motor bus be tried out for the next thirty days.

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New Jersey Fare Reduction Bill Fails of Passage

The bill aiming to reduce fares on the electric railways in New Jersey from 8 to 5 cents failed to pass the Legislature. In fact, the measure never got any further than the committee room. The bill was introduced by Minority Leader George of Hudson County. It was sponsored by Governor Silzer. The latter inserted a plank in his pre-election platform declaring that if elected he would try to have the fare reduced. The bill went to a committee room, where it was reported adversely. The statement accompanying the bill said that the object of the bill was to declare a definite legislative policy with regard to the valuation of railway properties operating under certain conditions specified in the bill. Further, that the bill provided for varying schedules of rates with increases allowed in the rates of return on the value of railway properties as rates of fare were reduced. That in the event of any company refusing to accept the legislative policy as declared in the bill its franchise, by the operation of the act, would cease.

Pass System for Rainier Valley Line—Municipal Operation Suggested

The application of the Seattle & Rainier Valley Railway, Seattle, Wash., for permission to install the weekly pass system has been granted by the Department of Public Works at Olympia. It was intended to put the pass on sale on April 2 for a trial period of four months. Under the ruling, weekly passes can be sold to patrons of the road, good only within the city limits, for $1.25 each.

In the meantime, the Rainier Valley Five-Cent Fare Club, composed of citizens of that district, is declaring that instead of reducing the present fare of 8½ cents, the pass increases the fare. The members point out that for the passengers who use the cars twice daily, six days a week, to and from employment, the fare would be only $1, instead of the $1.25 pass charge. A hearing upon the complaint against the present fare will be held in Seattle shortly by Department of the Public Works officials.

Five-Cent Fare Cuts Revenue $5,000 a Day in Seattle

According to figures prepared by Superintendent of Public Utilities, George F. Russell the Seattle (Wash.) Municipal Street Railway loss since the 5-cent fare became effective on March 1 has been virtually $5,000 a day instead of $4,000, as mentioned in the article on page 622 of this issue. The figure of approximately $5,000 a day included the depreciation reserve. The increase in the number of car riders compared with March, 1922, has been 7.31 per cent.

The special committee appointed by the Council is working with Mayor E. J. Brown and other Council members to devise means of increasing patronage, cutting down expenditures and providing for the semi-annual interest payment of approximately $370,150.

The Lower Cost of Government League urges that politics be put aside in the operation of the municipal railway. The league advises the employment of an experienced transportation manager at a salary of $25,000 a year, giving him a free hand to conduct the affairs of the line.

New Jersey Company to Seek Bus Rights

John L. O'Toole, assistant to President Thomas N. McCarter of the Public Service Railway, New Jersey, has written to the town commission of Belleville about the transportation situation there. He states that the New Jersey Transportation Company, now operating buses from Manville to Somerville, is in a position through an arrangement which it has made with the Public Service Railway to submit a proposition to the commission to supply bus service to the Union Avenue section in Belleville. A hearing on the matter is to be held on April 10. Application for similar rights to accommodate Union Avenue residents has been made by private bus owners so that the proposal made by the Public Service through its subsidiary, the New Jersey Transportation Company, puts the railway in active competition with the private owners for operating rights.

Buses to Operate in Greece by May 15.—James F. Hamilton, president and general manager of the New York State Railways, states that three buses will be put in operation in Greece, N. Y., by May 15. The franchise permitting the company to operate buses was granted by the town board on March 2.

Through Freight Service Started.—Through freight service between Dayton and Cleveland (Ohio) was started April 2 over the Indiana, Columbus & Eastern Traction Company's line and connecting traction lines. The through freight is being routed via Springfield, Columbus, Delaware, Marion, Bucyrus, and Mansfield.

Substitution of Buses Allowed.—The Washington Railway & Electric Company, Washington, D. C., has received permission from the Public Utilities Commission of the District of Columbia to substitute buses for electric cars over the Tenleytown-Potomac Park line from Seventeenth and H Streets to Potomac Park. The railway will issue free transfers for use between buses and trolleys.

Bus Lines Over Utica Parkway.—Papers of incorporation are to be filed shortly by the Utica Railway Co-ordinated Bus Line, Inc., the new company formed by the New York State Railways for the purpose of operating a bus line over the Parkway in Utica. The buses are not being put into service with the idea of their becoming a paying proposition, but as a convenience for the people who live along the Blurrstone Road and along the Parkway and in cases many blocks from any car line.

Bus Line Authorized.—Through a recent order of the Public Utilities Commission the Capital Traction Company, Washington, D. C. has been authorized to operate a motor bus line acting as a feeder for its Fourteenth Street railway line. There will be a 2-cent transfer privilege between the two lines. Buses will run from the terminus of its Fourteenth Street line, west on Kennedy Street to Sixteenth Street, north on Sixteenth Street to Montague Street, east on Montague Street to Fourteenth Street and south on Fourteenth to the terminal at Kennedy Street.

Pass Said to Be Working Well.—The Springfield (Mo.) Traction Company's plan of selling a pass for $1 has met with favor from both bus and electric railway patrons. The pass system was not put into effect in Springfield to help eliminate a competitor as the traction company owns all the railway lines and the buses operating in the city. The very large increase in the use of private automobiles during the past few years has, however, tended to keep the railway earnings down. The City Council has adopted an ordinance restricting the parking of automobiles to a period of two hours.

Agreement Reached on Fares.—At a conference before the committee on street railways of the Massachusetts House on March 27 an agreement was reached by which a 10-cent fare between Hyde Park and Boston will probably result. Representatives of the Boston Elevated Railway, the Eastern Massachusetts Street Railway and the city of Boston agreed that the lines of the Eastern Massachusetts in Hyde Park should be taken over by the city, which shall lease the lines to the Elevated at an annual rental of 4½ per cent. The price to be paid by the city for the Hyde Park lines, under the agreement would be determined by a jury to be drawn from among the voters of Suffolk, Norfolk or Middlesex counties.

Seeks Rerouting to Eliminate Transfer Charge.—Residents of the Lake Burien district have petitioned the City Council of Seattle, Wash., to reroute the Lake Burien cars so as to make the loop uptown instead of around Washington Street. The change is asked to do away with the present 1½-cent transfer charge under the 5-cent fare required on those car services which do not make the loop through the downtown business centers. The request made to the railway department recently was denied, Superintendent Henderson declaring that such a change in operation would mean an added cost of $25,000 to $30,000 yearly. The utilities committee of the Council is again taking the matter up with the railway officials.

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Legal Notes

FEDERAL COURTS—*Statute Providing for Public Operation of Boston Elevated Railway Held Not Unconstitutional.*

The Massachusetts statute, providing for the operation of the Boston Elevated Railway by trustees, for the payment of any deficit from the treasury of the commonwealth, and for the assessment of the amount paid as taxes, and delegating to the trustees the power to determine the needed expenditures to comply with the obligations of a lease or the requirements of adequate public service, held not unconstitutional, as violative of Const. U. S. Amend. 14. [City of Boston vs. Jackson, 43 Supreme Court Rep., 129.]

FEDERAL COURTS—*A Receiver May Take Reasonable Time and Consider Interest of Public Before Rejecting Lease of Railway.*

This case arose because the receiver of the New York Railways, who was appointed March 20, 1919, did not turn back the property of the Eighth Avenue Railroad until Aug. 1 and the Ninth Avenue Railroad until Oct. 1 of that year. It was held that this was not an unreasonable time, especially in view of the fact that the lessor companies were without cars and other facilities to operate the lines if they should have been turned back earlier, and that the lessor was entitled only to the net earnings of the properties and not to the rent specified in the lease. [American Brake Shoe & Foundry Company vs. New York Railways, 282 Fed. Rep., 523.]

FLORIDA—*The Word "Running" Does Not Apply to a Stationary Car.*

A Florida statute declares that a railroad company shall be liable to damage done to persons or property "by the running of locomotives or cars," unless the company shows that its agents have exercised reasonable care and diligence. The word "running" in this section conveys the idea of action and the presumption does not hold where a passenger was injured in leaving the car while it was stationary. [Tampa Electric Co. vs. Soule, 94 Southern Rep., 692.]

IOWA—*Carrier Liable When Interloper Released Brake.*

While a motorman was absent from his car to get a new package of transfers, an interloper released the brakes and the car began to coast down an incline toward a railroad crossing where a train was passing. The passengers hurriedly left the car and the company was held responsible to a woman passenger who sprained her ankle while alighting from the moving car. [Kliebenstein vs. Iowa Railway & Light Co., 188 Northwest Rep., 129.]

IOWA—*Company Not Held Liable for Collision With Automobile on Reservation.*

On a street where the tracks are in an unpaved reservation in the center of the street an automobile skidded on the wet pavement on the side and part of it projected over the railway tracks. The evening was misty and a trolley car soon after ran into the stalled automobile. The railway company was held not liable, as the last clear chance doctrine applies only if the defendant has knowledge of the negligence on the part of the plaintiff. [Baker vs. Des Moines City Railway, 188 Northwest. Rep., 829.]

MISSOURI — *Automobile Driver Not Bound to Drive So as to Be Able to Avoid Street Cars Violating a Speed Ordinance.*

Where an ordinance limited street cars to 10 m.p.h., an automobile driver was not bound to drive at such rate as to enable him to stop or slow down in time to avoid cars running at 30 or 35 m.p.h., but only cars running at the lawful rate. [Mason vs. United Railways of St. Louis, 246 Southwestern Rep., 319.]

MISSOURI—*Company Not Responsible When Automobile Without Chains Skidded.*

There was evidence tending to show that the street car moved forward quickly at a corner without preliminary warning and without the motorman looking for coming automobiles, and it may be assumed for the purposes of the case that the motorman was negligent in so doing. The pavement was wet and slippery and the plaintiff's automobile had no chains, and the plaintiff testified that if her automobile had not skidded, it would have stopped. The motorman had the right to assume that the driver of the car would use ordinary care, which included the use of chains in these circumstances, and there can be no recovery. [DeMoss vs. Kansas City Rys., 246 Southwest. Rep., 566.]

MISSISSIPPI — *In Suit for Failure to Stop for Intending Passenger, It Was Error to Admit Testimony as to Previous Controversy with Motorman.*

In a suit for damages in which the plaintiff received $500 in the trial court for wilful failure of a motorman of a street car to stop for her when she indicated that she desired to board the car, it was error to admit testimony on the trial showing the details of a previous controversy between the same motorman and passenger, or the son of the passenger, about a different matter. [Meridian Light & Ry. Co. vs. Williams, 91 Southern Rep. 863.]

NEBRASKA—*Interurban Company's Use of Street Railway Tracks Held Unauthorized.*

The statute, providing that the city council may require a street railway company to permit an interurban company to use its tracks, so that the interurban company may enter the city and have terminal facilities therein, is not broad enough to authorize the council to grant to an interurban company the right to use other tracks of the street railway company for the purpose of extending the interurban's local street railway business within the city and of diverting to its own lines street railway business which would otherwise have gone to the local company. [Lincoln Traction Co. vs. Omaha L. & B. Ry., 187 Northwest. Rep., 790.]

NEW HAMPSHIRE—*Conductor Injured While Signaling Car for His Own Purpose Held to Be a Trespasser on the Highway.*

The plaintiff, while on duty, left his own car and attempted to stop another by signaling it because he expected that his wife was on the other car. To do this signaling he stopped in the middle of the track but was not seen by the motorman of the other car and was injured. The court held that the accident did not arise out of his employment, and so he did not have the rights of an employee. [Manning vs. Manchester Street Railway, 118 Atlantic Rep., 386.]

NEW YORK — *City's Recourse Against Operation of One-Man Street Cars.*

A city is not without recourse to prevent the operation of one-man street cars, if such operation is dangerous, even though it has no authority to prohibit it by ordinance; but it, or any of its citizens, may invoke the power of the Public Service Commission to act in the premises, and the action or refusal to act of the commission is subject to review by the courts, under the Public Service Commission Law. [City of Schenectady vs. Schenectady Ry., 194 New York Sup. 375.]

NEW YORK—*A Charter Authorizing the City to Regulate "Operation and Speed" Held Not to Authorize Ordinance Regulating Weight of Interurban Cars.*

Rochester City Charter, Sec. 85, 86, authorizing the city to regulate the "operation and speed" of railroads in the streets of the city, did not empower the city to pass an ordinance regulating the weight and character of the wheels of interurban and suburban cars using the right-of-way of a street railway under a traffic agreement with the railway. [New York State Railways, et al., vs. City of Rochester, 195 New York Sup., 783.]

NEW YORK — *Alighting Passenger Struck by Car on Adjoining Track.*

It is not negligence as a matter of law for a passenger alighting from a street car to pass around the rear of

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the standing car and attempt to cross the adjoining track, where she looked and listened as diligently as possible, but was struck by a car approaching at a rapid rate of speed without signal. [Wall vs. International Ry., 135 Northeast. Rep. 512.]

NEW YORK—*Adoption of Rules to Cover Certain Contingencies Is Warrant of Inference to Apprehend Danger.*

An inference of a carrier's negligence may be drawn from disobedience to rules drafted by itself. Thus, the adoption by an elevated railway company of rules carefully guarding against danger from the throwing of bundles of newspapers from moving trains at station platforms warranted the inference that there was reason to apprehend danger from the unregulated carrying of bundles of papers. [King vs. Interborough Rapid Transit Co., 233 New York Sup. 330.]

NEW JERSEY—*Responsibility to Passenger Hurt While Assisting in Ejectment Case.*

A passenger complained to a conductor about a disorderly negro passenger and was asked by the conductor to assist in ejecting him. During the fight the conductor deserted when the negro drew a knife and the passenger assisting in the ejectment was injured. The company was held responsible. [Frazier vs. Public Service Ry., 116 Atlantic Rep. 769.]

NEW JERSEY—*Child Injured in Car Yard Where Play Was Permitted.*

A car storage yard was inclosed, but there were paths through it used by the public and the children had a ball ground there and played with the trucks and wheels. While doing so one was injured when an unbraked truck rolled down an incline. The company was held to be responsible. [Public Service Ry. vs. Wursthorn, 278 Federal Rep. 408.]

NEW JERSEY—*The Obstruction of the Highway for a Reasonable Time Without Warning Is Permissible.*

A railway company is entitled to obstruct a highway grade crossing by its cars or trains for a reasonable time, and while in the exercise of that right is not required to give warning to travelers on the highway of the obstruction to travel. [Nadasky vs. Public Service Railroad, 117 Atlantic Rep., 478.]

NEW JERSEY — *Automobile Passengers Have a Duty to Look Out for Their Own Safety.*

An automobile with three passengers besides the driver drove into an excavation made by a railway company for repairing its tracks and insufficiently guarded. Suit was brought by all four in the automobile and the jury found against the driver but in favor of the others, and it is their verdicts which are under consideration in this case. The trial judge properly said that any negligence of the driver could not be imputed to his passengers, but he also said: "If the man who drove the car was not contributorily negligent and the defendant was negligent . . . , all the plaintiffs are entitled to a verdict, the driver included." The Supreme Court held that this instruction was incorrect because it implied that the passengers owed no duty to care for their own safety in any situation wherein the driver was not himself negligent, and as the verdict was against the driver, it was impossible to say whether the jury based its findings for the other plaintiffs on the theory that they were chargeable with no duty or that no delinquency in their duty had been shown. [Schroeder et al. vs. Public Service Ry., 118 Atlantic Rep., 337.]

OHIO—*Franchise Obligation as to Fare in Certain Territory Not Affected by Annexation of Such Territory by City.*

The obligation of a street railway to carry passengers for a certain fare from a village to a certain point outside the village under its franchise with the village was not affected by a city's annexation of such territory, since the city took the territory subject to all valid contractual rights then in existence, which contractual rights were protected by Const. art. 2, sec. 28, and Const. U. S. art. 1, sec. 10, relating to impairment of the obligation of contracts. [Village of Wyoming vs. Ohio Traction Company, 135 Northeastern Rep., 675.]

OKLAHOMA — *Instruction as to Duty to Alighting Street Car Passengers Held to State Law Correctly.*

In an action for injuries to a street railway passenger, while endeavoring to alight from a car, where the court instructed the jury that the defendant street railway company owed to its passengers the duty to exercise the utmost care and diligence to afford them a reasonable opportunity to alight in safety from its cars, to stop such cars a reasonable length of time for the purpose, and to ascertain that its passengers who were attempting to alight had alighted from said cars before the same were again started, it was held that the instruction correctly stated the law defining the duty of the defendant company to its passengers. [Muskogee Electric Traction Company vs. Elsing, 208 Pacific Rep., 264.]

WEST VIRGINIA—*Substation Employee in Interstate Commerce.*

Where a substation operator receives a pass which designated him as a railway employee and his wages were paid by the railway company, he was its employee for the purpose of the federal Employers' Liability Act, although the substation belonged to a power company. And as the employee was injured while installing a new rotary and transformer intended to supply energy for the operation of cars in interstate service, he was employed in interstate commerce, within the meaning of the federal liability act. [Hally vs. Ohio Valley Electric Railway, 114 Southeastern Rep., 572.]

UTAH. — *Workmen's Compensation Act and Part Time Employee.*

A power station employee who spent part of his time operating railway machinery on one side of the building and part on lighting machinery on the other side of the building and was injured while operating the lighting machinery was not an employee of the railway company so far as the Workmen's Compensation Act is concerned, but the full amount of his award based upon the total amount of his earnings from both companies should be made against the lighting company alone. [Bamberger Electric R. Co. vs. Industrial Commission of Utah, 203 Pacific Rep. 345.]

UTAH—*Responsibility for Precautions Between Motorman and Company.*

Where a motorman was killed by the overturning of a street car at a curve visible at least 500 feet therefrom, and there was a slow-down sign approximately that distance from the curve, it was not error for the trial court to take from the jury the question of negligence in failing to place a slow-down within a reasonable distance from the curve. As between a motorman and a street railway company, also, a defective condition of the brakes is insufficient to establish the company's liability in the absence of any evidence that the company knew, or might by proper inspection have known, of the defect. [Burbridge vs. Utah Light & Traction C., 211 Pacific Rep., 691.]

VIRGINIA—*Person Transferring to Another Car Is Not a Passenger After Reaching Place of Safety.*

A person who has alighted from a street car for the purpose of transferring to another car and has reached a place of safety, is not a passenger, but is entitled only to the same degree of care from the company as any other pedestrian upon the highway. [Virginia Ry. & Power Co. vs. Dressler, 111 Southeast. Rep. 243.]

WISCONSIN—*Building a Double-Track Street Railway on Street Constituting Dividing Line Between City and Town Held Not an Additional Burden.*

Where one-half of a street is located within the limits of a city, and the other one-half is within the limits of a town, and the street is used almost exclusively for city travel, and a single-track railway is operated on the portion within the city, such street is not a rural highway, and the construction of a double-track street railway does not impose an additional burden or an illegal taking of property. [Packard Motor Car Co. vs. Milwaukee Electric Ry. & Light Co., 190 Northwest Rep., 914.]

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Personal Items

Team Mates

Claus Spreckels and "Ed" Burns Are Doing Surprising Things Out at San Diego

Zone fares, weekly passes, monthly commutation, safety cars, motor-coaches—all these and more galumphing about in a city of 100,000 must draw attention to the men behind them. Well, these men are: Claus Spreckels, general manager, and his side-kick, Edward Johnson Burns, assistant general manager.

Claus Spreckels' novitiate was spent as secretary and treasurer of the San Diego Electric Railway. In February, 1922, however, he became general manager. His outspoken indorsement of motor-coach operation at the time *Bus Transportation* was projected showed that the younger Spreckels had inherited the courage and foresight that have made San Diego and Spreckels synonymous. But Claus Spreckels is more than in independent thinker; he also takes his duties as a purveyor of mass transportation so seriously that he has the funny idea that he ought to buy no vehicle that he would not enjoy riding in himself. He has already proved this through his motor coaches, and it will be proved again in the next lot of cars that San Diego buys. Moreover, in accepting the weekly pass installed on New Year's Day, 1923, his primary idea was not to get more money from the public but to make it easier for the public to do business with his concern.

HUMAN RELATIONS A FACTOR

The same human spirit is being shown by Mr. Spreckels in his relations with the men. In addition to the sales commission which the platform men have hitherto enjoyed in selling tokens (and now passes as well), he has revised the accident bonus system so that the men will be rewarded in proportion to their individual efficiency. On top of this, he has added a series of individual monthly awards for exceptional courtesy, neatness and other desirable qualities.

Another 1923 innovation is the welfare department with free medical service to the men and their families.

At a get-together party on Dec. 29, 1922, his address to the men and women of the staff was marked by such sincerity that the ensuing ovation would have convinced any auditor that the average man knows the difference between buncombe and candor. Not the least stirring feature of the evening was his presentation of splendid gold watches and fobs to a pair of twenty-year termers.

Right alongside Claus, is "Ed" Burns. "Ed" holds the degree of *summa cum laude* from Hard Knox University. At the age of fourteen he started as call boy on a steam railroad, went through the shops and other mechanical departments and then found himself trolleying with the Utah Light & Railroad Company. Then he hied himself to the "Key Route" at Oakland, Calif., and next entered the bureau of finance, California Railroad Commission, following which he became manager of the San Diego & Southeastern Railway, a steam line which was later absorbed by the San Diego & Arizona Railway. "Ed" remained with the Spreckels interests, however. During 1918 to 1920, he was engaged chiefly in electric railway rate cases. On Jan. 1, 1920, he blossomed out with a 5-cent base zone fare that added 33 per cent to the company's revenues and gained passengers, too! A little thing like running side-gate cars with multiple fares and one man had no terrors for Burns and his loyal crew. When Santa Claus Spreckels slipped the weekly pass down the San Diego chimney Christmas, 1922, it was Brother Burns who led the bally-hoo with such success that men and patrons alike rose to the pass like a trout to a fly in April.

Claus Spreckels

E. J. Burns

Government Drafts Mr. Feiker Again

At the request of Secretary Hoover of the United States Department of Commerce, F. M. Feiker, assistant to the president of the McGraw-Hill Company, Inc., publisher of the ELECTRIC RAILWAY JOURNAL, has again been granted leave of absence to undertake the organization and general direction of the world surveys of raw material supplies, rubber, sisal hemp, and nitrates, for which Congress recently made an emergency appropriation of $500,000.

Mr. Feiker served as assistant to the Secretary of Commerce during the first year of Mr. Hoover's administration, acting as general assistant in organizing the personnel and industrial trade contact committees in relation to the Bureau of Census, the Bureau of Standards and the Bureau of Foreign and Domestic Commerce. Out of his nine months work came the monthly statistical survey of the Bureau of Census, the Division of Simplified Practice of the Bureau of Standards, Commerce Reports in new form and fifteen so-called commodity divisions of the Bureau of Foreign and Domestic Commerce.

E. J. McIlraith Made Staff Engineer

E. J. McIlraith has been appointed staff engineer under G. A. Richardson, vice-president of the Chicago Surface Lines. The appointment became effective on April 1. Mr. McIlraith was formerly with the Philadelphia Rapid Transit Company. He became connected with the company operating the railway lines in the city of Philadelphia in 1919, when he entered the elevated-subway division. In 1920 he was made operating manager of the division and in less than a year became superintendent of way. In April, 1922, he was promoted to the head of the department of rolling stock and buildings. Before joining the forces of the Philadelphia property Mr. McIlraith was associated with Stone & Webster in Seattle, assuming the position of superintendent of way in 1913. He is a graduate of the University of North Dakota and was instructor at Cornell University for three years.

Mr. McKinley and Mr. Studebaker Head New Company

William B. McKinley, who has been president of the Illinois Traction Company, will be chairman of the board of the Illinois Power & Light Corporation, which is acquiring an extensive group of long-established utility properties and which will control Illinois Traction, Inc., through ownership of the entire capital stock of that company. The president of the Illinois Power & Light Corporation will be Clement Studebaker, Jr., who with his associates, through the medium of the North American Light & Power Company, is acquiring a controlling interest in the company. Mr.

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Studebaker is chairman of the board of the North American Light & Power Company. Among the directors of the Illinois Power & Light Corporation in addition to Mr. McKinley and Mr. Studebaker will be William A. Baehr, H. E. Chubbuck, George Mattis and G. W. Niedringhaus.

E. J. Dickson Resigns

Vice-President in Charge of Operation at Buffalo Retires After Ten Years of Service

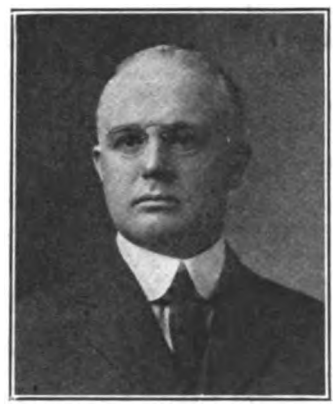
E. J. Dickson, who for the last ten years has been vice-president in charge of operation of the International Railway, Buffalo, N. Y., tendered his resignation at the annual meeting of the stockholders of the company during the week ended March 31, the resignation to become effective on May 1. Mr. Dickson has been with the Buffalo property since 1913, and when the present Mitten management took control in 1920 he was one of the few officials connected with the former administration who remained with the property.

As vice-president in charge of operation Mr. Dickson has served throughout the most difficult period in the company's history, beginning with the strike of trainmen in July, 1922. Although he has desired for a long time to be relieved of his duties, he felt it his duty to remain until this emergency had been successfully passed. That his services have been greatly appreciated by the company and that his resignation will be keenly felt is indicated by the following statement issued by the board of directors:

E. J. Dickson, vice-president of the company for some years, today resigned, and retired from the International Railway. The announcement of Mr. Dickson's resignation, made by the company officials, was as follows:

"E. J. Dickson, who has for some time past been desirous of being relieved of his duties as vice-president with the International Railway, had, however, consented to continue until the annual organization meeting held today. His resignation was accepted with regret by the management, which takes this occasion to express its great appreciation of his valuable services."

Mr. Dickson started in the transportation industry as office boy with the Chicago, Burlington & Quincy Railway at Galesburg, Ill., at the age of thirteen in 1887. He was advanced through various clerical positions to that of assistant trainmaster at Galesburg. He next was chief clerk in the office of the superintendent of motive power, with the Northern Pacific Railway at St. Paul, Minn., for three years, and following this occupied a similar position with the Lehigh Valley Railway at South Bethlehem, Pa., for three years. He next became secretary and purchasing agent of the New England Investment & Security Company, a holding company for twenty-three trolley lines in the New England District. This was in 1907. After this he became general manager of a group of four electric railways at Attleboro, Mass. Following this he was made general manager of the Springfield (Mass.) Street Railway. In 1913 he became vice-president in charge of operation of the International Railway, which position he has held up to the present time.



E. J. Dickson

Mr. Dickson's resignation from the International Railway has caused distinct regret among the Buffalo people, as reflected by comment in the public press. He has been held in very high regard and enjoyed the confidence of the public and the good will of all his associates. His career has been marked by steady advancement from the lowest rank in the ladder to very nearly the highest, and he has the good wishes of a host of friends throughout the industry.

Mr. Geisse Heads Wisconsin Association

Harold L. Geisse was elected president of the Wisconsin Utilities Association at the recent convention of that association in Milwaukee. Mr. Geisse is the secretary and general manager of the Wisconsin Valley Electric Company at Wausau, Wis. He was graduated from the University of Wisconsin in 1907. He served as statistician with the Railroad Commission of Wisconsin for one year and then joined the operating staff of the San Antonio Gas, Electric & Traction Company in Texas. Mr. Geisse returned to Wisconsin in 1913 and re-entered the employ of the Railroad Commission as statistician.

H. L. Geisse

Subsequently he was promoted to assistant secretary and finally secretary. In the spring of 1919 he became associated with the Northwest Utilities Company, an Insull property, and later operated the Janesville Electric Company. Mr. Geisse remained with this organization until August, 1921, when he took charge of the Wisconsin Valley Electric Company.

Changes Made in Ironwood Property

The following appointments and changes have been made in the personnel of the Ironwood & Bessemer Railway & Light Company, Ironwood, Mich.: W. T. Leander replaces W. H. P. Weston as secretary and treasurer, W. J. Hodgkins, formerly purchasing agent, is now general manager; the position of purchasing agent is being filled by L. G. Gothe; J. B. O'Neil, formerly line superintendent, has become district manager, supplanting E. L. Hinchliff; E. O. Sinrud replaces W. A. Campbell as assistant district manager; R. S. Wilhelm, formerly engineer of power station, has become chief engineer, and R. L. Boisen is electrical engineer.

Mr. Johnson Made General Superintendent of Toledo Property

J. Franklin Johnson, who has been receiver in charge of operation of the Toledo & Western Railroad for three years, has been made general superintendent of the Community Traction Company, Toledo, by order of President Frank R. Coates and relieved of his duties as receiver for the interurban line by the Federal court at Toledo.

Albert A Swartz, who has been vice-president and superintendent of transportation of the Community Traction Company, has been named receiver for the Toledo & Western and will succeed Mr. Johnson in the operation of that property. Mr. Swartz was for a number of years with the Toledo & Western and is familiar with its many problems. It is expected that he will wind up the receivership possibly within the present year.

Joseph M. Enright has been placed in his old line of work as superintendent of transportation. He occupied that place for several years with the Toledo Railways & Light Company before the Community Traction Company was organized.

It is expected that Mr. Johnson will take complete charge of the big maintenance program and repair and extension work that the Community Traction Company has planned for 1923.

The personnel changes became effective on April 1.

Thomas Penney, who for many years has been a vice-president of the International Railway, Buffalo, N. Y., was not re-elected to that position at the annual meeting of stockholders. Mr. Penney retains his place on the board of directors and continues to have the

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title of general counsel. He formerly was president of the company and always has been active in its affairs.

C. J. Joyce, general counsel for the Mitten Management, Inc., and a member of the legal staff of the Philadelphia (Pa.) Rapid Transit Company, has been elected vice-chairman and counselor of the board of directors of the International Railway, Buffalo. This is a new position. Mr. Joyce also becomes a member of the executive committee of the International Railway.

Charles W. Murray, for the past two years superintendent of the Janesville (Wis.) Traction Company, has resigned. He expects to depart soon for Wyoming, where he has land holdings. His successor has not yet been named. Mr. Murray is a nephew of W. C. Sparks, general manager of the Rockford & Interurban Railway, of which the Janesville Traction Company is a subsidiary.

Matt J. Kennedy, formerly with the Montreal Street Railway, now the Montreal Tramways, has gone into business for himself in Montreal with a fleet of fifty taxis. Mr. Kennedy was connected with the Brooklyn Rapid Transit Company for a period of about five years some ten years ago during the superintendency of Dow S. Smith. For part of this time he served as superintendent of the Ninth and Vonderbilt Avenue divisions.

W. J. Curle, general superintendent of the Chatham, Wallaceburg & Lake Erie Railway, Chatham, Ont., has resigned. Mr. Curle has been a prominent figure in the railway field in Canada for more than thirty-five years. He entered railway service with the Grand Trunk Railway at Brockville, Ont. Subsequently, he held positions with the Canadian Pacific Railroad, the Brockville, Westport & Northwestern Railway and the Canadian Northern Railway. In 1916 he was appointed general manager of the Chatham, Wallaceburg & Lake Erie Railway to succeed the late William Norris.

J. W. Gerke, for many years associated with several electric railways and for the past three years staff engineer with the Texas Company, has joined the Transit Equipment Company, New York, as vice-president and general manager. He will take active charge of its plant at Saybrook, Conn., with a view of developing this branch of the company's business. Mr. Gerke started his railway career in the shops of the Capital Traction Company in 1897, leaving in 1905 to become superintendent of the Washington, Arlington & Falls Church Railway. In 1909 he became connected with the J. G. White Engineering Corporation and was assigned to the Tri-City Railway at Davenport, Iowa, as superintendent of equipment and buildings, but in 1911 he went to Wilmington, Del., as master mechanic of the Wilmington & Philadelphia Traction Company and the Southern Pennsylvania Traction Company. In 1915 he became superintendent of maintenance in charge of all departments excepting transportation of the New York & Queens County Railway and Long Island Electric Railway, remaining for six years.

New Superintendent of Transportation in Buffalo

As was reported in the ELECTRIC RAILWAY JOURNAL, issue of March 24, Thomas D. Kiniry has been appointed general superintendent of transportation of the local and interurban lines of the International Railway, Buffalo, N. Y., to succeed William M. Casey, who has accepted a similar position with the Georgia Railway & Power Company, Atlanta, Ga.

Mr. Kiniry was born in Glen Mills, Pa., and was educated in the public schools of that town. In his early years he served as an apprentice printer and later played semi-professional baseball. In May, 1900, he joined the Philadelphia Rapid Transit Company as a motorman and continued in that position four years, when he was promoted to the position of supervisor.

T. D. Kiniry

In May, 1906, Mr. Kiniry was appointed one of a staff of assistant division superintendents. On Jan. 1, 1913, he was made division superintendent in charge of the Amber depot and in April of that year, when the Philadelphia Rapid Transit Company opened the new Luzerne depot, Mr. Kiniry was transferred to that depot as first assistant division superintendent. He remained in that position under Mitten Management until Jan. 6, 1919, when he was made division superintendent at the Callowhill depot. In July of that year Mr. Kiniry was transferred from the Callowhill depot to the Luzerne depot as division superintendent and the next month he was made district superintendent, which position he held until he was made superintendent of supervision, April 1, 1922.

Since the early part of December, 1922, Mr. Kiniry has been detailed to Buffalo by Mitten Management, Inc., in the capacity of supervisor to the instruction force, and with the resignation of Mr. Casey, Mr. Kiniry was made general superintendent of transportation of the local and interurban lines of the International Railway.

Obituary

George A. Weber

George A. Weber, inventor of the Weber rail joint, died at his winter home in Pasadena, Cal., on March 29. He was in his seventy-fifth year. Mr. Weber was founder of the Weber Rail Joint Manufacturing Company, which was incorporated in 1889. In 1905 this company, with the Continuous Rail Joint Company and the Independent Railroad Supply Company, formed a consolidation under the name of the Rail Joint Company. Mr. Weber has been a director of the Rail Joint Company since its incorporation and has always taken a keen interest in its affairs.

Charles Thomas Nicholas White Spunner, for many years treasurer of the Mobile Light & Railroad Company, Mobile, Ala., is dead.

A. S. McSwigan, president of the Kennywood Park Corporation, Pittsburgh, Pa., is dead. At the height of the street railway park movement Mr. McSwigan gave freely of his advice as an amusement man to the electric railway interests. He was at one time on the staff of the Pittsburgh Railways in charge of park matters.

George H. Guy, for the last forty years secretary of the New York Electrical Society, died on April 1. He was born in England, studied music in Leipzig, spent several years sugar planting in Jamaica, West Indies, and then came to New York. In addition to his brilliant work for the electrical society, Mr. Guy did much to promote automobilism and aviation. He was one of the leaders in the movement to secure from Andrew Carnegie the gift that created the United Engineering Societies' Building and that of the Engineers' Club in New York. He was a member of the American Institute of Electrical Engineers and the Engineers' Club.

Dr. Walter Gill Wylie, for many years intimately associated with water-power development in the South, died at his home in New York City on March 13 at the age of seventy-five years. Dr. Wylie was born in Chester, S. C., and besides being a surgeon of note was the first president of the Southern Power Company, Charlotte, N. C. He helped to organize the Anderson Water, Light & Power Company, Anderson, S. C., and later the Catawba Power Company. Early in 1900 he interested J. B. Duke, the tobacco magnate, in the water power possibilities of the Carolinas and shortly afterward the Southern Power Company, which has since grown to be the dominant power company of the South, was formed with Dr. Wylie as its head. Professional work in New York, however, caused him later to relinquish the presidency to J. B. Duke, but his interest in the industrial and power development continued unabated. Dr. Wylie was consulting surgeon of Bellevue Hospital and professor emeritus of the New York Polytechnic School for medicine for post graduates.

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Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Important Research Work Published

Graphic Analysis Made of Census of Manufactures of United States 1849 to 1919

The graphing of statistics reaches an unusually high level of excellence in a publication with the above title just issued by the National Industrial Conference Board, New York City. In this, the wealth of data made available, but not readily comprehensible, through the census of manufactures taken every five years by the United States Bureau of the Census, are put into such form that they can be readily analyzed and compared.

Most of the data in the volume, tabulated and graphed, relate to fifty leading industries of the country, although some statistics are given for the country as a whole. Following are the topics which are made the basis of study, to each of which nearly ten charts and tables, on the average, are devoted: Persons engaged in manufacture, distribution of personnel, value of products, major items of expenditure, average cost of service, size of establishments, character of ownership, regularity of employment, prevailing hours of labor, power in manufacturing industries, fuel used in manufacturing industries, production, labor, power and values, and a summary of the data for the fifty leading industries.

Book Well Arranged

The general arrangement in this book is to have the tabular material on the right-hand page of two facing pages and the charts on the left hand. Thus, one has before him at one time only one compilation, but this is put into forms to be readily grasped and visualized. Great ingenuity has been displayed in the preparation of the charts, which are of many different forms and colors, the form in each case being chosen best to represent the particular data to be depicted. The variety in method of graphical presentation prevents monotony in the appearance of the charts and also tends to distinguish them among themselves.

The Industrial Conference Board has done the industries of the country a great service by giving vitality to the dry statistics of the nation's manufactures. This work places at the disposal of manufacturers and others who are analytically and reflectively inclined an opportunity to survey the labor and material situation broadly. Careful study must, however, be given to the tables, charts and comments if they are to yield information of practical usefulness in any particular manufacturing field, as for example, that serving the electric railway.

Payment Ordered to Barney & Smith Creditors

Payment of 50 cents on the dollar to all creditors of the Barney & Smith Car Company, Dayton, Ohio, whose claims are not disputed is authorized in an order issued by Judge Edward T. Snediker of the Montgomery County Common Pleas Court. The court's order followed a report by Special Commissioner John Dineen that the claims of creditors total $140,039.99, which can be partly liquidated with about $100,000 cash on hand. The plant recently was offered for sale at public auction with no bidders.

Large Foreign Orders for Power Apparatus

The Compania Chileana De Electricidad, Ltd., Santiago, Chile, which has a contract to furnish power for the Chilean State Railways, has recently ordered from the Westinghouse Electric & Manufacturing Company through Carr Brothers, New York City, 45,000 kva. of power transformers, together with oil circuit breakers, bushing type current transformers and spare parts.

The apparatus included on this order is as follows: Three 7,500-kva. three-phase, 50-cycle, 100,000 to 44,000-volt, oil-immersed, forced-cooled transformers; three 7,500-kva., three-phase, 50-cycle, 100,000 to 12,000 volt, oil-immersed, forced-cool transformers; eight electrically operated, type G-11, oil circuit breakers, outdoor, 400 amp., 3-pole, single-throw, 110-kv. for floor mounting; thirteen type G-11, outdoor, 400-amp., 3-pole, 50-kv. frame-mounted oil circuit breakers, together with necessary bushing type current transformers, control relays, auxiliary switches and necessary spare parts.

The apparatus included on this order is to be used by the power company for transmitting power from its present system to the Chilean State Railways.

Brill Sale Rumors Denied

Samuel M. Curwen, president of the J. G. Brill Company, Philadelphia, has made the following statement:

To set definitely at rest rumors as to a sale of the J. G. Brill Company, I take this occasion to say no negotiations are pending for recapitalization or sale of the company or for its consolidation with any other corporation, and the board of directors is unanimously opposed to sale of the company. I am further authorized to state by owners of a controlling majority of both preferred and common stocks their holdings are not for sale.

Asks Authority for $189,000 Expenditure

Receivers of the Pittsburgh (Pa.) Railways have filed a petition in the Federal Court seeking permission to spend $189,510 for track rehabilitation. The work will be done in the boroughs of Mt. Oliver, Knoxville, Carrick and Brentwood. The petition was referred to Special Master Henry G. Wasson by Judge W. H. S. Thomson.

ELECTRIC RAILWAY MATERIAL PRICES—APRIL 3, 1923

Metals—New York

Copper, electrolytic, cents per lb	17.187
Lead, cents per lb	8.225
Nickel, cents per lb	27.50
Zinc, cents per lb	7.90
Tin, Straits, cents per lb	47.625
Aluminum, 98 to 99 per cent, cents per lb	25.75
Babbitt metal, warehouse, cents per lb.:	
Fair grade	65.00
Commercial	40.00

Bituminous Coal

Smokeless mine run, f.o.b. vessel, Hampton Roads	$6.125
Somerset mine run, Boston	3.50
Pittsburgh mine run, Pittsburgh	2.00
Franklin, Ill., screenings, Chicago	2.075
Central, Ill., screenings, Chicago	1.625
Kansas Screenings, Kansas City	2.625

Track Materials—Pittsburgh

Standard Bessemer steel rails, gross ton	$43.00
Standard open hearth rails, gross ton	43.00
Railroad spikes, drive, Pittsburgh base, cents per lb	3.15
Tie plates (flat type), cents per lb	2.575
Angle bars, cents per lb	2.75
Rail bolts and nuts, Pittsburgh base, cents, lb.	4.25
Steel bars, cents per lb	2.50
Ties, white oak, Chicago, 6i n. x 8 in. x 8½ ft.	1.50

Hardware—Pittsburgh

Wire nails, base per keg	3.00
Sheet iron, (28 gage), cents per lb	4.00
Sheet iron, galvanized, (28 gage), cents per lb	5.25
Galvanized barbed wire, cents per lb	3.70
Galvanized wire, ordinary, cents per lb	2.65

Waste—New York

Waste, wool, cents per lb	12-16
Waste, cotton, (100 lb. bale), cents per lb.:	
White	11-13.50
Colored	8-13

Paints, Putty and Glass—New York

Linseed oil, (5 bbl. lots), cents per gal	1.13
White lead, (100 lb. keg), cents per lb	13.375
Turpentine, (bbl. lots), per gal	$1.59
Car window glass, (single strength), first three brackets, A quality, discount*	84.0%
Car window glass, (single strength), first three brackets, B quality, discount*	86.0%
Car window glass, (double strength, all sizes, A quality), discount*	85 0%
Putty, 100 lb. tins, cents per lb	5.00

*These prices are f.o.b. works, boxing charges extra.

Wire—New York

Copper wire base, cents per lb	18.625
Rubber-covered wire, No. 14, per 1,000 ft	7.50
Weatherproof wire base, cents per lb	19.50

Paving Materials

Paving stone, granite, 4 x 8 x 4, f.o.b. Chicago, dressed, per sq.yd	$3.60
Common, per sq.yd	3.15
Wood block paving 3½, 16 treatment, N. Y., per sq.yd	3.19
Paving brick, 3½ x 8½ x 4, N. Y. per 1,000 in carload lots	54.00
Crushed stone, ¾-in., carload lots, N. Y., per cu.yd	1.75
Cement, Chicago consumers net prices, without bags	2.20
Gravel, ¾-in., cu.yd., N. Y	2.25
Sand, cu.yd., N. Y	1.00

Old Metals—New York

Heavy copper, cents per lb	14 00
Light copper, cents per lb	12.50
Heavy brass, cents per lb	8.50
Zinc, old scrap, cents per lb	5.25
Yellow brass, cents per lb (heavy)	7.75
Lead, heavy, cents per lb	7.25
Steel car axles, Chicago, net ton	24.75
Old car wheels, Chicago, gross ton	28.75
Rails (short), Chicago, gross ton	26.75
Rails (relaying), Chicago, gross ton	33.50
Machine turnings, Chicago, net ton	14.75

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Rolling Stock

Kentucky Terminal & Traction Company, Lexington, Ky., will use the Nic Le Grand, Inc., positive safety appliance in the twenty-seven new one-man cars being built by the Cincinnati Car Company.

Augusta & Aiken Railway & Electric Company, Augusta, Ga., has announced that the sixteen one-man safety cars which it is proposing to add to its rolling stock will be built by the Perley A. Thomas Car Company, High Point, N. C. It is expected that these cars will be delivered in three and one-half months. The company will also rebuild ten cars now in service.

Worcester (Mass.) Consolidated Street Railway will add six new sweepers to its winter equipment. The company now has seven sweepers in commission. The new sweepers will be constructed by the company in its own shops during the summer months. Discarded open cars will be utilized in building them. The cost is estimated at $3,600 for each sweeper.

Indiana Service Corporation, Fort Wayne, Ind., has closed a deal for fifteen new double-truck cars to be used on the Fort Wayne city lines. The cars cost in the neighborhood of $14,000 each, making the order total more than $200,000. The cars were ordered from the St. Louis Car Company. Delivery of the new cars is to start Sept. 1. The cars will be operated by one man, as are the present cars, but there will be a front entrance and a front and rear exit, instead of only front entrance and exit. The cars will be of all steel construction and will be equipped with four G. E. 25-hp. motors and will have a seating capacity of fifty passengers.

Houston Electric Company, Houston, Tex., has purchased ten double-truck, double-end Birney safety cars from the American Car Company. They are described as follows:

Number of cars	Ten
Date order was placed	March 10, 1923
Date of delivery	August, 1923
Type of car	One-man, double-truck, double-end
Seating capacity	Forty-four
Length over all	40 ft. 1 in.
Length of platform over dashers	5 ft. 9 in.
Width over all	8 ft. 5 in.
Height rail to trolley base	12 ft. 5 in.
Roof	Arch
Air brakes	Westinghouse with DH-16 compressors
Control (type)	Westinghouse K-35 double end
Curtain material	Pantasote
Destination signs	Hunter
Door	Double doors, opening 48 in. in the clear
Door opening mechanism	Pneumatic Devices Company, two door engines, and one selector valve per opening
Fenders	H. B. Life Guards
Handbrakes	Peacock Staffless
Headlights	Golden Glow SM 95
Motors	Four Westinghouse No. 508 AN
Fare boxes	Johnson air-operated with coin separator
Registering devices	Dapron air-driven register mechanism and air box motors
Seats	Brill Co. Waylo special reversible
Seat material	Canvas lined rattan
Trolley catchers	Keystone
Trolley base	Simplex No. 3
Trucks	Brill 77-E trucks with friction bearings
Wheels	28-in. Davis cast steel

Maumee Valley Railways & Light Company, Toledo, Ohio, will use the Nic Le Grand, Inc., positive safety appliances for seven new cars.

Michigan Railroad, Jackson, Mich., has placed a fifth repeat order with Nic Le Grand, Inc., for safety appliances for ten more cars.

Cincinnati, Lawrenceburg & Aurora Electric Street Railroad, Cincinnati, Ohio, will use the Nic Le Grand, Inc., positive safety appliances for seven converted cars.

Detroit (Mich.) Municipal Railway will be provided with funds for the purchase of 200 cars through the passage at the election on April 2 of a bond issue authorizing the expenditure of $5,000,000 for extensions and improvements.

Cumberland County Power & Light Company, Portland, Me., has placed a contract with the Wason plant of the J. G. Brill Company, for six new steel passenger cars at an approximate cost of $13,000 each. The cars will be arranged for either one-man or two-man operation. They will have a seating capacity of forty-eight.

Track and Roadway

Knoxville Power & Light Company, Knoxville, Tenn., has started the construction of the Walnut Street crossover line, which is to cost the company about $24,000.

Portland Railway, Light & Power Company, Portland, Ore., will expend at least $500,000 during the year in track improvements. Details of the improvements have not yet been worked out.

Hydro-Electric Power Commission, Ont., Canada, has announced, through Chief Engineer F. A. Gaby, that improvements to the Hydro-Electric Railways (Essex District) will be completed this year at a cost of $760,000.

Puget Sound Power & Light Company, Bellingham, Wash., has been granted permission to install switches and other curve work at the intersections of Elk and Holly, Dock and Holly and Holly and Bay Streets.

Akron, Canton & Youngstown Railway, Akron, Ohio will spend more than $250,000 for track and property improvement. Of this sum, at least $150,000 will be spent for improvement to the right-of-way, while the remainder will be used for the development of roundhouse and yard facilities.

Interborough Rapid Transit Company, New York, N. Y., during 1922 expended $1,400,000 to maintain its subway and elevated tracks, not including the supporting structures or tunnels, and keep them safe for the operation of 7,000 trains a day. Including both subway and elevated lines, 22 miles of single track of new rail were relaid and 37,500 ties were replaced. A total of 385,000 ft. of planking was used to construct and repair walks along and between the tracks on the elevated lines and the viaduct sections of the subway.

Power Houses, Shops and Buildings

Columbus Electric & Power Company, Columbus, Ga., has perfected plans for the construction of a service building, work on which will start within the next few weeks. The building will cost approximately $35,000 or $40,000.

Beloit, Wis.—Fire of unknown origin in the carhouse of the Rockford & Interurban Railway did much damage recently to electrical equipment such as motors, armatures and coils, in addition to the destruction of belting shafts and valuable tools. Three city cars and an interurban car which were in the building at the time were not damaged.

Indianapolis Ind.—Plans are maturing for the erection of a traction freight terminal in Indianapolis on a plot of twelve acres known as the old Greenlawn Cemetery site. The Terminal Realty Company has a freight house on the location, but it is inadequate to the needs of the roads. The new terminals will cost more than a million dollars when completed. The plans are being worked out by Robert I. Todd, president of the Terre Haute, Indianapolis & Eastern Traction Company; Harry Reid, president of the Interstate Public Service Company; Charles L. Henry, president of the Indianapolis & Cincinnati Traction Company, and Arthur Brady, president of the Union Traction Company of Indiana.

Connecticut Company, New Haven, Conn., is planning to build a combined carhouse and bus garage in Waterbury on West Main Street, where it now has some car shops and other buildings. The problem will be to put up the new buildings without interfering with the operation of the line. It is expected that the new carhouse will have a capacity of 105 cars and the garage a capacity for sixteen buses, twelve for storage and four for repair. There will also be a new paint shop to go next to the present repair shop, and altogether it is expected that the installation will cost between $400,000 and $500,000. The company has also got to build a carhouse at Meriden to take the place of the one burned down Feb. 5.

Trade Notes

Wendell & MacDuffie, New York, have moved from 30 Church Street to the new Bowery Savings Bank Building, at 110 East Forty-second Street, New York.

Carnegie Steel Company, Pittsburgh, Pa., has received the order for the rolled steel wheels to be used under the 576 cars recently ordered by the Philadelphia Rapid Transit Company.

Standard Underground Cable Company, Pittsburgh, Pa., wishes to have all communications to the general offices on and after April 1 directed to 100-108 Seventeenth Street, Pittsburgh, instead of to the Westinghouse Building.

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New Light Weight Interurban Car on Western Ohio Railway

Profitable Operation

By the introduction of new Light-Weight Cars, weighing only 33,000 lb., the Western Ohio Railway Company was changed from an unprofitable to a profitable enterprise. The last three months of 1922, after these new light-weight cars had been placed in service, it is reported demonstrated that economies can be effected in the operation of interurban lines which will reduce expenses to a point below the income and enable them to complete successfully with other means of transportation.

Mounted on Brill No. 77-E Low-Level Trucks the most comfortable riding action is provided under these Western Ohio Cars, which is essential to all classes of interurban service. Their light weight enables them to maintain schedules much better than the heavier types of rolling stock and their operation has been most satisfactory in every way.

THE J. G. BRILL COMPANY
PHILADELPHIA, PA.
AMERICAN CAR CO. ST. LOUIS MO. — G.C. KUHLMAN CAR CO. CLEVELAND, OHIO. — WASON MANF'G CO. SPRINGFIELD, MASS.

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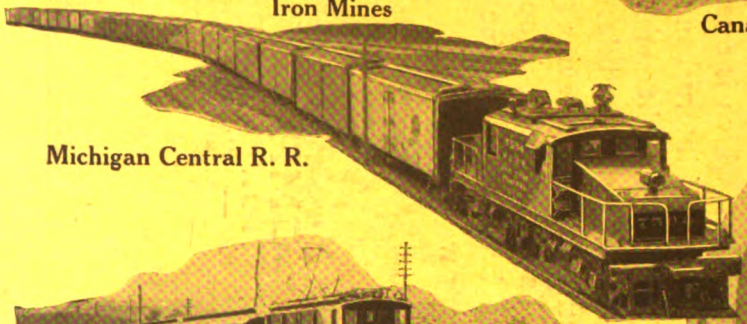
Some G-E Railway Electrifications

Bethlehem Chile Iron Mines

Canadian National

So. Manchurian Ry.

Hershey Cuban Ry.



Michigan Central R. R.

Baltimore & Ohio

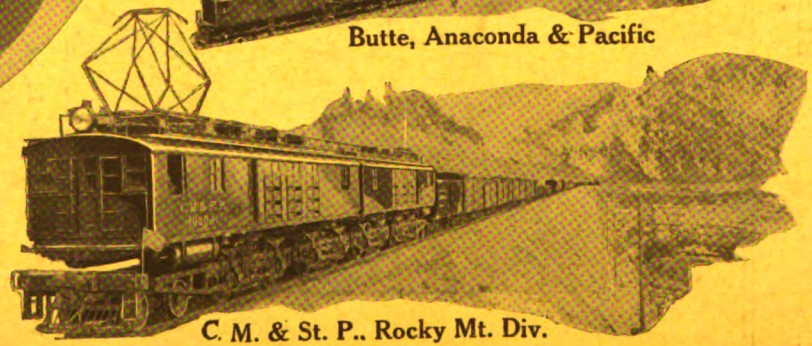
Paulista Ry.

New York Central

London & Port Stanley

Butte, Anaconda & Pacific

C. M. & St. P., Coast Div.



C. M. & St. P., Rocky Mt. Div.

General Electric Company

General Office
Schenectady, N.Y.

Sales Offices in all large cities

25-174

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ELECTRIC RAILWAY JOURNAL

Drawn from actual photograph

Phono-Electric

TROLLEY WIRE

The same qualities that resist wear on curves and crossings give Phono-Electric the long life on tangent lines, as shown above, that results in far-sighted economy and uninterrupted service.

"Bridgeport" BRASS TRADE MARK

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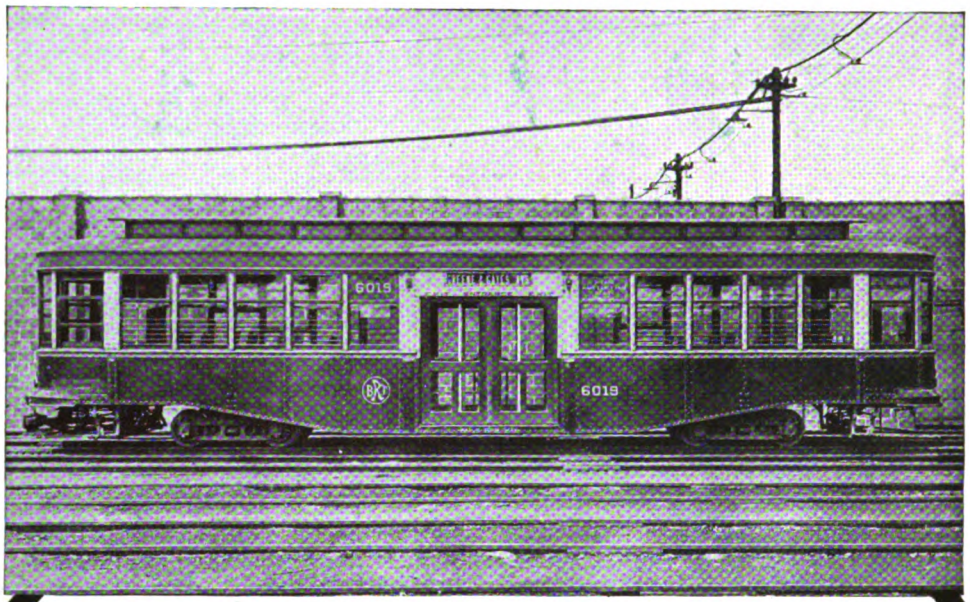

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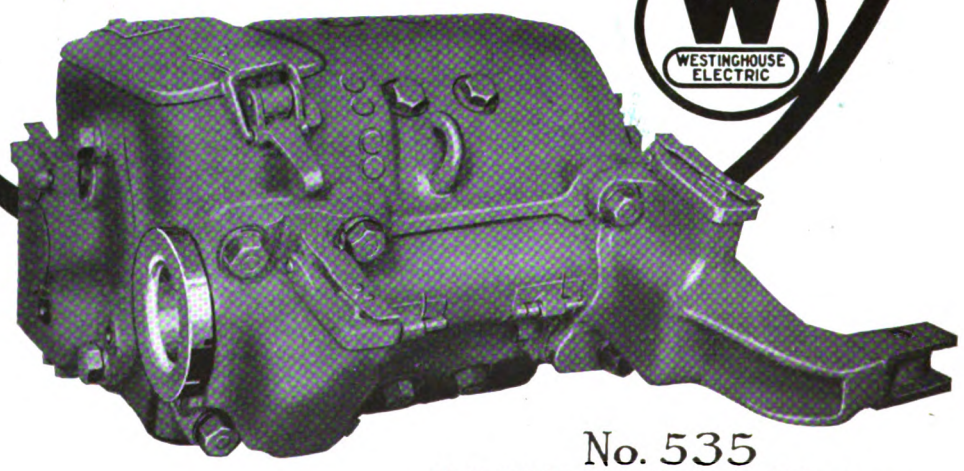

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ELECTRIC RAILWAY JOURNAL

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Company, Inc.

HENRY W. BLAKE and HARRY L. BROWN, *Editors*

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Engineering Science Gets Substantial Impetus in England

ANNOUNCEMENT has been made that the famous pioneer builder of high-speed vessels, such as torpedo-boat destroyers, Sir Alfred Yarrow, has given £100,000 to the Royal Society (of Great Britain) for the promotion of engineering research. In doing this he follows the excellent example of Ambrose Swasey, Warner & Swasey, Cleveland, Ohio, who some years ago gave practically the same sum, or $500,000, for a similar purpose in this country. The Engineering Foundation is the result of the Swasey gift. It is performing, in a quiet way, a useful service, by encouraging that fundamental investigation upon which industrial progress ultimately depends.

The electric railway industry in Great Britain, America and elsewhere will benefit by such noble gifts as those of Swasey and Yarrow. The Charles A. Coffin Foundation recently established by the General Electric Company will have much the same effect in providing a stimulus to engineering development. Electric railway transportation is an application of engineering of nearly all varieties. Whatever makes engineering sounder at its foundations in the end permits the electric railways to give better service.

High Fixed Investment in Railways Merits Greater Publicity

IN HIS recent address before the Wisconsin Utilities Association, James P. Barnes referred to the lack of understanding that many business men have of the electric railway industry because of its highly specialized vocabulary. He said that while we speak fluently of return on the investment or return on fair value of the property, we refer infrequently to the fact that in this business the usual rate of annual gross earnings is only from 15 to 30 per cent of the amount invested in the property. To put it in terms that the merchant or manufacturer can understand, we should refer to the annual turnover of capital. Many lines of business turn over the capital from two to ten times a year. Naturally it is amazing to find an industry where the capital is turned over but once in from three to six years, as is the case of the electric railways.

This small volume of business on the invested capital is one of the most serious problems of the industry. A merchant invests in stock which he cannot dispose of, but in a few months he is able to close it out, even though at a loss, and stock up with new goods. Before the year is over the loss will be absorbed and forgotten. On an electric railway, however, a mistake, say in the design of cars or track, cannot be forgotten so readily. It must be used intensively for a number of years in order to recover the original cost.

The thought to be emphasized is that realization by the public of the railway problems immediately enlists in most cases fairness and co-operation. That makes it worth while to spend considerable effort on getting the right kind of publicity and having it handled right in presenting it to the public. Mutual understanding might often silence critics who insistently demand lower fares and more service without having any idea of what it is going to cost.

Simplified Practice Next Best to Standardization

WHILE many companies are prevented from adopting various American Electric Railway Engineering Association standards because they cannot afford to throw away equipment and track which is still good for many years of service, there remains much which they can do in the direction of simplified practice, as urged by Secretary Hoover. This is particularly true in the case of lines with a number of operating divisions and also with holding companies.

An inventory of the equipment of the different lines of a holding company, for instance, may show that each of its operating properties has a half dozen or more types of motors of modern design as well as a number of the ancient types. It is quite probable also that an engineering examination of the operating conditions of a property will show that the company can get along very well with two or at most three types of modern motors. The variety of equipment has been brought about either because the motors were purchased in small lots when the railways were being operated separately or because they were bought in large quantities by the head office and distributed in small numbers to the different companies.

In a case like this at least one large holding company is endeavoring to standardize each property on the basis of the minimum number of motors possible on its lines, say two or three. In some cases this may mean the shipment of some motors from one road to another, but it means also the relegation of the less efficient motors to the plows, sweepers and other equipment not often used and to the scrap heap, and confining purchases on each property to two or three modern types. Obviously, much the same practice can be followed with other parts of the equipment, even cars, if the railways are not too far apart so that transportation charges would be too high.

The application of this system of simplified practice has been mentioned in the case of a holding company, but the plan is equally applicable, of course, to a large company with a number of operating divisions, where there is an advantage in having the equipment repair parts in each car inspection shop kept low. Nevertheless, it is undoubtedly true that the smaller company benefits

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more proportionately from standardization and simplified practice than the larger company. The latter can afford to keep a large variety of parts in its storehouse, where the smaller company would be overwhelmed by their variety. It is the latter, therefore, that will be most benefited by standardization or this form of simplified practice.

Do the People Want Interurban Rail Service?

FOLLOWING is a letter received by the editor this week from a resident of a rural community. This letter is an editorial as it stands:

"In an issue of ——— *Star* of Jan. 22, we notice an article quoted from your JOURNAL saying, 'Electric Railway Outlook Improving,' which prompted us to ask you a few questions on this subject.

"We are located between ——— and ———, a distance of 27 miles, and, until the war, had a steam line connecting those two cities, a line that was doing a paying business. But on account of the high price of rails, it was junked and rebuilt in France, leaving this territory without a railroad of any kind, a very fertile country of several square miles.

"The main object of this letter is to ask you if you know of some electrical promoter who would connect us up with the ——— — ——— electric lines on the south and the ——— line at ——— on the north. The old roadbed is still intact, and the people are ready to help by either private subscription or vote a subsidy if necessary.

"Can you give us any information as to where we could get in touch with some real-for-sure promoter who could put this project over, or of some financiers who might take it up? We can show that the old road did a good business, as it was the only outlet of this vast territory. As people have found by experience that the trucking business is not a success, they are very anxious for a railroad of some kind. Let us hear from you."

A Great Industry Without Education

IT SEEMS almost incredible, but it is nevertheless true, that the great public utility industry, ranking among the most important fields of endeavor in both investment involved and value to the common good, is practically without representation in the curricula of the colleges. Young men are trained to be engineers, they are taught general economics, they learn something of corporation law, they may get a smattering of regulatory practices, but there is no course of education that might truly be said to be designed to fit young men to enter the public utility field. Here is a great industry, the ramifications of whose business involve in a particular way almost all branches of engineering, the law and business administration. It draws very heavily upon the graduate rolls of the universities for personnel, yet its needs are not directly in view in the planning of courses of education. Only recently has this situation begun to be realized by the universities and by the public utility interests in a constructive way, and both are now giving the matter some attention.

One of the great tasks in this connection is the work of compiling suitable textbooks. This is a rather formidable undertaking, which should have behind it the combined intelligence of a number of the leading minds of the field. It is one which probably would not be accompanied by a sufficient sale of the books to compensate individual enterprise for its efforts. Which means that the utility companies, looking honestly without thought of propaganda toward the development of future personnel, should sponsor, or give financial aid to this work of providing the universities with adequate textbooks, as written and compiled by accepted authorities in each branch of the utility field. It would seem quite in keeping with the demands of the future that many universities should include in their curricula such courses as would permit the student to specialize his last year or two in public utility administration.

Railway for Express Service; Bus for Local Service

PROVIDENCE, R. I., presents some knotty transportation problems for settlement. If ever a city exemplified the idea which the writer of the cowpath poem had in mind it is the city founded by Roger Williams. It didn't name any of its streets after the author of the poem, but it did name one Weybosset as signifying the idea behind the poem. There would not be synonyms enough to go around, but all streets in Providence might be named Weybosset, or the equivalent, so much are they alike. This succession of narrow, winding streets on the cowpath plan would of itself be enough to tax the ingenuity of any transportation management, but in addition to this there are the seven hills on which the city is set with which to contend. Movement of railway traffic through the business district downtown is both slow and hazardous.

It is to help relieve this situation that the United Electric Railways has hit upon the plan of establishing ten distinct loops in the business district, taking all cars off some streets of heavy traffic, and of running trolleys in express service on Broadway from Providence to Olneyville Square, with buses in use for local service over the same thoroughfare. The run is only 1.52 miles, but it is one of the most interesting experiments yet made with buses, for beyond Olneyville Square seven different trolley routes spread out fan fashion. Moreover, the use of the trolleys in express service means that all the people within the area between Barton Street and the center of Providence are being served entirely by motor buses in lieu of trolleys. In other words, the United Electric Railways is voluntarily giving over entirely to vehicles other than its own some of the streets formerly occupied by it, while in the Broadway instance it may turn out that the company, with both trolleys and buses, will eventually monopolize a goodly part of the street. Even to that there can be no reasonable objection when such occupancy has behind it the idea of the greatest good for the greatest number. The lessons to be drawn six months from now from these experiments may prove to be of considerable value to operators elsewhere confronted with similar problems.

President Harding has again shown his grasp of business and employment problems by promptly putting in effect as far as practicable the recommendation of Secretary Hoover and the Conference on Unemployment, headed by O. D. Young, that government construction work should be minimized when times are good and pushed in slack times. This is a matter of interest to electric railways, for if the plan is emulated by the states and cities, the governmental work in dull years will have an appreciable effect in keeping the riding up.

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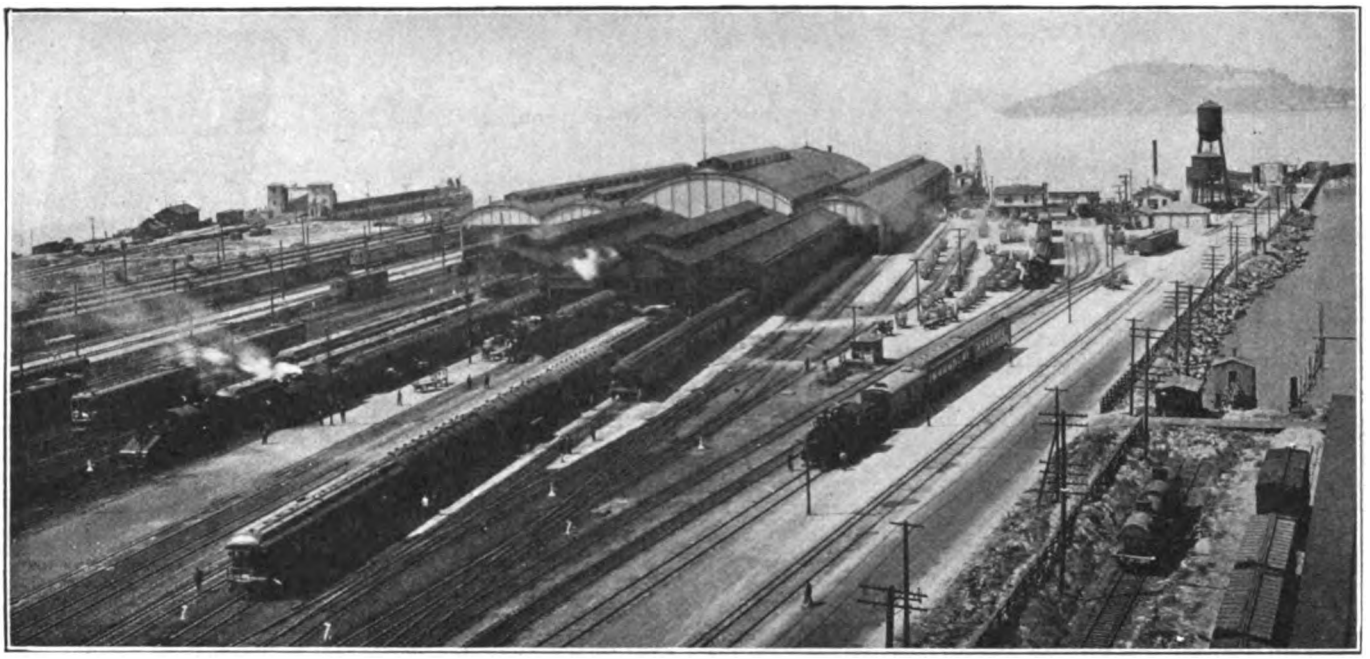

Oakland Pier from Above

At the extreme left is a lumber pier and slip. The next slip is for freight. The next pier contains the main train sheds with the electric station on the left and that for the steam lines in the center and right. Next are the pumping plants and water tanks for terminal supply and fire protection. The slip farthest to the right is for automobiles.

East Bay Electric Service of the Southern Pacific Railroad

Two Million Passengers per Month Use Trains that Must Connect with Boats on Two-Minute Delay Margin—To Meet These Requirements a Precise System of Maintenance Is Followed in Order to Keep Maximum Number of Cars in Service—The Cars Purchased in 1911 Have Given Very Satisfactory Service

IN THE thriving communities on the east side of San Francisco Bay the Southern Pacific System gives a rapid transit service on what is known as its East Bay electrified division. These lines are operated and maintained according to the same standards as main line service and therefore require a highly efficient system of inspection and upkeep. One of the reasons why a high standard of maintenance and reliability is necessary is that the schedules of the ferryboats running across the bay and completing the journey to San Francisco are maintained independently, and all trains must connect with the boats they meet on a delay margin of two minutes. Because of the necessity of simultaneously loading from thirty to thirty-four cars with ferryboat loads of 2,800 to 3,000 commuters during peaks the system of handling traffic at the Oakland and Alameda ferry terminals has received constant study and has been brought to a high degree of perfection.

Features of the East Bay system as a whole were described in the ELECTRIC RAILWAY JOURNAL for Sept. 18, 1915. Recent changes in equipment and some of the features of present methods of operation, maintenance and inspection are noted in the following:

PASSENGER-HANDLING PROBLEM

The electrified division serves parts of Oakland, Alameda, Berkeley and neighboring towns and comprises slightly more than 51 miles of double-track line. Each month it operates approximately 29,000 trains, handling about 2,000,000 passengers. Station stops, approximately 1,500 to 2,000 ft. apart, are made instead of stops at street corners. Trains are scheduled so as to arrive and leave the piers in processional order and are so arranged that no train, when arriving at or leaving terminals, moves through passengers detraining or entering. Most of the traffic is to and from Oakland and Alameda piers, which are the east shore terminals for the ferries that cross San Francisco Bay. With boats operating on a twenty-minute interval, capacity loads are carried on practically all trips during the morning and evening rush hours.

At the San Francisco end of the ferry trip a considerable portion of the business district of that city is within easy walking distance of the ferry, and with the favorable weather that obtains a large part of the year many of the commuters are accustomed to walk the distance between the ferry and their places of business.

On the East Bay side, however, where the property described in this article is located, a different condition obtains. The ferry terminal is several miles from the business district and still further from the residential districts to which most of the commuters go. At this terminal, therefore, all passengers use the electric trains, and during the evening rush hours this means that every twenty minutes the commuters land from two levels of the ferryboat in a period of about two minutes and go directly to the waiting cars.

The fare between San Francisco and all points within

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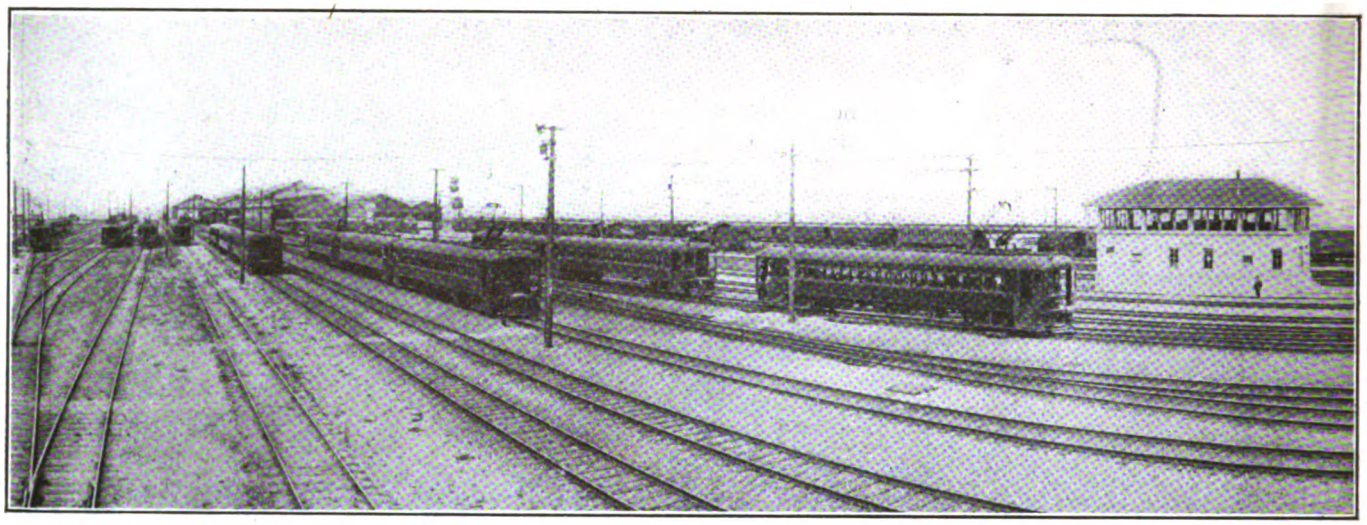


Train Yards at Oakland Mole Terminal

The switch tower at the right controls the movements for all steam and electric trains. In the terminal station, in the background, the electric division uses the structure at the left, covered by a double-truss roof, while the main line steam trains use the higher structure which is located at the right of the electric terminal.

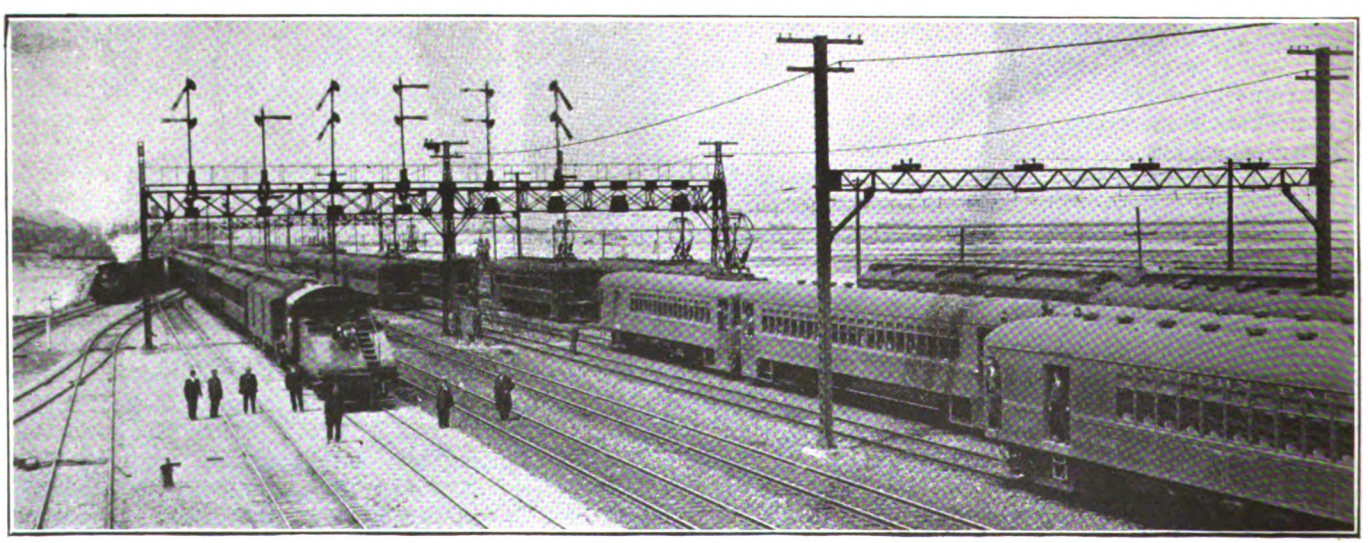
city limits of East Bay cities is the same, namely, 18 cents for a single cash fare, or $4.80 for a commutation book of sixty rides. Collections can therefore be made as the passengers enter the waiting room at San Francisco, thereby avoiding ticket wickets that would cause delay in moving from the boats to the several trains. The boats discharge at both piers on three gangways, two of which are 20 ft. wide and the third 12 ft. wide. The gangway from the upper boat deck leads into a 20 per cent ramp, 12 ft. wide, which affords convenient access to the track level.

Arrangements on the Pier

On the Oakland Mole the main track level is divided into two parts. Main line steam trains occupy one side (twelve tracks) and the local electric trains the other (seven loading and six storage tracks). On the Alameda Mole there are only electric lines, and the entire terminal with eleven tracks is devoted to their use. All electric trains operating out of these terminals have double-end control so that stub-end tracks are used, and the train is ready for the return trip as soon as the motorman walks the length of the train and takes his place in the cab.

Ordinarily cars are operated out of the Oakland Mole on seven routes, leaving from five tracks, and out of the Alameda Mole on three routes, leaving from three tracks. The Oakland Mole carries five tracks in each direction, which includes steam service as well, and the Alameda Mole two tracks in each direction. Large signs, listing the names and destinations of the various routes, are posted in the waiting room on the San Francisco side, also in the depots on the East Bay side and in several places where the passengers cannot fail to see them as they leave the boat. Route signs are displayed on portable stands near the entrances of all trains, and the conductors and brakemen stand on the main floor near their trains to answer inquiries.

A feature of these terminals is the ample space provided for the separation of streams of traffic going from the boat to the several trains. As passengers come from the ramps or the outlets from the main deck gangways, the lines of traffic diverge fanwise in a spacious area around which the trains are waiting. For the purpose



Typical View of Traffic on Oakland Mole

The mole terminal appears in the distance at the left, and the electric trains on the tracks at the right. In the left foreground a switch engine is bringing main line cars from the yard to be made up into trains on the mole. At the extreme left a switch engine is hauling freight cars between the freight yard and the freight ferry slip.

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of speedy loading, the cars, which are designed expressly for this service, have very wide entrances and large platforms so that there is a minimum of delay in getting passengers aboard the train. It is not unusual, even during the rush hours, for the first train to leave within one and one-half to two minutes after the first passenger gets ashore, and the last of the eight trains from the Oakland Mole is ordinarily in motion within four minutes thereafter.

To handle the crowds in this way calls for teamwork, not only between various crews but between different departments. An instance of this occurred recently, when a grounded motor caused a circuit breaker to open in the Oakland Mole terminal just as trains from one of the rush-hour boats were moving out. This cut off the power and, of course, left all the trains in darkness. According to the company rules, power could not be restored until the power house was advised that the trouble was cleared. The foreman of the terminal crew knew from observation that what had occurred was limited to one train and that it had cleared itself. He therefore first ordered the power restored, and then, with assistance, went to the train in trouble. The cars were again illuminated and moving within one minute. Within one and one-half minutes from the time the trouble first appeared the train on which the trouble occurred was also under way, completing its run with the disabled motor cut out.

One disadvantage of having a ferry terminal on a mole is the impracticability of having car storage yards near at hand. The Oakland and Alameda Mole trains have to be made up in a storage yard about 2,000 ft. from the ferry terminal. All cut-outs and pick-ups of cars have to be made during the layover period of eight minutes. This time, however, has been found sufficient, even though practically all pick-ups and cut-outs are made from the center portion of the train, and back-up movements are directed either by hand signals or by the engineer changing operating ends of the equipment.

CARS AND EQUIPMENT

Three types of cars are used, namely, motor cars, trailers and a combination coach and baggage car. The latter is 67 ft. long and seats eighty-eight passengers. The bodies of the motor cars and trailers are alike and they are 72 ft. long and seat 116 passengers. Twenty-one of the trailers have been provided with cabs and operating equipment, so that they can be used as the first car in the train for the purpose of reducing switching and the makeup of trains. The motor cars weigh about 900 lb. per passenger and the trail cars about 600 lb. per passenger.

Each motor car has two 140-hp., 1,200-volt motors per truck, permanently connected in series and geared to a free running speed of approximately 38½ m.p.h. Each motor car has its own current collector; power bus lines are not used in the operation of trains. A 600-volt lighting and control circuit supplied by a dynamotor, however, serves a duplex bus which is run throughout the train to provide current for lighting and control.

Throughout the trains, some of which are made up of as many as eight cars during rush-hour service, there is one nine-point control cable which is coupled to all master controllers and all contactor boxes so that the train can be handled from any cab. This also applies to the air brake equipment, with the exception that air compressor motors are energized direct from the current collectors of individual motor cars.

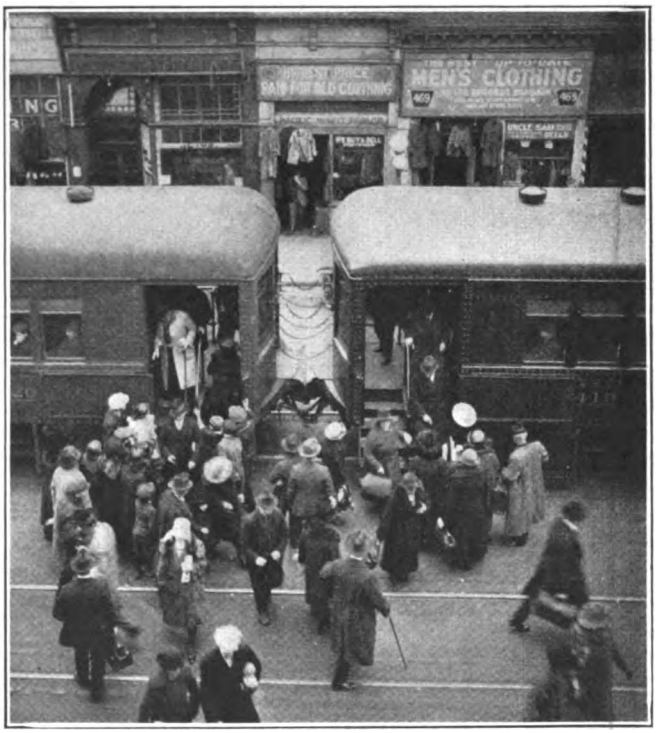
Oakland Ferryboat Entering Slip

These boats carry 2,800 to 3,000 commuters each in rush hours, and the Oakland Mole Terminal is so arranged that even with this large number of passengers the first train leaves within one and one-half to two minutes after the first passenger gets ashore.

All the cars are equipped with the usual A.R.A. standard coupler and safety appliances so they can be jointly switched in yards with main line equipment, and should emergency require the train coaches can be used in main line service with steam power.

INSPECTION AND PAINTING SYSTEM

The electric division has a total of 141 cars in this ferry train service. On the basis of their being repainted at intervals of two years, from six to seven cars are constantly in the paint shop. All of the remaining 134 are needed to handle the daily peak loads. Hence, while there is the advantage of no non-revenue equipment, it is necessary to arrange inspection and



A Stop on the Seventh Street Line with a Seven-Car Train

These cars are 72 ft. long and 10 ft. 5⅞ in. over eaves in width. This makes possible a triple seat on one side of the aisle and a double seat on the other and gives a seating capacity of 116 passengers per car. Each motor car is equipped with four 140-hp. motors and with the regular A.R.A. standard coupler so that they can be switched and otherwise connected with main steam line equipment should emergency require at any time.

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maintenance programs so that no cars are kept out of service during either the morning or evening peaks except the six or seven held out for repainting, at which time a general overhauling is also given.

Inspections are made at intervals of 1,200 miles on motor cars and 2,000 miles on trailers. To accomplish this effectively, each inspector is trained to do a certain part of the work and is kept at his specialty without such interruptions as making sick relief or filling such other temporary vacancies that occur in the shop organization. A feature of the company's policy in this regard is to require each inspector to sign a statement covering the condition of that part of the work he has inspected. It is considered as important to let him know when he does good work as when he does not, and in order to keep him informed as to the results he has obtained, the performance records of equipment are regularly shown him. By this means the efficiency of each inspector is a matter of record, the force is strengthened and unsatisfactory labor is promptly eliminated.

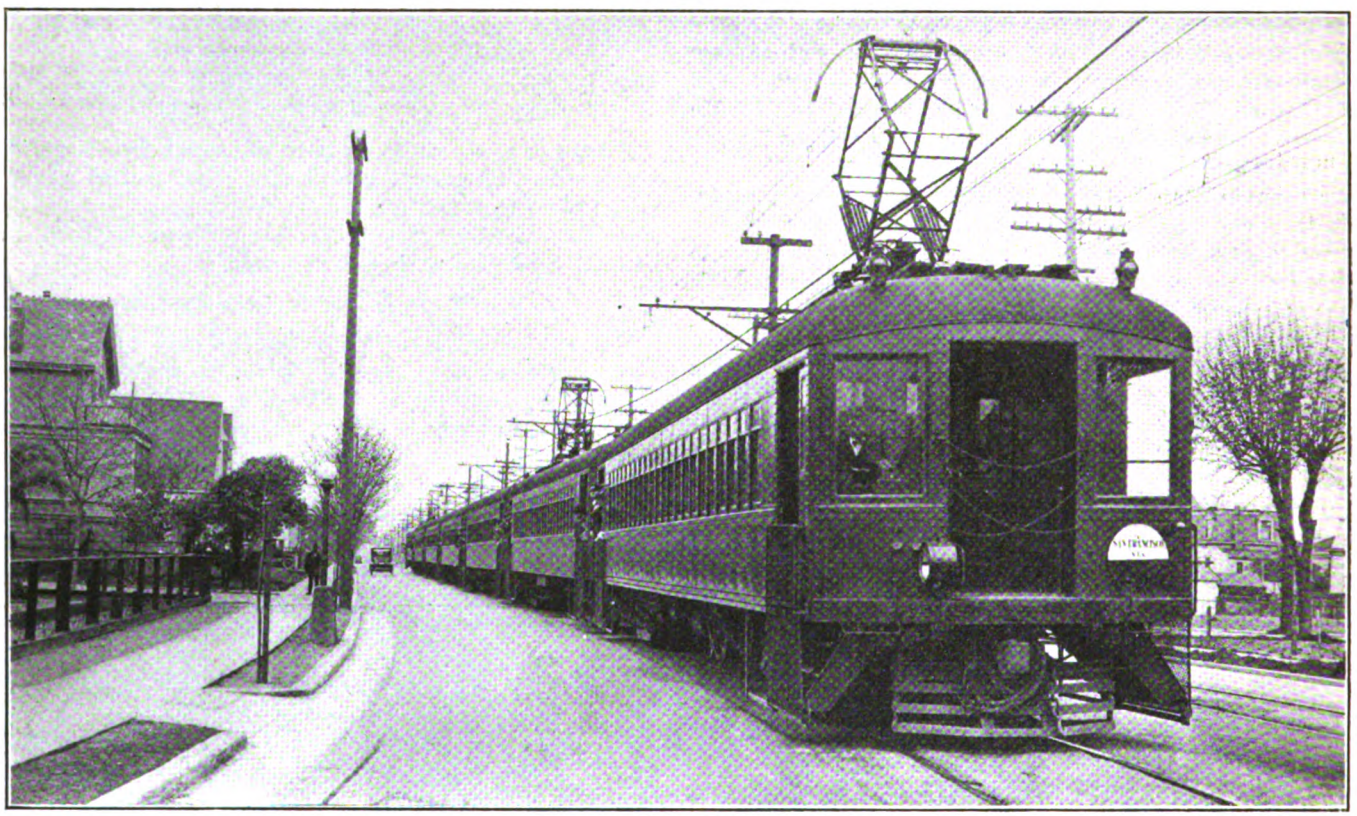
Between these 1,200 and 2,000-mile inspections the only work done on the cars, in addition to cleaning, is the renewal and adjustment of brake shoes. The shop where the inspection, repairs and painting are done for all rolling stock of the electric division is at West Alameda and is divided into mechanical and electrical departments, each with its own foreman. The electrical foreman has charge of inspection and also the overhauling of electrical equipment; the mechanical foreman directs all overhauling with the exception of electrical equipment. The paint shop is operated as an adjunct under its own foreman and has no direct relation to the other departments.

Cars are brought in for general overhauling at intervals of twenty-four months on the assumption that the mileage will average 4,000 miles per month. On account of the makeup of trains, some cars make only half this mileage and their equipment is overhauled only at forty-eight-month intervals. However, the repainting is done every twenty-four months, regardless of mileage.

General overhauling consists of stripping the car of all electrical apparatus, excepting the frame of the various control units. The car body and trucks are then sandblasted to take off the accumulated dirt, rust and such paint as requires removal. After all necessary cleaning of trucks and car body, the bottom of the car is repainted by the air-pressure spray process. While the electrical equipment is being cleaned and put in good condition the necessary work on the car body and trucks is done, and the car is then reassembled and moved into the paint shop.

During general overhauling and painting cars are out of service approximately thirty days where repairs are heavy, or less time in proportion to the amount of work to be done. The painting consists of a color varnish process covered with an additional coat of wearing varnish which has been found to give good service for a period of two years. This wearing surface is renewed about four times (or it has about ten years total life) before all paint has to be removed for a fresh start. In this district the salt fogs are very severe, the routes follow the bay shore almost entirely, and the cars are stored on piers over the bay water.

For running repairs, the idle units, such as motors, compressors and dynamotors, belonging to cars being painted are used as exchange units for the purpose



Seven-Car Train Operating Out of Alameda Mole

With trains like these the Southern Pacific Railroad carries commuters living in the East Bay cities of Oakland, Alameda and Berkeley to the ferry slip, whence they cross the bay by ferry to San Francisco.

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of reducing shop time on such repairs. This makes extra equipment unnecessary. When released from the paint shop, cars are fitted with trimmings and are given approximately a 10-mile test run before being released for service.

The paint shop is equipped with a hot air heating system to maintain a uniform temperature for varnishing. The machine shop is fitted with a twenty-five-ton traveling crane which handles all car bodies, motors and other heavy parts. The inspection shop is fitted with floors between pits depressed approximately 18 in. to facilitate inspection. The trolley wires in the inspection shop have a feeder circuit, opened and closed through a magnet circuit breaker which has a remote control and is coupled with indicating lights and warning whistles so that the trolley cannot be energized unexpectedly. Such remote control switches have a spring release to prevent trolley wires being left energized without an attendant.

CHANGES IN EQUIPMENT

No changes have been found necessary in the original design of the equipment or shops since its initial service in 1911. In 1921 a program of renewing armature windings in traction motors, air compressor motors and dynamotors was begun. This work is handled as the cars come in for overhauling and thus has extended considerably over two years. At the same time all field coils in these units were removed for the first time and for the purpose of renewing the exterior insulation and deteriorated leads.

During the rewinding of the traction armatures it was considered advisable to apply bronze end castings that would support the laminations not only below the coils but between the coils, and also to substitute a stronger air duct spacer in place of the old pressed steel type which has shown a tendency to fail. At the same time a solid conductor was installed in the traction motor armatures in place of the previous split bar overlap type conductor which has shown a tendency to fail before the insulation had run its life. These changes are expected to increase the life of the armature insulation materially.

Some consideration has been given the question of equipping motor cars with the modern type of line switch to assist contactors in handling the current. However, thus far failures due to the lack of these devices have not been of such a character as to seem to make them essential.

SLIDING CONTACTS TO REPLACE ROLLERS

The current collectors are the U.S. 121-A pantograph with built-up angle-iron frame and with rollers revolving in bearings as the contact device. The pantographs themselves have given no trouble and will continue to be used as originally designed. The rollers, however, which are 5 in. in diameter, are to be replaced with a sliding shoe contact. This decision was reached after extensive service tests in which the sliding shoes were found to require less maintenance and less tension in pantograph springs at the same time that they afforded a much larger contact area. Due to the two latter advantages of the sliding contact considerable savings are expected in the reduction of trolley wire wear.

J. C. McPherson is superintendent of the East Bay Electric Division of the Southern Pacific Railroad and J. H. Lockett is master mechanic.

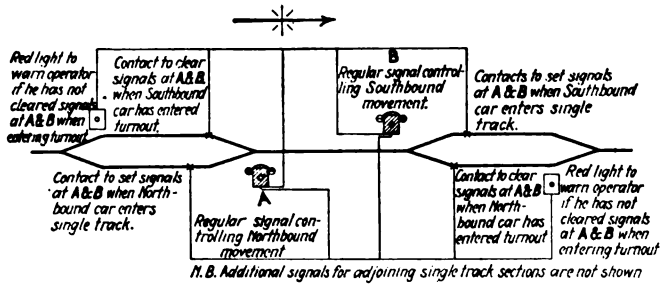
Repeater Signals Aid Safety Car Operators

A SIGNAL that cannot be relied upon is worse than no signal at all, and on single-track electric railway lines the proper clearing of signals is second in importance only to their proper setting. If the indication remains "Stop" after a car has passed beyond the section of track which the signal is intended to protect, other cars may be held up unnecessarily. When this occurs very frequently the motormen lose confidence in the signals and sometimes proceed onto single track against a "Stop" indication, thinking only that the last car in the opposite direction failed to clear the signal. With two men on a car it is easy for one of them to watch the signal to see that it has been cleared after the car leaves the single track and enters a turnout. But with the increasing use of one-man cars throughout the country somewhat of a problem was created.

Repeater Signal Located on Pole at End of Turnout

Inasmuch as the signal which protects a car on single track against an opposing movement must be in front of the car on the siding, it will necessarily be behind the first car after the latter has reached the turnout. The operator of a one-man car, therefore, has no way of telling whether or not he has cleared the signal after leaving the single track unless he stops his car and looks back at the signal. If his car is crowded, or if low branches obscure the signal, he may even have to get out of his car to see it. Under these circumstances it is inevitable that an operator will often not take the trouble to make sure that he has cleared the signal.

The Public Service Railway of New Jersey met this situation in an unusual way, its lines being equipped with United States non-registering signals. Since with this system the first car to leave the block clears all



Position of Signal Lights and Contacts

the signals, the rules state that there shall be only one car at a time in the block, and the motorman may no more enter against the green light set by the preceding car in the same direction than he would enter against the red of an opposing movement. So long as two-man cars were operated on the single-track lines of this company it was the custom for the conductor to look back at the signal after a car had entered a turnout and give the motorman two bells to proceed when he saw that the signal had been properly cleared. In the summer of 1920, however, safety cars began to replace the

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former two-man cars on many of these lines, and trouble was experienced. To remedy the difficulty the company devised a repeater signal which would be visible to the operator on the front end of a safety car, and this device has now been installed on all lines where safety cars are operated on single track.

As an example of the way the scheme works, let it be assumed that a northbound car is entering a stretch of single track. The entrance of the car upon single track sets three signals. The first is the green signal at the point where the car left the siding. The second is a red "Stop" indication at the other end of the single track to halt an opposing movement. The third is the repeater signal, which is, like the second, at the distant siding, but some distance beyond the ordinary signal and facing toward the car which set it. When the northbound car has left the single track and entered the next turnout it passes under a contact which clears all the signals. The repeater signal shows simply a plain red light whenever the other signals are set for northbound traffic, and far enough ahead of the contact so that the operator can readily see it and know whether or not he has cleared the signals behind him. If not, the red light before him gives warning not to proceed until he has done so. This device has worked in a most satisfactory way on the Public Service Railway and has eliminated much signal trouble.

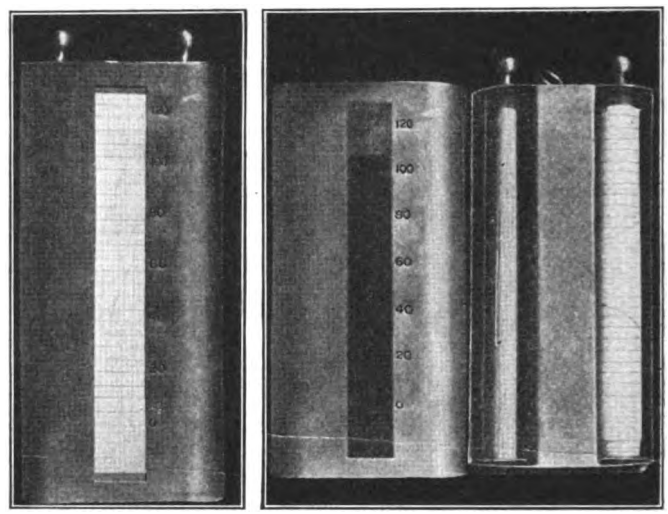
Detroit Traffic Graph Made Directly on Street

A Simple Mechanical Device Is Used by Which the Checker Records the Car Loading by Drawing a Line Along a Straight Edge

TO SAVE office labor and secure immediate interpretation of car-loading and headway checks taken on the street, the Department of Street Railways, city of Detroit, has devised the following means for recording and plotting the car-loading graph in one operation:

A strip of paper about 64 in. long by 7½ in. wide is prepared as a record form by unbroken horizontal rules to cover passenger capacity and by short vertical rules top and bottom to cover the time intervals. The numbers of the cars corresponding to the time points are written in together with the name of the route and intersection. The length of the record portion itself is 54 in., the remaining length being required for a 5-in. ear at each end, which is cut out for the easy rolling up of the strip on a spool, as described in the next paragraph. One ear carries the necessary identification marks as shown in the illustration below.

To secure the synchronous loading check and graph, the strip is placed in an elliptical or flask-shaped container made of sheet copper and measuring 8½ in. in height, 4½ in. in width and 1¾ in. in depth. Within the container is mounted a sliding base into which are set two spools slotted exactly like the film spools of a kodak. All that the checker has to do in loading the container is to roll up the strip on one of the spools and attach the ear to the slot of the other spool. The spool-base is then pushed back into the container, into which an opening has been cut to expose 1 in. of strip.

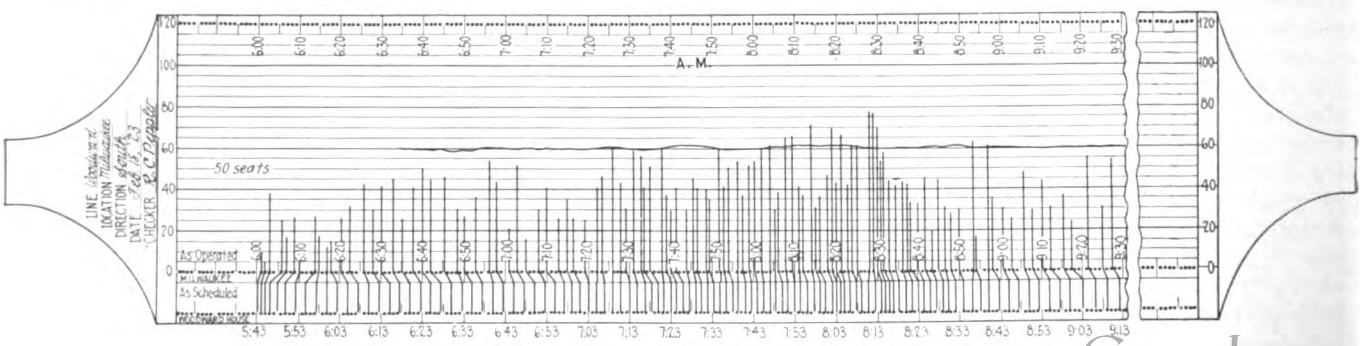


At Left, Recording Device Used in Detroit in Changing Car Loadings. At Right, the Spool Carrier, Which Embodies the Principle Used in Hand Cameras

As each successive car arrives, the checker winds up the strip by means of the spool knob and draws a "time-load" line along the straight edge on the right-hand side of the container window. The length of this line, of course, is proportionate to the passenger load. The checker is guided in drawing this line by the passenger-load scale (0-20-40-60-80-100-120) stamped alongside the container window.

Coal Investigation by A.E.C.

AT THE last meeting of the executive board of the American Engineering Council, held in Cincinnati, March 23-24, it was decided to make a nation-wide investigation on the economic value of coal storage. It is understood that both the Coal Commission and the Department of Commerce will look with favor upon such a survey. The object is "to determine the facts relating to the engineering, chemical and economic factors involved in, and their influence upon, coal storage at the mine and by large and other consumers of coal." It is expected that President Cooley will appoint a committee representative of the various groups interested, such as mining, transportation, public utilities, chemical engineering, etc.



Part of Record Strip with Car Loading Graph

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Way Construction Experience in Portland

Rail Direct on Concrete Slab Has Given Best Life—Ballasted Track Has Proved Unsatisfactory—All Track Now Being Laid with Concrete Slab to Eliminate Settlement—The Details of the Construction Are Given

By F. I. Fuller

Vice-President Portland Railway Light & Power Company, Portland, Ore.

THE Portland Railway, Light & Power Company's track system consists of a total single track equivalent of 297.6 miles, 150.8 miles being paved and 35.4 miles unpaved in the city streets of Portland. On the interurban lines there are 2.78 miles of paved and 108.6 miles of open track. Of the above track 186.2 miles in Portland is 3 ft. 6½ in. gage and the balance is standard gage.

BALLASTED TRACK CONSTRUCTION NOT SATISFACTORY IN PORTLAND

In the business district the track is principally from fifteen to twenty years old, laid mostly with a 7-in. grooved rail. Some is on ballasted tie construction and some on a concrete slab, and nearly all is paved with basalt stone blocks. The most satisfactory of this old type construction has been that in which the rail was laid directly on a concrete slab with small ties about 10 ft. apart and tie rods in between.

Joints are cast welded and, while some of these joints failed due to softening of the rail head over the weld, a large proportion are still good. (See Fig. 1.)

The tracks in the residential portion of the city are laid principally with 6-in., 72-lb. tee-rail on the narrow-gage lines and 7-in., 80-lb. tee on the standard-gage lines. Ballast is either bank gravel or broken stone, drained with a 4-in. farm tile under the center of the track and connected to the street sewer at all available points. Paving is either stone, brick or concrete. Joints are 4-bolt continuous type and the rail is fastened to the ties with ordinary track spikes.

This type of construction has not been entirely satisfactory as, due to the wet climatic conditions of Portland, the track shows a tendency to settle, causing the pavement to break up along the rails. The continuous joints have become loose and it is very expensive to rebolt them where the track is paved. The track spike does not hold the rail firmly to the ties, allowing the rail to move vertically as the cars pass. Track of this type, while lower in first cost, does not last as long as the more rigid construction. (See Fig. 2.) In a climate like ours, with comparatively long and wet winters, any ballast with voids in it, placed on a clay subsoil, no matter how well drained, will not be satisfactory in hard-surface paved streets.

Our latest type of construction for tracks in the business district is with 7-in., 105-lb. grooved rail for the narrow-gage tracks and 7-in., 122-lb. grooved rail for the standard gage tracks. Concrete slab foundation 6 in. to 8 in. thick and surfaced 2 in. below ties is used. A farm-tile sub-drain under the concrete slab is connected to the city sewer wherever possible. The ties are 6 ft. long for the narrow gage and 8 ft. long for standard gage, spaced on 3-ft. centers and tamped up with 2 in. of 1-in. rock on top of the concrete slab. After the track is surfaced this fine rock is grouted. The rail is fastened to ties with 8-in. x 10-in. x ½-in. flat tie plates and 6-in. screw spikes. The rail is also held down to the concrete between ties with ½-in. x 1-in. steel stirrups bent over base of rail and extending down into the concrete about 6 in. Joints are standard 4-hole

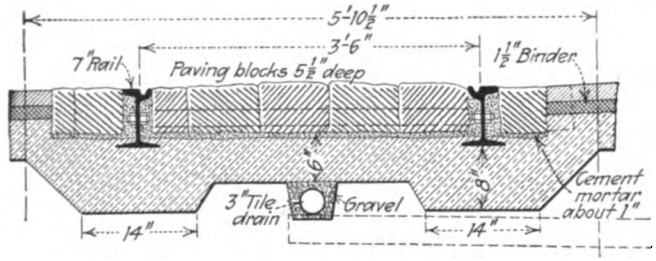

Fig. 1—Construction Installed on Washington Street, Portland, in 1892, and Still in Service

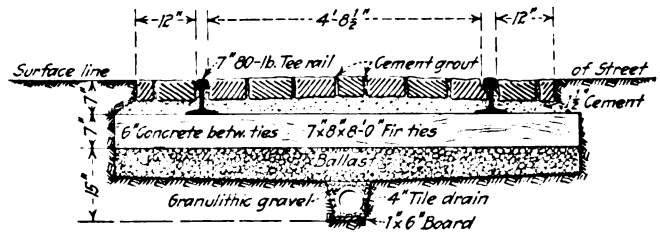

Fig. 2—Type of Track Used Generally in Portland During Past Fifteen Years

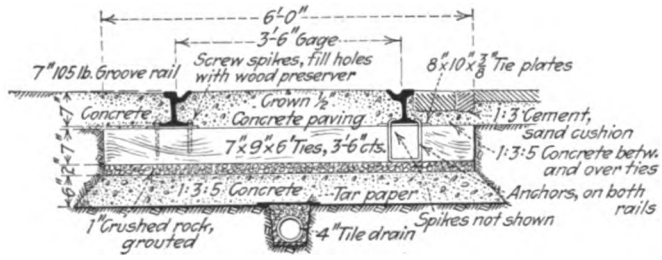

Fig. 3—The 1923 Track Construction in Portland, Employing Tie Plates, Screw Spikes and Anchor Stirrups

fish plates, electrically welded to the rail top and bottom, and the heads and nuts of the bolts are also welded to the plates. Paving is either basalt stone blocks or concrete on a concrete base between ties. Cast-iron surface drains the full width of the track are placed at all low points in grades. (Fig. 3.)

Our new type of construction for tracks in the residential districts is similar to the new type in business districts, except that 6-in., 100-lb., A.R.A. tee-rail is used and the paving is all concrete.

We expect, with these new types of construction, to eliminate practically all track settlement and vertical movement of the rail, thereby prolonging the life of the

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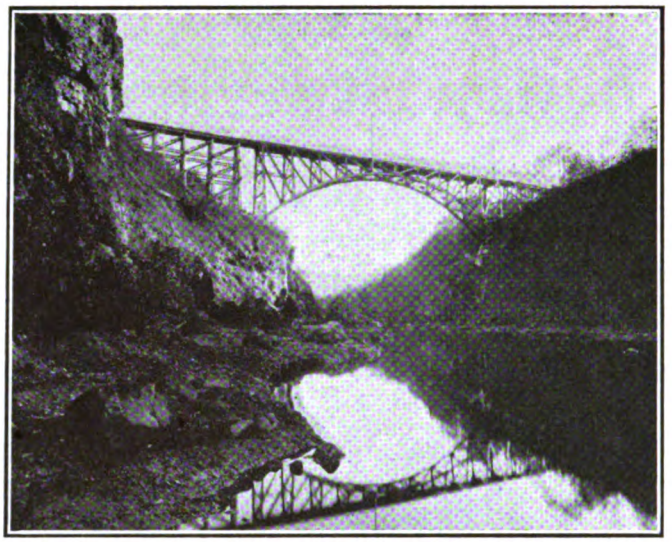
track and keeping the surface of the street in better condition.

All special trackwork pieces are made to standard dimensions. The narrow-gage curves have a center radius of 35 ft. with 75-ft. radius switches. Our standard-gage curves have a 57-ft. radius with 120-ft. radius switches. Nearly all special trackwork is built in our own shops. The switches are all of one-piece cast-steel design, the mates, frogs and crossings of grooved guard rail being electrically welded with heavy base plates, knees, riser plates for flange bearings, etc. Steam-railroad crossings are either solid manganese, purchased from special trackwork manufacturers, or of the bolted rail type, made in our own shops.



A Graceful Steel Bridge on the P. R., L. & P. Co.'s Lines

SPECIAL TRACKWORK IN PORTLAND LARGELY HOME MADE

Spring or lock boxes made in our own shops are placed on all switches to hold the tongues in the desired position.

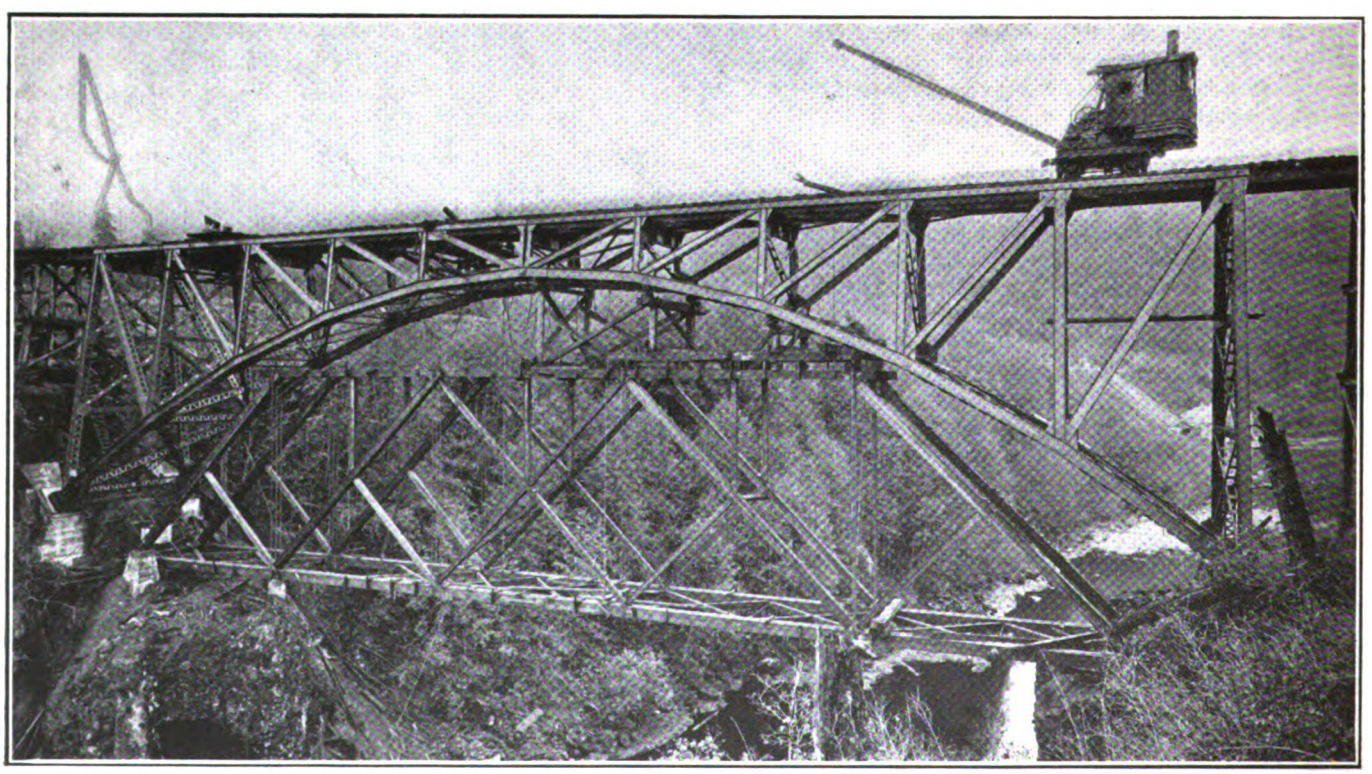
Three stationary shop electric welders and five portable welders are kept constantly busy on the manufacture and repair of special trackwork. All rail cutting necessary for the making of special trackwork is done with gas cutting torches.

Cast steel switches and the electric welded special work are proving very satisfactory from the standpoint of first cost, quickness of manufacture and length of service. Open tracks on these lines have rail weighing from 56 lb. to 80 lb., on 7-in. x 9-in. x 8-ft. wood ties laid on gravel ballast. Spring switches and frogs are used, and the rail joints are partly of the 4-hole continuous type and partly angle bars. Bonds are principally No. 0000 electric welded type.

During 1922 we extended our Cazadero line 5 miles to the north fork of the Clackamas River and this year a further extension of about 24 miles is being made in order to reach a new hydro-electric power plant being built by the company. These extensions are through a mountainous country and the grading work was all very heavy.

Two of our largest bridges on the interurban lines were reconstructed last year. The Sandy River bridge, which is 1,700 ft. long and 80 ft. high, was rebuilt with steel truss construction for 280 ft. and six post frame bents on concrete piers for the balance. About 865,000 ft. of timber and 278 tons of structural steel were used in this work.

The other bridge replaced was a 170-ft. wooden deck truss bridge across the Clackamas River at Faraday. This was replaced with a 190-ft. steel arch span. The deck is over 100 ft. above the river. As this was a difficult place in which to build falsework, the old wooden bridge was first stripped, the ends and decking were removed and the bridge was then lowered 20 ft., moved lengthwise 9 ft., and used as falsework during the erection of the new steel work.



Old Wood Bridge Used as Falsework for New Steel One

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Los Angeles Board for Extensions, Subways and Buses

Ten Miles of Double Track on Sixteen Car Lines and Installation of Twenty-four Feeder Bus Lines Planned at a Total Cost of $5,000,000—Subways Favored for Congested District—Unification of System Suggested

THE Board of Public Utilities of Los Angeles, Calif., which for the past eight months has made an extensive study of the local traffic congestion and transportation problem, on March 20 presented its report, which was signed for the board by Walter R. Leeds, president; Commissioners J. P. Kennedy and E. F. Bogardus and Chief Engineer F. A. Lorentz.

The principal recommendations are that the two local systems, the Los Angeles Railway and the Pacific Electric Railway, construct 10 miles of double-track extensions to sixteen different street railway routes into unserved portions of the city and install twenty-four motor-bus feeder lines, totaling approximately 82 miles.

It is recommended that the Los Angeles Railway's lines be extended into Hollywood, which now is served exclusively by the local lines of the Pacific Electric system. It is proposed that certain Pacific Electric track in Hollywood, which is standard gage, be equipped with a third rail for use of the Los Angeles Railway's narrow-gage cars. Certain changes in routing and service are also included.

The report calls for immediate construction by the Pacific Electric of a subway from its Hill Street terminal to Glendale Boulevard, and claims that it is necessary that the same company's line be extended along Highland Avenue to connect with its Sixteenth Street line at Vineyard Junction.

The program for improved street car service in Los Angeles will cost approximately $4,000,000. The railway extensions recommended will cost about $170,000 per mile of double-track girder-rail construction in paved streets, or a total of $1,700,000. It is estimated that the companies will be obliged to purchase at least fifty motor buses, costing from $6,000 to $8,000 each, and employ 2,000 additional men.

The report favors universal free transfers at all points of contact, both between rail lines and bus lines, irrespective of ownership. It is recommended that the "gentlemen's agreement" between the two railways, under which neither will make extensions into the other's territory, be broken. In lieu thereof there should be a harmonius understanding between the two companies which will permit each to render the service that the city requires. Unification of the systems is favored, but the board takes the stand that this feature and the question of universal transfers rest with the State Railroad Commission along with its powers for fixing rates of fare.

The board's report, however, is opposed to the increased street car fares granted the Pacific Electric lines Jan. 1, 1922, by the Railroad Commission, which are characterized as contrary to the charter privileges of the city of Los Angeles. Under the commission's order, claims the board, this company is permitted to receive more for transporting local passengers in the city than is the Los Angeles Railway.

Commenting on the bus situation, the report states:

The use of motor buses as auxiliaries to our existing street car service is a foregone conclusion. The vast cost of maintenance of the rail lines, including the upkeep of tracks, paving rights-of-way, erection of substations for the generation of power and the high cost of same, to which is added a very large sum in the form of depreciation, are all factors that will occasion the installation of bus-line service. Such service will greatly assist in solving our transportation problems, and if sufficiently operated will prove to be the most important adjunct to our present rail system.

It is estimated that 4½ cents of each 5-cent fare that is taken in is expended in the manner stated above. Moreover, street cars move slowly and they deposit passengers in the line of traffic, while buses receive and discharge passengers at the curb. The bus is a utility within itself. It generates its own power, is flexible, accommodates as many people as the street car, moves more quickly and in every way is more adapted to the needs of the traveling public. Less than half of each bus fare is consumed in the maintenance of the system, hence a greater profit and better service.

The board states that it will take no action on the application of the People's Motor Bus Company, represented by William G. McAdoo, for a bus line franchise, since the question is to be voted on at the election May 1. The McAdoo bus interests have circulated an initiative petition, which is to go on the ballot, to repeal the present jitney ordinance prohibiting operation of buses on the congested streets. Another petition to be voted on is whether the People's Motor Bus Company shall be granted a franchise for motor bus lines on 62 miles of the city's streets.

Extensive Transportation Demands Outlined

The report also contains a memorandum dealing with the extensive transportation demands outlined by the board, which are claimed essential in solving the transportation problem. The subway problem was not gone into, however, but it was announced that the board's chief engineer soon will submit a detailed report on this subject. It is understood that subways are favored for urban and interurban traffic, costing in excess of $75,000,000. This is far more elaborate than the proposal of the Los Angeles Planning Commission submitted to the board several weeks ago. This latter plan was for a system of subways to remove the Pacific Electric's interurban trains from the congested streets.

Upon serving the two street railway companies with notice to place the proposed program in effect, the board gave them ten days in which to file replies, following which the board will formulate its recommendations to the City Council for enforcement.

President Leeds, commenting on the report, stated that he favors that part of the report coming under the memorandum, but does not approve the recommendations concerning the buses, saying in part:

I do not approve what is said in the report about motor buses. Experience of approximately fifty cities of the United States for the past few years has shown the following conclusions in regard to motor-bus operation: (a) Motor buses as substitutes for street cars in heavy traffic areas are not satisfactory; (b) motor buses competing with street cars generally result in inferior service on the car

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lines with increased fare, which causes public reaction against such competition; (c) motor buses, where operated as feeders by rail carriers in new territory not yet able to support street car service, are found to be satisfactory, and (d) motor buses are most economical where traffic is comparatively light.

In his comments President Leeds stated that while universal transfers are desirable, unless provision is made to charge for them their use will result in increased fares. He stated further that he did not believe the Board of Public Utilities should be made the catspaw to force upon the street railways and the public the extension of rail lines or the operation of bus feeders to help the promotion of new real estate subdivisions.

Following its report the Board of Public Utilities has announced tentatively the plans it proposes to recommend to the City Council for rapid transit for both urban and interurban traffic, which involve an elaborate subway and elevated system. Two distinct subway systems are called for, the first to be a "Y" system, with Pershing Square as its center, while the second forms a loop around the downtown congested district, the two systems to connect at three or more points. Both of the subway systems, as well as the elevated system, are to be arranged for four-track operation.

The plans call for bringing the interurban trains of the Pacific Electric system between Los Angeles, Hollywood, Glendale, San Fernando Valley points and other northwestern points into Pershing Square from the north by the northwestern arm of the "Y," while the Pacific Electric lines between Los Angeles and Santa Monica Bay points are to be routed over the southwestern arm of the subway.

The Pershing Square underground depot, as provided in the plans of the Los Angeles Planning Commission, also would be a dispatching point for Pacific Electric interurban trains to the southeast and northeast under the board's plans.

The board proposes that the Pershing Square "Y" subway should also be used by the local street car lines as well as by the interurbans, which, entering the city over various routes, will be afforded opportunities for transfer. Pacific Electric trains that now operate from the Sixth and Main Streets terminal, Los Angeles, for northern division and southern division points under the board's plan would operate from the Pershing Square depot through the proposed tube to the Main Street terminal, thence via viaduct to the interurban right-of-way.

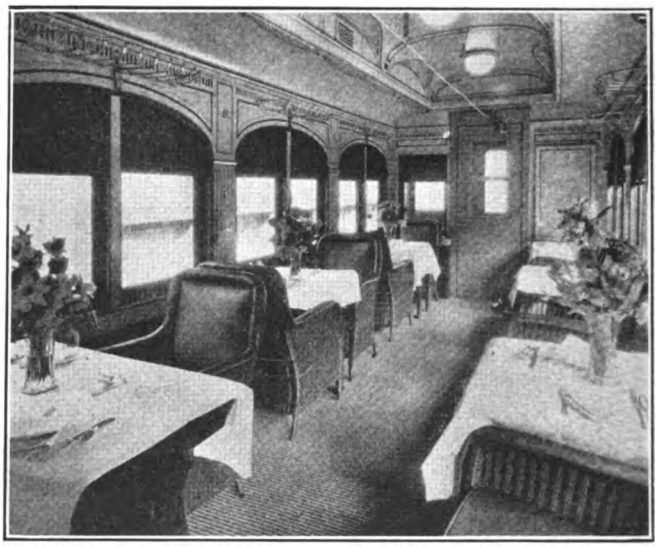
It is expected that the subway and elevated plans of the Board of Public Utilities will be officially placed before the Pacific Electric and Los Angeles Railway companies when the survey now under way, contemplating the unification of the two local street car systems in Los Angeles, is completed.

Installation of six viaducts across the Los Angeles River, estimated to cost $3,801,281, have also been recommended by the board, the viaducts to be constructed at Macy, Aliso, First, Fourth, Seventh and Ninth Streets. In addition the board recommends the depression of the tracks on both banks of the river, a program bringing the total estimated cost of the project to $5,001,281. These proposed viaducts are to relieve traffic congestion and eliminate grade crossings, carrying city, county, street railway and steam road traffic. The board recommends that in carrying out this "short viaduct" plan the city, county and street railway lines should each bear 16⅔ per cent of the total cost, while the two steam roads involved would pay the remaining 50 per cent. The board claims that the "short viaduct" plan is the most favorable because the steam roads are now located on the east and west banks of the river through the industrial district.

Buffet-Parlor Car Has Novel Interior

A NEW buffet-parlor car was put in service by the Chicago, Aurora & Elgin Railroad the latter part of March. This car has been under construction for the last six months at the company's Wheaton shops. It is the first of three similar cars. The two remaining cars will be ready for service about the first of June.

Approximately $30,000 was spent in building and equipping the new parlor-buffet car. The design embodies the latest features of high-speed equipment, the underframe being of solid steel, heavily reinforced with



The Tables in the Dining Compartment May Be Removed, Converting It Into a Parlor Car

a steel superstructure to insure rigidity and easy riding qualities. The car is driven by four 125-hp. motors, capable of speed up to 70 m.p.h.

It is stated that no expense has been spared in providing interior comfort, and that the car will be one of the finest examples of buffet equipment on any suburban road in the country. Richard A. Boaler of Watson & Walton, Chicago, designed the interior decorations, which provide a light, cheerful atmosphere.

The floor of the lounge smoking compartment is finished in marble effect with green, tan and black predominating, with the main or dining compartment in tan and black striped Wilton carpet. The body color and walls resemble old Grecian marble, striped in Athens green, gold and black, these bright tones being set off by a black wainscot carried up to sill height. The furnishings are luxurious reed chairs, painted and glazed in red to match the decorations.

Electric heaters, thermostatically controlled, heat the car, and Pullman semi-indirect lighting is used. Ventilation is secured by Utility ventilators. The chef's kitchen has been given special attention to secure perfect sanitation, with adequate facilities for icing perishable foods. Individual dining tables fold into compact compartments when not in use. The car exterior is painted vermillion. A new step, designed after experimentation, makes alighting at either elevated platform or street level easy for women.

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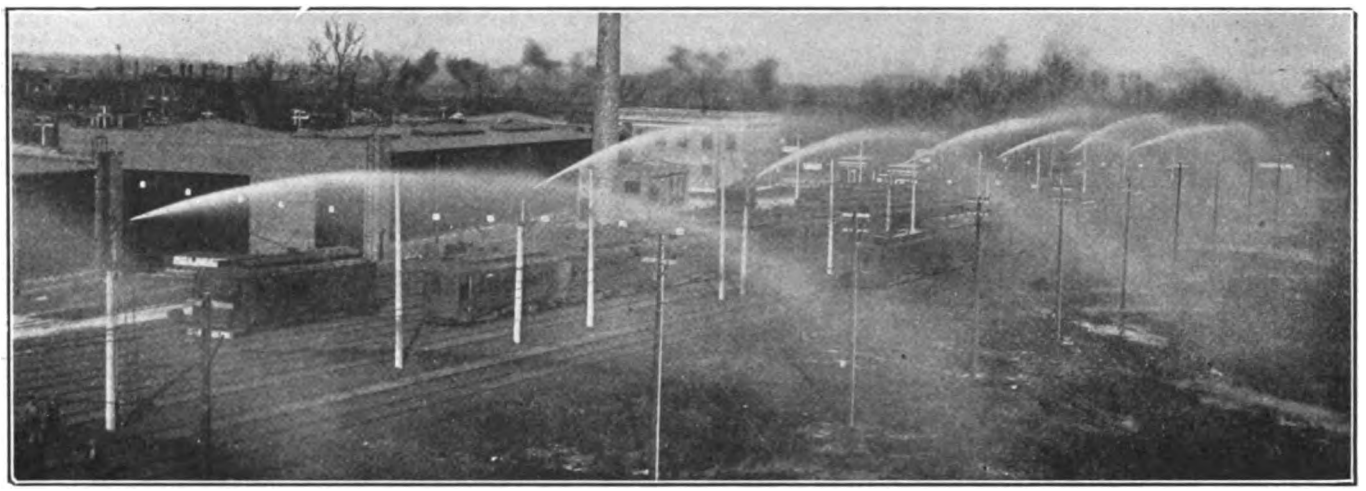


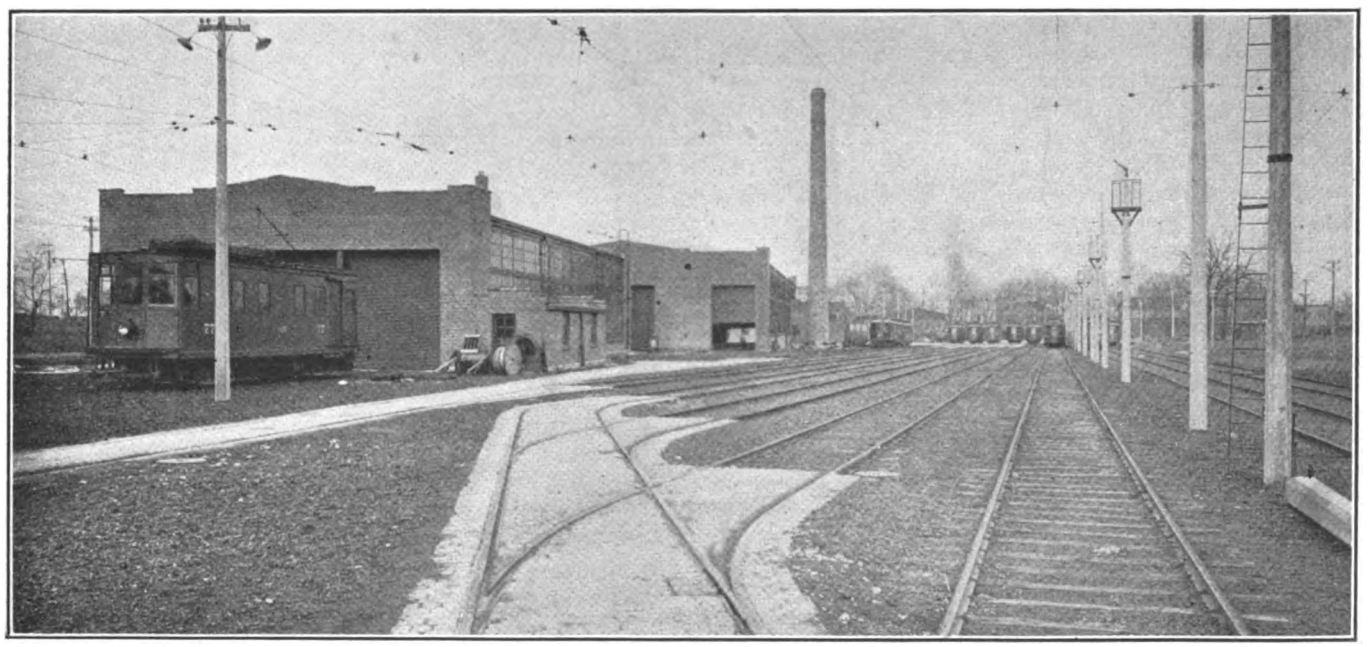
Fire-Fighting Towers in Operation

Latest Practices Followed in New St. Louis Carhouse and Storage Yard

Plant Constructed for Handling Light Maintenance and Inspection Work of 125 Cars Consists of Office Building, Shop, Washhouse and Large Storage Yard—Cost Was $265,000

AN EXAMPLE of modern practice in carhouse and storage yard design is the new division layout of the United Railways of St. Louis, located at Broadway and Taylor Avenue. This plant, exclusive of the land, cost about $265,000. It consists of a two-story office building, a shop building, a washhouse and several smaller buildings, together with a storage yard having track facilities for more than 200 cars. The office building, which measures 62 ft. x 70 ft., furnishes accommodations for the divisional headquarters. In addition to the offices, it is provided with recreation rooms, shower baths, steel lockers and a rest room for the convenience of the employees. The inspection shop, which is the largest of the group of buildings, measures 81 ft. x 200 ft. The structure designed to be used exclusively for car washing has dimensions of 53 ft. x 125 ft. Sufficient space is available so that the present car storage capacity of 200 cars can be later increased to 400 by the addition of more tracks. Both the building and the yards are equipped with modern fire-protection devices, the yard protection consisting of nozzle towers so spaced that any part of the yard can be reached with a stream of water.

The washhouse and shops are laid out in a line, with a transfer table between them, so that cars can be brought in at one end of the washhouse and, after



Division Buildings and Storage Tracks

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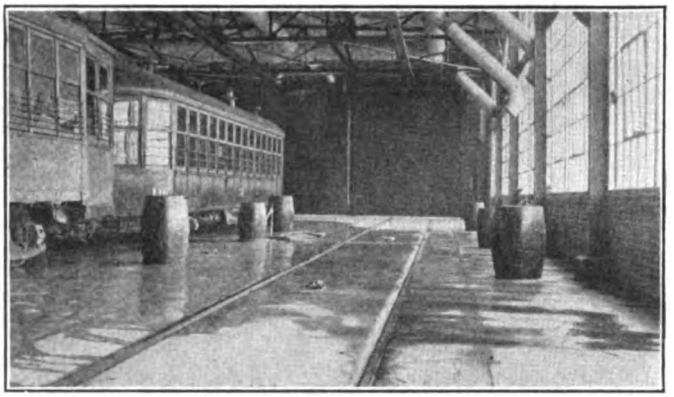
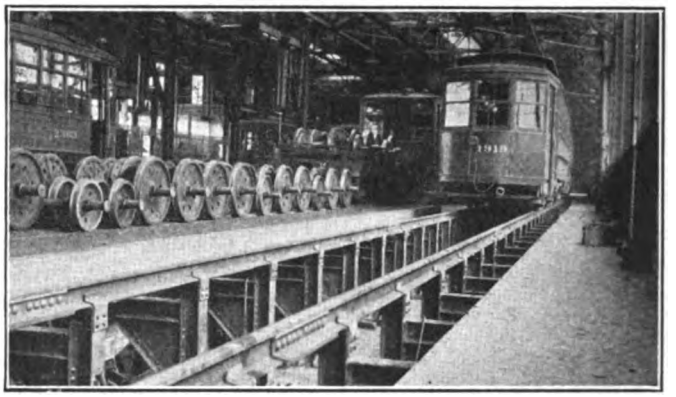


Washroom, Showing Hot Air Ducts



Track with Special Construction to Facilitate Inspection Work

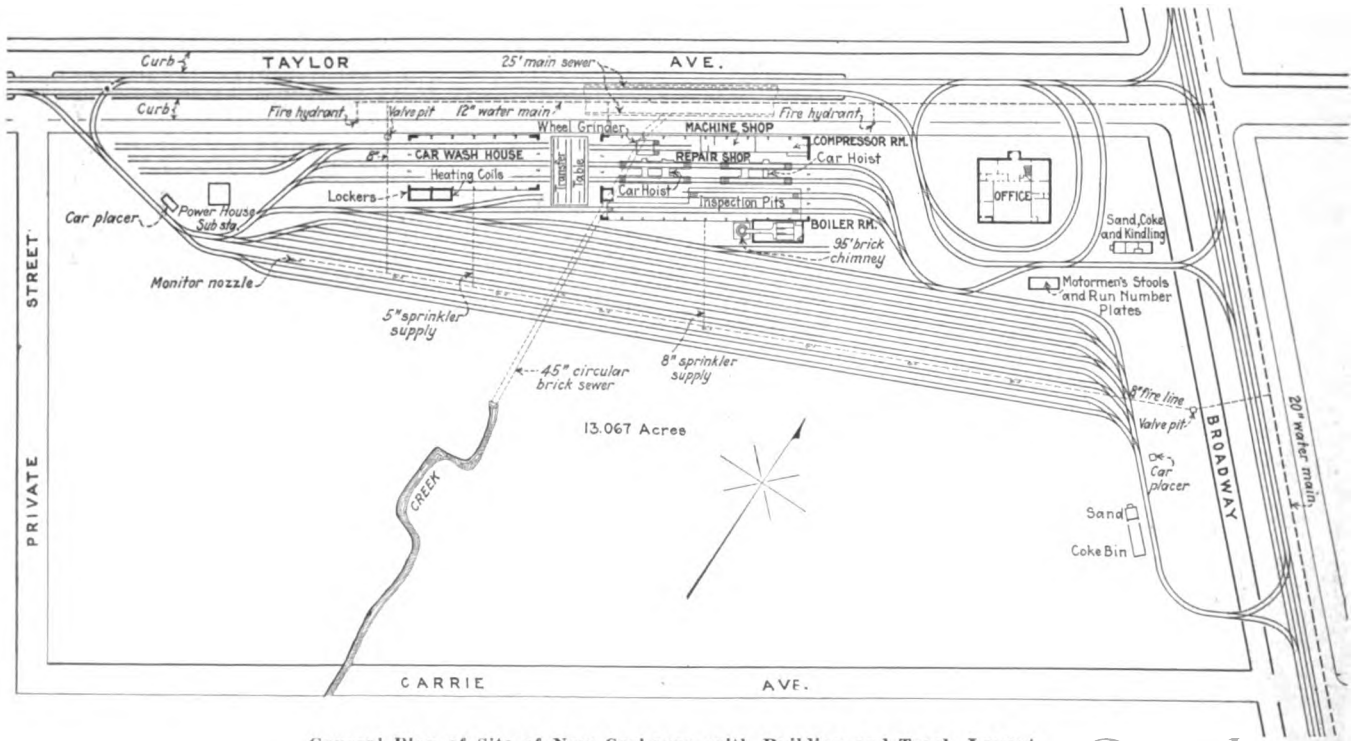
washing, moved out the other end onto the transfer table, from which they can be set on any track in the shop. On completion of the shop inspection the car is run out the front end and switched into the storage yard. Both shop and washhouse are of brick and steel construction, each having full glass sides from a height of about 4 ft. In this way excellent advantage is taken of the natural light. Both buildings are fitted with Kinnear rolling steel doors at each end.

An interesting feature of the washhouse is the method of hot air heating, the air being distributed throughout the building by means of a system of overhead ducts. The outlets of these ducts are curved, as can be noticed in one of the accompanying illustrations, so that the air blast is directed against the side of the car. This scheme has been found particularly helpful in drying the windows after washing, so that no streaks are left. Moreover, this positive system of heating has proved very efficient in heating the whole building to the proper temperature, and but a few minutes is required after the blower is started to establish the required degree of heat.

The same method of heating has also been installed in the shops. The steam for both heaters is furnished from a small boiler plant adjacent to the shop. In the shops the radiator and blower equipment is located on a specially constructed overhead platform so that no otherwise useful space is taken.

Besides the desirable arrangement of tracks for moving cars into and out of the shops, one shop track has been specially designed to facilitate car inspection work This track has a pit open on the sides as well as between the rails, and the floor adjacent to it is about 8 in. lower than the track level. With this construction it is convenient for men to sit on the floor while inspecting journals, etc. The floor being cut back in this manner allows an open, well-lighted space for storing a few brake shoes, gear cases and other parts used on ordinary maintenance work. The depth of this inspection pit is 4 ft. 6 in., while the pit under track where motors are removed is 5 ft. deep.

One corner of the shop is partitioned off to serve as an air compressor room, for the air storage system for brakes is still used in St. Louis. Having an abundance of air available, air hoists are located at convenient points about the shop. The other equipment used in the light maintenance and inspection work of some 125 cars of that division consists of a pit wheel grinder and two pit motor hoists. Machine shop tools comprise a small lathe, a drill press, a commutator slotter and a forge.



General Plan of Site of New Carhouse, with Building and Track Layout

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Company Employee Organizations on Eastern Interurban

Both a Twenty-Year Club and an Employees' Association Organized Among Interurban Men—Employees' Organization Functions Wholly from Membership

THE employees of the Olean, Bradford & Salamanca Railway, Olean, N. Y., are organized at the present time into two associations, namely, the Twenty-Year Club and the Olean, Bradford & Salamanca Railway Employees' Association. The Twenty-Year Club members are all members of the employees' association and attend both the meetings of the association and their own club meetings.

The Olean, Bradford & Salamanca Railway succeeded the Western New York & Pennsylvania Traction Company after foreclosure sale in October, 1921. A potent factor leading up to the receivership of the Western New York & Pennsylvania Traction Company was a strike of the employees in 1919, at which time demands were made for a minimum wage; recognition of the union just organized, and improved working conditions, especially in the operating department. This strike, fought by the railway, ultimately resulted in a truce whereby the men returned to work upon the promise that a tentative agreement would be shaped into a definite agreement immediately. A committee of the men met the management and an increased wage was allowed, the union was not recognized and working conditions were considerably improved. The agreements signed by the men ran one year and expired. Meanwhile a receiver was appointed. He increased the wages of the men and matters remained in statu quo.

The bondholders purchased the property and after reorganization appointed R. H. Wheeler general manager. Mr. Wheeler took over his duties on Oct. 1, 1921, after having spent some time as manager for the receiver, during which he had become conversant with the situation with regard to the attitude of the men to the company. At that time the men were literally adrift and were fertile ground for another union organizing campaign.

Twenty-Year Club

Just before the new year of 1921, those men who had been in the employ of the road twenty years or more were invited to an informal dinner by the manager. He pointed out the relationship he desired to establish between the men and his office, stating frankly his views that the railway was in dire straits as to a sound financial future and that the very friendly and cordial assistance of the men to carry out the plans of a manager was perhaps the first essential toward rebuilding the road. As the manager was a total stranger to the men, he desired to build up an interchange of friendship and daily strengthen their confidence in his plans by a more or less intimate knowledge of the program to be carried out, gaining this knowledge by discussing the problems as they arose, in so far as the men could help him by a free interchange of thought in open meeting.

The men readily appreciated the frankness of the manager's position and responded quickly in the formation of the Twenty-Year Club, which to date comprises about twenty-five members. A constitution and by-laws were drawn up; neat coat lapel emblems were presented to the men by the management, and a meeting room engaged without expense to the men where meetings are held on the first Tuesday of each month. These men as seniors in the various departments of the road very readily gave of their experience and knowledge of the past affairs and became immediately an invaluable store of information to the manager in picking up the threads of local administration in the cities of Olean, N. Y.; Bradford, Pa., and Salamanca, N. Y.

Officers of the company in the employ the requisite number of years ranked shoulder to shoulder with trackmen and men in the operating department. The first president of the Twenty-Year Club was Floyd A. Garey, an experienced and capable motorman in the freight locomotive service.

On one or two occasions, the management has provided an evening of instructive entertainment through educational films or the introduction of speakers upon subjects non-technical but of interest. When the reasons were explained, local merchants readily gave of their time and thought to the Twenty-Year Club, talking informally upon interesting subjects. This also served to acquaint and interest the patrons of the road with the plans of the new management. Meetings are held in one or another of the three cities, rotating upon invitation. Spontaneously, the matter of a ladies' night came up, the idea being that the ladies, wives of the members of the club, should be permitted to participate. Since its organization, the club has enjoyed two or three ladies' nights, with the ladies as guests at an informal dinner and the members and their wives treated to a theater party by the resident members.

The Twenty-Year Club functions, as it was conceived by the manager, with increasing interest arising from within the ranks of the members and the monthly meeting is an event to which all look forward, days in advance. On the other hand, the Twenty-Year Club has been of inestimable assistance to the manager, as the employees of the road soon saw the sincerity of the relationship developed and became anxious to enjoy the same cordial understanding with the management as do the club men.

Employees' Association

In April, 1922, the Twenty-Year Club requested the employees of all ranks and departments to meet with them to form an Employees' Association. The response was so cordial that it was decided to hold the meeting after the usual operating hours of the railway and more than 95 per cent of the employees of the road were in attendance at the meeting and signed the Articles of Association.

When Mr. Wheeler came to the property, he early sensed the fact that the men lacked some form of association among themselves to build up the *esprit de corps* of the property. He felt certain that if a demonstration could be made of a sincere interest upon the part of the manager in problems of the men and an open mind as to their viewpoints, co-operation would result and a feeling be built up on the part of the men that their problems could be worked out at home without the necessity of calling in any organization to negotiate for them.

This was founded on the belief that no results achieved could be sound and durable unless both sides were convinced of the frankness of the negotiations. When 95 per cent of the men met at 12:30 midnight at their personal discomfiture to form an employees' association, it was at once apparent that the men were con-

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vinced that a new epoch in management had successfully been launched and they were ready immediately to co-operate in its continuance.

As in the instance of the Twenty-Year Club, a constitution and by-laws were drawn up and officers elected, the first president being John A. Nutt, chief electrician of the property. As a little surprise to the men, at this meeting, the manager stated that he had been able to negotiate with the Travelers Insurance Company a group insurance whereby each man in the association could enjoy $500 of life insurance and $500 of accident and disability insurance, making a total of $1,000, in case of death from unnatural causes, or $500 in case of death from natural causes. In this matter, the company undertook a small percentage of the payment of the premium in accordance with the laws of the state of New York. The remainder of the insurance is paid by the men from dues in the association.

Health and disability insurance is handled by the recommendation of the insurance committee to the executive committee of the association. There is available a certain proportion of the dues set aside monthly and invested, which, at the discretion of the executive committee, can be donated to needy members in the form of a lump sum payment or a weekly indemnity. This method of handling the health insurance results in an individual inspection of each needy case and brings to the attention of the whole association any of its members in outlying points who are out of the service because of the misfortune of illness, either individually or in their families. Under this arrangement less than 10 per cent of the fund has been distributed, whereas, by other methods of handling the fund, it would have been possible to dissipate the fund because of trivial demands upon it.

An emblem was decided upon, and, with each certificate of membership and insurance policy, this emblem was distributed by the association to its members. The association has met by invitation in the cities served by the company. There has developed a considerable spirit of rivalry between teams of the association's athletic activities in the various cities. Whenever a meeting is held away from the Olean headquarters, there is always a desire to witness the events which transpire during the evening, bringing out a large attendance. The railway in each case is very pleased to furnish special car service as there are always employees available to operate the equipment.

One of the standing committees of the Employees' Association is a company relations committee. This committee has met the management in only one instance in the past sixteen months and then for an informal discussion of a new ruling promulgated relative to labor passes, in order to determine more accurately the individual application of the pass ruling. When the committee left the discussion, each member pledged himself as in exact accord with the ideas of the management and agreed to constitute himself a committee of one to disseminate the discussion among the ranks of the employees. In consequence the matter was never again questioned on the road. This incident proved the success of the theory of having a committee handle the matters with the employees after they have become convinced of the intention and spirit of the ruling.

In no instance where discipline has been necessary has there been any request for a revision of the decision upon the part of the company relations committee, and to the knowledge of the management the company relations committee has never been approached to request a hearing.

These employee organizations function wholly from their membership. The working of the new arrangement shows the men to be in complete accord with the policies and plans of a management which is appreciative of the efforts of the "human" spokes which maintain the integrity of the wheel and make it easy to keep rolling.

The sincerity of the men and the management under the new arrangement has won the liberal support of the business men, who in turn have helped in their way to raise the standing of the electric railway men to a new status in their communities.

Average Automobile Carries Less than Two Passengers

THE Pacific Railway Advertising Company recently conducted an investigation to determine the average use of passenger automobiles and street cars. On Saturday, Nov. 4, 1922, investigators at principal street intersections in the cities of Seattle, Portland, San Francisco, Oakland and Los Angeles checked 4,101 automobiles carrying a total of 6,730 passengers. This is but 1.64 passengers per automobile. The street cars carried 700 revenue passengers a day on the average. Ten street cars would, therefore, transport 7,000 people a day, which is more than is carried by 4,101 automobiles with the average load.

With the exception of Portland, Ore., more than half the automobiles checked carried the driver only. In Portland and Los Angeles approximately 80 per cent carried but two persons, while in San Francisco, Oakland and Seattle approximately 90 per cent of the automobiles carried two people. The figures of the investigation follow:

	San Francisco		Oakland		Los Angeles		Seattle		Portland	
	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent
Driver only....	1,102	64.0	241	57.0	586	52.0	259	54.0	136	37.0
Driver and 1 passenger...	453	27.0	143	34.0	308	28.0	170	35.0	161	43.5
2 passengers.	89	5.0	25	5.5	133	12.0	37	7.7	43	12.0
3 passengers.	34	2.0	11	3.0	57	5.0	10	2.1	23	6.0
4 passengers.	14	0.8	2	0.5	35	3.0	1	0.2	5	1.0
5 passengers.	*16	0.9	...	....	....	....	...	....	2	0.5
6 passengers.	*5	0.3	...	....	....	....	...	....	...	....
	1,713	100.0	422	100.0	1,119	100.0	477	100.0	370	100.0
Passengers.....	2,612		656		1,994		755		713	
Average people per car.....	1.52		1.55		1.78		1.58		1.92	

* Jitney buses included. Delivery trucks not included.

The investigation also developed that only 50 per cent of the owners of pleasure automobiles use them daily for business purposes. Only 18 per cent of the women of the family use them for shopping purposes, while 39 per cent of the men owning pleasure automobiles use the street cars twice a day going back and forth between their homes and their offices, and 13 per cent use the street cars most of the time. Of the women owning automobiles, 51 per cent use the street cars from three times a week to as often as twice a day.

The principal reasons advanced by automobile owners, both men and women, for their extensive use of street car transportation are that they find the street cars more economical, and that they are assured of safety from reckless drivers and speeders. Many of them stated that parking spaces were too difficult to find in the downtown section of the city, and the street cars were more convenient for shopping.

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Additional Light on the Detroit Municipal System

Consultant's Leaflets Criticise Handling of Accident Cases and Purchasing by Established City Departments — Financial Methods for Amortizing Purchase Price Compared with Glasgow and Toronto — Renewal Fund Held Necessary Only on New Construction and Equipment

THE fifth, sixth and seventh bulletins prepared by Walter Jackson, consultant, for enlightening the public of Detroit, and which complete the series prepared by him, are now available. Other bulletins in this series have been abstracted in the ELECTRIC RAILWAY JOURNAL for March 3, 1923, page 371, and March 24, 1923, page 508.

The fifth bulletin in the series treats of the claims division. Mr. Jackson states that the claim department of the Municipal Railway System embodies the usual organization except that the trial attorneys are a part of the office of the corporation counsel. He states that this is apparently a disadvantageous difference. On the other hand, he states, the claim department has taken over two functions that hitherto have been part of personnel work of the transportation department. These are responsibility for the physical standard of applicants for platform jobs, and attention to certain personal features in the home life of the platform men.

Mr. Jackson states: "The claim department, although held responsible for the sums spent to compensate claimants for damages, suffers a serious disadvantage of having no direct control over the counsel who represent its side of the case in court. According to the present interpretation of the charter provisions, such legal work is to be done through the office of the corporation counsel, who, nevertheless, charges the cost of such services to the Department of Street Railways." The consultant quotes several sections from the street railway amendments to the charter, adopted in 1920, and says that to him these clauses mean that the electric railway management should have sole and immediate control over these expenditures for claims; or at the very least, the department should have the right to designate such individual counsel in the office of the corporation counsel as it considers most capable of conducting its litigation. He states that the present method is bound to involve much unnecessary labor and duplication of effort.

AUTOMOBILES CAUSE MAJORITY OF ACCIDENTS

Mr. Jackson then discusses the causes of accidents, giving several tables for accidents from September, 1922, to January, 1923, inclusive. These figures are collected in the accompanying table:

CLASSIFICATION OF ACCIDENTS BY MONTHS

Month	Total Accidents	Automobile Collisions	Car Collisions	Step Accidents	Passengers Carried
1922 September...	1,819	1,240	78	107	35,770,063
1922 October.....	1,890	1,329	92	103	37,752,445
1922 November...	1,900	1,384	99	102	37,103,301
1922 December....	2,499	1,805	197	126	38,258,194
1923 January.....	2,636	1,864	182	133	40,196,401

Commenting on the record, Mr. Jackson says: "No wonder that the claim department has taken the offensive and is suing automobile owners for damages to street cars! The department is permitted to sue directly in the justice court. Since May 15, 1922, the day of taking over the Detroit United System, about $3,000 has been collected amicably without suit. Should citizens sit on juries in which automobile collision accidents are involved—not unlikely when 70.7 per cent of all January accidents were due to automobiles—they can reflect on the fact that it is not customary for the trolley to careen out of its trackway to strike an auto; and that the driver of the street car is entitled to the benefit of the doubt because he was not allowed to run a car until he had passed a series of physical and intelligence tests. Furthermore, the apparatus of a street car, as regards stopping and starting, is not only the simplest known but is also subject to regular inspection—something that cannot be said of the individually owned car."

Mr. Jackson says that in the extremely hazardous month of January there were 61.6 accidents per 100,000 car-miles and 6.59 accidents per 100,000 revenue passengers.

OVER 3 PER CENT OF GROSS PUT IN ACCIDENT RESERVE

Regarding reserve funds for accidents, Mr. Jackson states that the Department of Street Railways has continued the practice of the Detroit United Railway of setting aside 3 per cent of the gross earnings as an accident reserve, aside from the cost of conducting the claim department. He gives figures showing that for the months of July to December, 1922, inclusive, the department has set aside 3.3 to 3.6 per cent of the gross for this purpose. Payments from the fund have been materially less than the amount reserved, since old cases under the Detroit United régime are not included in the statement, and claims so far have been made in less than one-fifth of the accident cases, while it is estimated that in 1921 the D.U.R. had claims up to one-third of all accidents.

Mr. Jackson says that the liberal policy of the Department of Street Railways, as in paying the time of platform men when they testify, is reflected in the comparatively small number of blind accidents. It is said that co-operation with the coroner's office is closer knit than in the days of private operation.

Mr. Jackson devotes considerable space to a discussion of the methods of handling accidents by the claim department. These are, in general, the same as those of many street railways in the United States. The bonus system, by which carefully trained men are rewarded for accident reduction, is also described. The consultant states that he has little faith in the enduring good of "safety week" and "similar ballyhoo campaigns." The best results are going to come from making the old equipment safer, teaching the men the correct principles of controller and brake operation,

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providing the incentive of line comparisons and of individual bonus plants; and, finally, of persistent work with those who are involved in nearly three-fourths of all accidents—the autoists.

Practices in Handling Supplies

Bulletin No. 6 deals with the supply division. Mr. Jackson states that in Detroit no purchase exceeding $500 may be made without advertising for bids, and that this limitation needs some modification to assure the most successful conduct of the Department of Street Railways. For example, lubricating oil is sold on a service basis; and to a lesser degree, this combination of material and service applies to bearings, trolley wheels, etc. He states that he does not wish to imply that the disadvantage of advertising for bids is peculiar to municipal operation. Perhaps the strongest argument that can be offered for permitting greater purchasing freedom is that the city's accounting system is wide open, and any one who questions excessive costs can have access to public documents.

Centralized purchasing is stated to have many benefits. Many of the stores cover several municipal departments and the street railway and other departments can draw upon common sources for certain supplies, such as crushed granite or cement, in addition to their smaller local stores.

All purchasing is done through the department of purchases and supplies of the city. Mr. Jackson goes into considerable detail in describing the requisition system. He states that the concentration of purchasing and storekeeping is an improvement over the practice of the Detroit United Railway, which maintained several independent storekeepers for the track, overhead and car maintenance departments, who were checked by assistant auditors or controllers at the main office.

The centralized stores plan also is said to save much mileage in the transport of goods to several departments. The city's stores division took over four service cars from the Detroit United, and has bought fifteen flat cars at a cost of $175 each, which have been fitted up for trailer use at an additional total cost of $500.

A considerable part of the bulletin is taken up with a discussion of the improved method adopted by this department for handling scrap. It is stated the salvaged material will bring $200,000 to $300,000 a year.

Finance and Auditing

In Bulletin No. 7 Mr. Jackson discusses the financial practices of the Department of Street Railways. Regarding a municipal loan he states that a municipality is compelled by law to set up a sinking fund whereby the loan will surely be paid back on the date the bond matures. Continuing, he says:

"Private utilities have not been compelled to do this, although it certainly would have been better for electric railways especially if they had been. What they generally did may be explained in this homely fashion:

"A person borrows $10 for three months. He pays interest regularly, but cannot restore the principal when the three months are up. So on the strength of his faithful payment of interest, he borrows $12 from some one else for another three months, using $10 to wipe out debt No. 1. Again he pays interest faithfully and again he is unable to restore the principal. Thereupon he uses his credit again to borrow $15, pays back the $12 and begins the merry-go-round again until some catastrophe makes it impossible for him to pay continually increasing interest charges. That is the way most electric railways were financed for many years, deluding themselves with the notion that the plan was going to come out all right through the increased earnings from a growing community."

Contrasting this with the terms of the Detroit purchase, Mr. Jackson continues:

"The purchase price [of the Detroit United Railway] exclusive of inventory, was $19,850,000. Toward this sum it [the city] made an initial down payment of $2,770,000 secured not from railway revenue but from the $4,000,000 bond issue authorized by a vote of the people on April 17, 1922."

It is stated that the department has already paid $3,770,000 to the Detroit United, of which sum $1,000,000 came out of earnings within seven months. Preceding the purchase of the D.U.R. and the $4,000,000 bond issue, which included the down payment of $2,770,000 and $400,000 for supplies, was the original $15,000,000 bond issue authorized by the vote of the people on April 5, 1920. This money was voted for the purpose of building and equipping entirely new lines in the outer area of Detroit, but with it were built 63 miles of track, an office building and carhouse were put up, and 250 safety cars and fifty Peter Witt cars purchased. The remainder of about $1,000,000 was left as partial payment for 200 Peter Witt cars bought for the system as a whole.

Mr. Jackson quotes from the report of the Glasgow Corporation Tramways for the year ending May 31, 1918, during which interest and sinking fund payments were reduced to zero. He says that payments into the sinking fund from 1896 to 1917 totaled £3,833,157. The direct sinking fund payments totaled only £1,506,267, the remaining £2,328,890 coming by transfer from the depreciation and permanent way renewals fund. He states that on the same basis as Glasgow, Detroit would have paid less than $500,000 a year against the purchase price instead of $1,000,000 a year. He says that the city of Detroit is paying so rapidly for its street railways that the older and major portion will be only a minor capital charge after ten years.

"This period is so short," says Mr. Jackson, "that one may well question the justice of a depreciation fund particularly when the property itself was taken over at a very low price regardless of its run-down and largely obsolete condition.

"As a matter of fact, a private company would have thought it worth $10,000,000 merely to have the right to handle the mass transport of the fourth and fastest-growing city in America. If every car and piece of track bought from the Detroit United has to be replaced with new, additional capital, the purchase would still be a bargain because of the wonderful traffic possibilities of Detroit."

To indicate how little new money the city of Detroit has put into the Department of Street Railways to make the D.U.R. lines as modern as those built by the department, he contrasts it with Toronto. He states that the Toronto lines built by the city before purchase cost $2,750,000, whereas Detroit's new lines cost about $14,000,000. The total investment in the Toronto lines, including some $25,000,000 of new construction, is given as $29,481,000. Adding to this the arbitration sum for purchase of the Toronto Railway, of $11,000,000 to $12,000,000, makes a total cost to the city of Toronto of some $41,000,000.

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Considerable space is taken with quotations from "Service at Cost Plans," by Harlow C. Clark, to show that he thinks writing off the investment an unfair burden on the present rider so long as there is a depreciation fund.

Mr. Jackson states that such an outcry was raised at the last election that the plan for relieving the Department of Street Railways of paving charges was rejected.

Mr. Jackson says that a depreciation fund is justifiable only on the new construction and equipment of the department of street railways. He continues as follows:

"The sharpest criticism directed at the financing of the Department of Street Railways has been the failure to set up a depreciation and renewals fund, although the critics have been calm about the rapid rate of amortization. One could easily argue that if amortization is a gift for the rider of the future by the rider of the present, why not equalize matters by simply keeping the property up to safe and efficient operating standards? In short, repeat the ancient claim that property was being kept 100 per cent efficient and that a depreciation fund for something that wasn't allowed to depreciate was a joke.

"As a matter of sound finance, however, one must set aside a depreciation and renewals fund because one must be prepared to meet changes in the art. A private company may take the view that it is better to have a satisfactory depreciation fund than a proper sinking fund, but a community lives not only for its citizens of today but for those of tomorrow. It must, therefore, in the absence of a profit-seeking motive carry both classes of charges.

"In the case of Detroit, this is far from meaning that the depreciation and renewals fund should cover all of the existing property. On the contrary, that secured from the Detroit United Railway was bought so cheaply and is to be paid for so quickly that a depreciation fund is unnecessary. The only way to look at most of this property is that it is something to be replaced gradually with entirely new parts to be supplied legitimately out of new capital or, in part, out of surplus earnings. The position is not unlike that of the Boston Elevated Railway as expressed in the Jan. 2, 1923, report of the Department of Public Utilities of Massachusetts (quoted on page 201, ELECTRIC RAILWAY JOURNAL, Feb. 3, 1923) where the commission says: 'In fixing the amount for depreciation, the property excluded from consideration was that listed as obsolete, not used or non-depreciable (like land) and that older than the estimated life.'

"If this criterion is applied to the Detroit United purchase and the cost of said purchase taken into consideration, there would be very little left to call for a depreciation fund."

To show that a depreciation fund should be set up only on the new construction and equipment put in by the Department of Street Railways, Mr. Jackson compares Detroit with the cities of Boston, Glasgow and Chicago:

"Taking Boston and Glasgow standards for guidance the highest rate of depreciation for the cars, amounting so far to a total of $2,241,275, would be 5 per cent, or roughly $112,000 a year. The rate of depreciation on the type of track used should not exceed 2 per cent to 3 per cent, while the buildings would carry no more than 2 per cent. The land purchased by the department naturally has increased in value because of the new transit facilities in the neighborhood.

"Suppose we were to take the highest figure quoted by the commission, namely, 3 per cent of the investment in road and equipment complete as used by the Chicago Surface Lines, then 3 per cent of the $14,000,000 actually at work now would be $420,000."

Mr. Jackson says there would be no trouble in finding the $420,000 for a depreciation and renewals fund, nor in finding twice that amount, because in the six months of full system operation, July 1-Dec. 31, 1922, the surplus, after all overhead charges, injuries and damage reserves, etc., was $512,278, or at the rate of $1,024,556 per annum.

Concluding, Mr. Jackson says: "From the viewpoint of public policy, it is also better to put surplus into funds for renewals and enlargements than to give a wrong idea that the surplus should be used to reduce taxes or make premature reduction from a fare that is either the lowest or next to the lowest big-city fare in the United States."

Speeding Up Surface Cars in London

THE London County Council is readjusting the motor equipment of its cars with a view to obtaining higher schedule speeds. Results secured with cars recently built and fitted with larger motors than had been used previously showed that considerable economy was effected in cost of operation while higher speeds and a better service were provided.

At a meeting of the Council held on March 13, it was decided that 200 cars, which have been in use since 1907 to 1921, shall be fitted with 60-hp. motors in place of 42-hp. motors. The motors released will be used to replace 30-hp. and 35-hp. motors on cars which have been in operation for twenty years. The changes will be made first on the lines which are located south of the Thames.

A probable result of the change in motor equipment will be the withdrawal of trailers from the southern route to determine whether the faster cars can handle the rush-hour traffic. If they are successful the trailer service will not be restored, as there was considerable opposition to its inauguration, and sanction to furnish it was obtained only after a hard fight in Parliament. When this sanction was obtained the schedule speeds were low, but the average speed is now reported to be more than 9 m.p.h.

Power Supply for British Electrification

THE London Electric Supply Corporation plans immediately to extend its power station at Deptford to enable it to supply the 80,000,000 to 100,000,000 kw.-hr. which will be required annually for electrical operation on the southeastern section of the Southern Railway. Before the recent amalgamation, this section was the Southeastern Railway. The Supply Corporation secured a contract covering fifty years supply of all of the energy required for the operation of the first section of the suburban lines of this railroad. The contract is the outcome of a recent decision of the Electricity Commissioners adverse to the erection of a power station by the railroad. Announcement of the contract was made by the chairman, W. H. Wilson, at the annual meeting of the London Electric Supply Corporation, held on Feb. 23.

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The Readers' Forum

When the Bus Will Replace the Urban Railway

GENERAL ELECTRIC COMPANY

SCHENECTADY, N. Y., April 10, 1923.

To the Editors:

I want to congratulate the writer of the editorial in the last issue of the JOURNAL entitled "When the Bus Will Replace the Urban Railway." You know very well what my views on this subject are, and I want to say that I have never seen a more comprehensive and yet more concise statement of the facts in the case as they appear to us as a result of all of our studies and experience. I think that had the railway advocates in Saginaw been able to express their case as well as this writer has done, they might have had a better chance of success at the election. I think this supplements very admirably the answer James W. Welsh recently made to an article in the *Wall Street Journal*, and I think the whole railway industry owes you a vote of thanks for its publication. J. C. THIRLWALL.

Connecting Armatures on the Ground Side

SOUTHERN PUBLIC UTILITIES COMPANY

CHARLOTTE, N. C., April 6, 1923.

To the Editors:

We had considerable trouble on our cars, due to flashing over of the motors. Considerable oil and grease would collect around the end of the commutators on our old-type motors. This caused flashing, and the motor parts were often badly burned and sometimes the armatures were grounded. After much experimenting we tried placing the armatures on the ground side and grounded the brush-holder instead of the field coils. Motors with these changes have now been in service over three months and our motor trouble has been reduced one-third.

Perhaps this information may be of use to others who are having similar trouble.

W. B. OSBORN, Master Mechanic.

Suggestion to Prevent Theft of Incandescent Lamps

SUSQUEHANNA TRACTION COMPANY

LOCK HAVEN, PA., April 4, 1923.

To the Editors:

Referring to your issue of March 24 in which "Executive" refers to method for stopping theft of incandescent lamps, some years ago I called the matter to your attention with the suggestion that theft could be stopped by the use of the left-hand thread in the receptacle instead of the right-hand thread as ordinarily used.

A representative of one of the largest lamp companies informed me that lamps were furnished to European trade with left-hand thread, but otherwise identically the same as the lamps furnished in this country. It was also stated that the manufacturers of sockets and receptacles made them both with right and left-hand threads. The right and left-hand thread portions were stated to be interchangeable so that the present right-hand receptacle could be changed quickly to left-hand type with almost negligible expense.

I believe that this offers the ideal solution of the problem and suggest that the ELECTRIC RAILWAY JOURNAL take the matter up with the respective manufacturers and then lay the facts before your readers. It is believed that this will be well worth while.

HAMILTON BALUSS, General Manager.

Schedule Dials of Houghton County Traction Company

WHEN traffic possibilities do not permit short-headway service, the next best thing is to make sure that the public knows exactly when the cars are available. With this thought in mind, S. B. Tuell, receiver of the Houghton County Traction Company, some time ago had installed sets of schedule dials at various places on the system. Such dials are especially useful in the case of service between the twin cities of Houghton and Hancock, for while the schedule calls for four cars an hour it is necessary to space the cars at unequal intervals. An accompanying illustration shows a set of such dials mounted on a steel pole.

Dials Over the Sidewalk Indicate When Cars Pass in the City of Houghton

Besides giving the public appreciated information as to the service, the dials are a continuous advertisement of the electric railway's service.

The fortieth anniversary of the inauguration of tramway service on the Huddersfield (England) Tramways System was celebrated recently. According to the *Electric Railway & Tramway Journal*, the first vehicle was a steam-driven car, horse cars being added later. Steam traction, however, proved preferable to the use of horses and was used until the time of the electrification of the system in 1902. The corporation now has 126 cars and ten omnibuses in commission.

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Association News & Discussions

Spring Convention of A.I.E.E.

THE 1923 spring convention of the American Institute of Electrical Engineers will be held at the William Penn Hotel, Pittsburgh, Pa., Tuesday to Thursday, April 24 to 26. The keynote of the program will be the operation, control and protection of transmission and distribution systems. Technical sessions will be held Tuesday afternoon and evening, Wednesday morning and afternoon and Thursday morning. A banquet will be the feature on Wednesday evening and an inspection trip to the Westinghouse Works on Thursday afternoon and evening. For those who wish to remain over, other inspection trips will be arranged for Friday.

Massachusetts Safety Conference

THE Massachusetts Safety Council will hold its second annual state conference in Springfield, Mass., on April 25-26, probably at the Hotel Kimball. The first day will be devoted to accidents on the highway, with two or three general safety topics. Thursday morning will be assigned to industrial accident problems, with several notable speakers, and the balance of the day will be devoted to considerations of fire prevention.

National Conference on City Planning

THE fifteenth annual conference on city planning will be held at the Southern Hotel, Baltimore, Md., on April 30 and May 1 and 2. The conference will be entertained by the city of Baltimore in co-operation with many civic and professional organizations. Among the papers to be presented will be one on "Inter and Intra Urban Transit and Traffic as a Regional Planning Problem," by George A. Damon, Pasadena, Calif. Other topics to be considered are terminals, zoning, regional planning, and parking of automobiles.

Canadian Association Planning for Convention

ALTHOUGH the date of the next convention of the Canadian Electric Railway Association has not been set, it may be held early in the present summer. The executive committee has therefore appointed convention committees. An exhibit will be a feature of the convention as in 1922, when the first and highly successful exhibit was held in Quebec. A representative committee of operating men and representatives of manufacturers have been appointed to arrange for the exhibit. W. R. McRae, Toronto Transportation Commission, will be chairman of the entertainment committee and will select the other members. The president of the association, Major F. D. Burpee, will arrange for the papers to be presented at the convention. As decided earlier, the convention will be held in Toronto.

Gear Manufacturers to Meet

THE seventh annual meeting of the American Gear Manufacturers' Association will be held in Cleveland, Ohio, April 19 to 21, with headquarters at the Hotel Cleveland.

Among the papers and addresses which will be given are the following: "What Does the Microscope Tell Us?" by E. C. Smith; "Grinding and Measuring Involute Gear Teeth," by E. J. Lees; "The Gear Testing Machine," by Wilfred Lewis; "Industrial Relations," by Frank A. Scott; "Some Thoughts of an Investment Banker on the Gear Business," by Owen A. Locke. There will also be a conference on conditions in the industry.

Wood Preservation

A MEETING of the Engineering Association committee on wood preservation was held at headquarters in New York City on April 13. The subject of discussion was the specifications for wood preservatives, particularly with reference to the methods of testing. The new test for coke residue was approved, subject to similar action by the A.S.T.M. at its June meeting. This test eliminates the glass bulb and utilizes the platinum crucible. The same action was taken with regard to the elimination of the specific gravity clause in the specifications for coal tar, creosote oil, creosote coal tar mixture, coal tar oil for wood paving blocks and distillate oil for paving blocks.

It was decided to suggest an investigation as to the opinion of member companies regarding the relative value of the flask and the retort in distillation tests.

The meeting was attended by H. H. George, chairman; A. P. Way, vice-chairman; M. J. Curtin, W. H. Fulweiler, E. F. Hartmann, E. A. Hoffman and E. L. Morier.

American Association News

Manufacturers' Committee Prepares Booklet

THE committee on co-operation of manufacturers of the American Association, of which E. F. Wickwire is chairman, has prepared a readable, instructive and typographically attractive booklet for distribution by manufacturers among their employees. It is entitled "An Old Friend Now Is Getting a Living Wage," and gives the reader actual data as to present electric railway operation. The "Old Friend" is, of course, the electric railway. The booklet is designed to enlist the co-operation of employees of manufacturers in obtaining a square deal for the electric railways, their customers.

Copies of the booklet can be obtained at association headquarters.

Inductive Co-ordination Committee Meets

THE sub-committee on inductive co-ordination of the power distribution committee, American Electric Railway Association, met at Purdue University, La Fayette, Ind., April 5. Three of the four members were present, John Leisenring, chairman; Prof. D. D. Ewing and A. Schlesinger. At this meeting the replies to data sheets sent out requesting information on transmission line parallels with telephone circuits were reviewed and discussed and a more elaborate letter requesting information in greater detail prepared.

It was the consensus of opinion of the sub-committee that the matter of inductive co-ordination was one that had been more or less neglected by the American Electric Railway Engineering Association. Hope was expressed that member companies will give the letter, which they will shortly receive, the attention it deserves, as the entire subject is of great interest to the association as a whole as well as to the individual members.

New Statistics Available

THE following special reports have been prepared by the bureau of information and service of the American Association and are available to member companies in good standing upon request:

Traffic Ratios: Statement showing in tabular form the riding habit, the average fare, average speed, revenue passengers and car-miles per mile of track and per car operated, revenue per mile of track, operating ratio, passengers per car-mile, proportion of transfer passengers and operating income per mile of track of more than 300 companies divided into city and interurban groups. Each group is further subdivided into three parts according to the sizes of the companies.

Bus Specifications and Operating Costs: Gives specifications of all buses of American make, and also contains the 1922 operating reports of the London General Omnibus Company, the Baltimore Transit Company, the Chicago Motor Bus Company and the Washington (D. C.) Rapid Transit Company.

One-Man Car Operation: Contains complete list of companies operating one-man cars, showing separately those operating one-man cars exclusively. Also gives a statement of the average cost of operation with one-man cars based on reports for 1922 of companies operating only one-man cars.

Treatment of Depreciation Reserve Funds: Abstracts of court and commission decisions fixing and discussing the proper disposition and use of these funds. Includes both electric railway cases and cases involving other public utilities.

In addition to the above, supplements to the Wage Bulletin, Fare Bulletin, and Cost of Living Studies have been prepared, bringing these sources of information down to date.

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Maintenance of Equipment

Unusual Block Signal Installation

BY H. B. CHARERS
Portland Railway, Light & Power Company, Portland, Ore.

THE Portland Railway, Light & Power Company recently had occasion to employ a rather unique arrangement of United States, Type G-1, trolley contactor block signals, to cover a special situation where it was required to furnish protection for a train entering a block from an intermediate switch.

While in most cases of this kind it probably would be advisable to divide the track into two blocks, in this instance the distance was too short and local conditions, such as the presence of two curves and a deep cut obscuring the view, further complicated the proposition.

In Fig. 1, *A* and *C* were the original limits of the block and an additional signal was installed at *B* to enable trains to enter the block from a gravel pit, located on the spur, without backing to *A* to set the signals. When a southbound train takes the block at *A* the motorman receives a proceed indication of a yellow light and a yellow semaphore blade and the signals at *B* and *C* show a red light and a red semaphore.

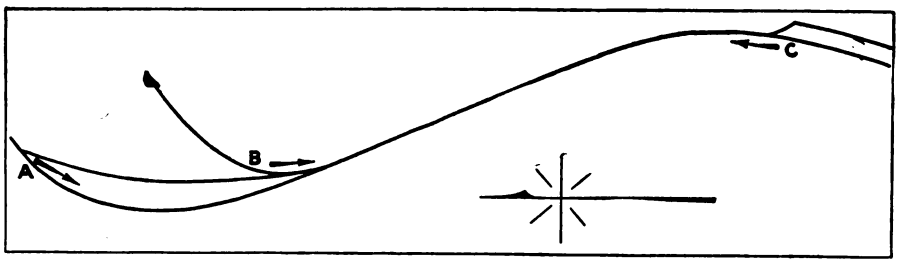

Fig. 1—Signals Arranged to Protect Cars Entering Block from Intermediate Switch

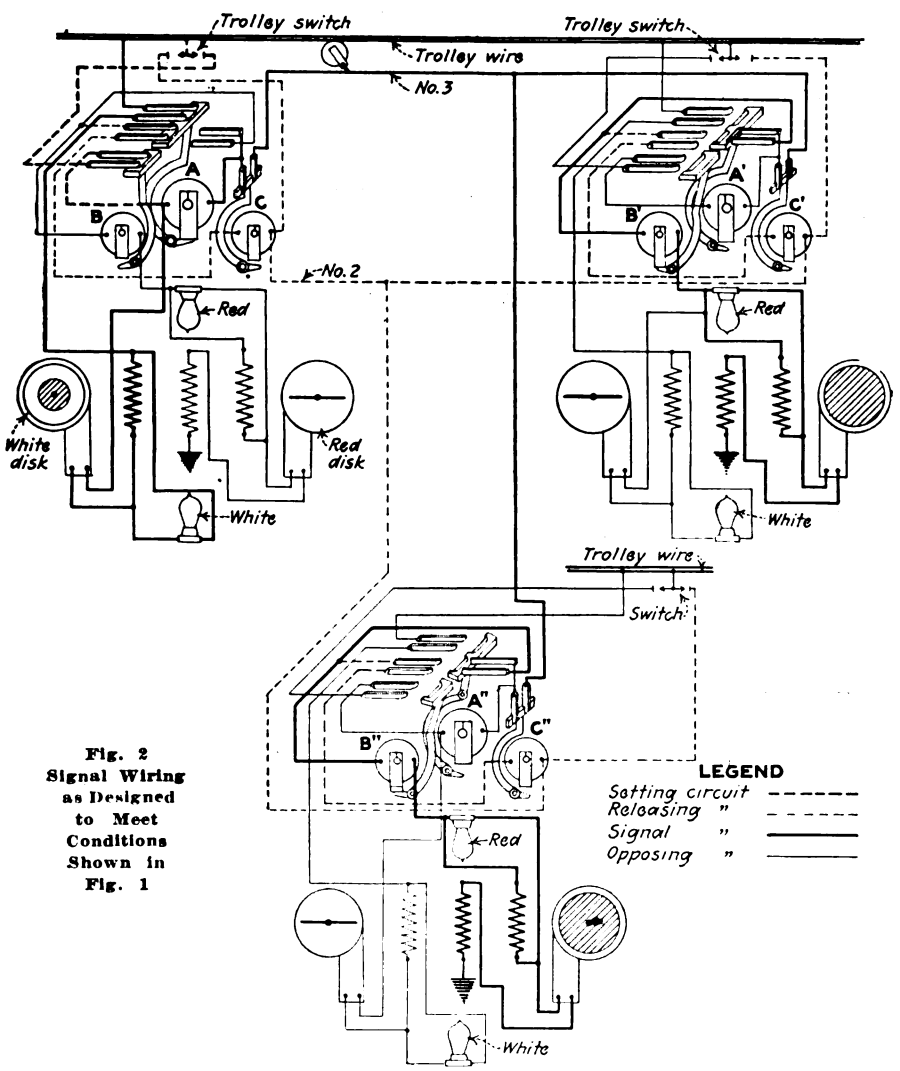

Fig. 2 Signal Wiring as Designed to Meet Conditions Shown in Fig. 1

A train taking the block at *B* displays a stop signal at *A* and *C*. Likewise a northbound train is protected at *A* and *B*.

When a car passes out of the block at either location the signals are restored to normal, i.e., no lights or semaphores showing.

In the wiring diagram, Fig. 2, it will be seen that the original connection of No. 2 wire was changed to the opposite side of coil *C*, thus causing the signaling circuit to be interrupted at the entering end only instead of at the leaving end of the block.

This was necessary because under the previous plan of connections interrupting the circuit at the leaving end of the block left one red signal in circuit, thus holding magnet *A* in the energized position.

Putting the two red signals in multiple required additional terminal resistance, which was provided by substituting one 550-ohm tube for the two 175-ohm tubes normally in the signal.

Sixty-four-watt carbon lamps are used behind the yellow lens and 36-watt Mazda lamps behind the red.

This arrangement has been in service for some time, with no failures as yet reported.

Dipping and Baking Armature Coils

BY JOHN S. DEAN
Renewal Parts Engineering, Westinghouse Electric & Manufacturing Company

IT IS the unanimous opinion among railway operators that the treatment of armature coils by dipping them in a good grade of insulating varnish, and then baking them, greatly improves the insulation and lengthens the life of these coils in service. In this connection, in a great many cases, there is very little thought given to the many details associated with these operations, but

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experience has shown that these are essential in order to get the best possible results from this method of treatment.

One important point which has been found to be very necessary, and that should be given some consideration, is to see that the individual coils are separated during the dipping and baking operations. When the coils are arranged as shown in an accompanying illustration, the varnish is able to reach all exposed surfaces of the coils. This permits an even penetration of the insulation when they are dipped in the tank of varnish.

Heat Reaches All Surfaces If Coils Are Properly Separated

Likewise, when the coils are placed in the baking oven, arranged as shown, the heat from the oven is better able to reach all of the treated surfaces of the dipped coil, and the varnish is more equally and uniformly baked. This precaution in connection with this treatment requires considerably more labor in the handling of the coils and additional equipment, which increases the cost, but the improved insulation of the finished coil warrants this additional expense.

It is very common practice, in connection with doing this work, to dip and bake such coils in bundles, which is cheaper and tends to speed up the work, but produces questionable results.

Other details in connection with this work which should be given some thought are as follows:

1. *Quality of Baking Varnish Best Suited for the Work.*—The varnish should possess a high dielectric strength and be acid, oil, and moisture resisting. When baked, it should finish, or set, with a hard surface, having considerable flexibility, which makes it firm in resisting mechanical injury.

2. *Specific Gravity or Density of the Varnish Must Be Kept Just Right.*—If the varnish is too thick, it will not penetrate the insulation, and if too thin, it will lack body and be of little value in improving the dielectric strength of the insulation of the finished coil.

3. *Time of Baking.*—If baked for too short a time, the varnish will not set properly, and if baked for too long a time the fibrous insulating materials may be damaged.

4. *Temperature of Baking Oven.*—If the temperature is too low the varnish will not set, and you may have coils that are wet inside. If baked at too high a temperature the cotton insulation may be damaged, causing it to disintegrate rapidly.

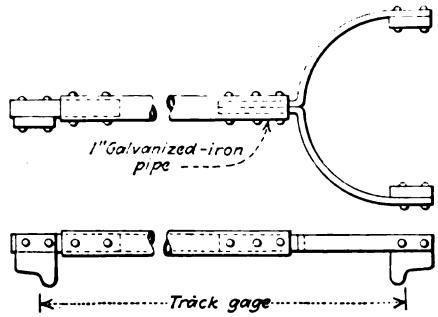
5. *Ventilation of the Oven.*—Unless proper ventilation of the oven is provided to furnish a change of air around the coils, the baking process will be retarded and may result in the varnish setting or hardening only on the surface of the coils.

Device for Testing Gage in Switches and on Curves

By J. S. Wilder,
Engineer of Maintenance of Way Municipal Railway of St. Petersburg, Fla.

The accompanying illustration shows a gage which we have been using for some time as a check on the installation of switches. The gage consists of a piece of galvanized iron pipe, carrying at one end a rod to which is attached a piece of iron plate cut to the contour of a wheel tread and flange, while on the other end are two similar plates riveted to a fork. When the fork end of the gage is held against the gage side of the rail or the bearing surface in the case of special trackwork, the gage is obviously normal to it at this point, and hence can be used in determining the gage of the track accurately at the location.

This gage was made because we noticed at times that wheel flanges were riding or bearing too close to mate or frog points. For instance, this year, while we were installing four

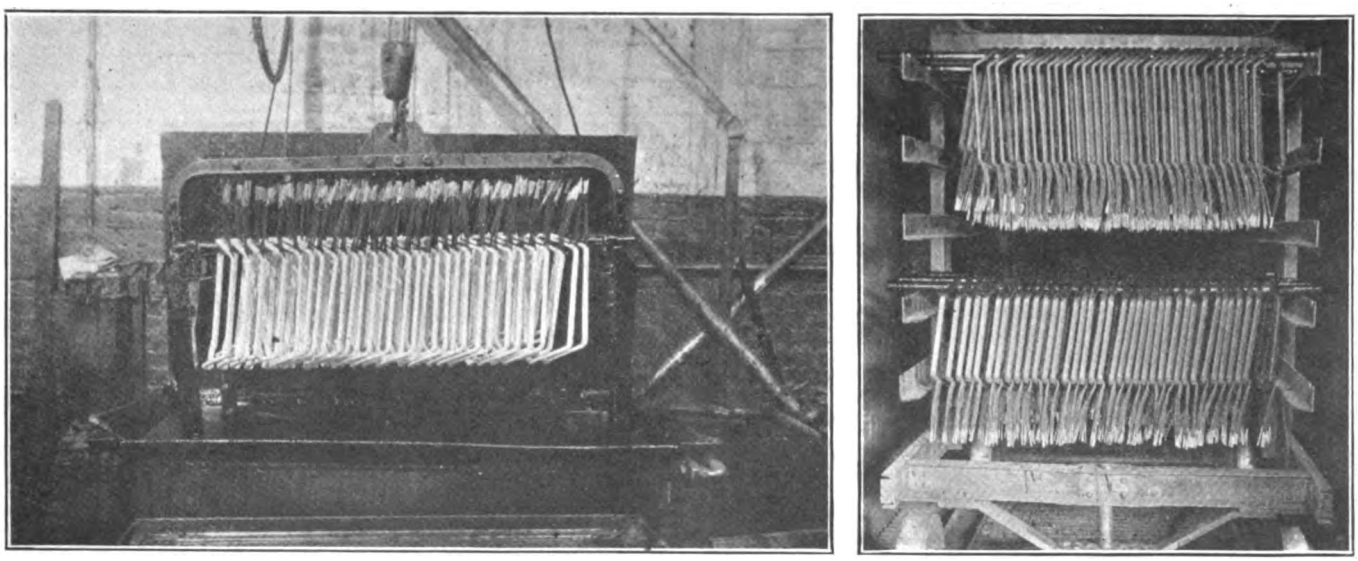


Forked Device for Determining Track Gage

new wye tracks, for which the pieces of special trackwork were made by one of the largest manufacturers, we found in several instances a slight variation in track gage. By means of our device we were able to get better clearance of wheel flanges at the mate points, either opening or closing the track gage slightly. On one wye track, the gage had to be closed nearly ¼ in. more than standard on the straight side, to secure a reasonably good gage through the curve. At the wye end, the gage had to be opened up a quarter inch throughout the entire switch piece.

We aim to allow the outer flange of a wheel when new just to touch, or nearly to touch, the edge of the head of the rail on double-guard curves, as experience has shown that this gives the best operation.

As a result of these adjustments the operation of cars over these



At Left, Coils Are Separated During Dipping and Baking. At Right, Coils Arranged in Oven So That Heat Will Reach All Parts

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tracks has been entirely satisfactory, which it would not otherwise have been.

This year we had occasion to move a passing track from one location to another. We had been unable to operate cars to the left on this passing track on account of wheel flanges riding or straddling the mate point. We shortened one lead rail at each end, moving the mate piece ahead of the position originally intended, so that cars could go either to the right or left as necessary. Our gage device came in handy in determining the amount necessary to cut off the lead rail.

I do not know whether this device is original, but I have seen nothing of the kind on the market. While we do not claim it to be scientifically correct, it is a handy, practical check on trackwork.

A Method for Washing Waste

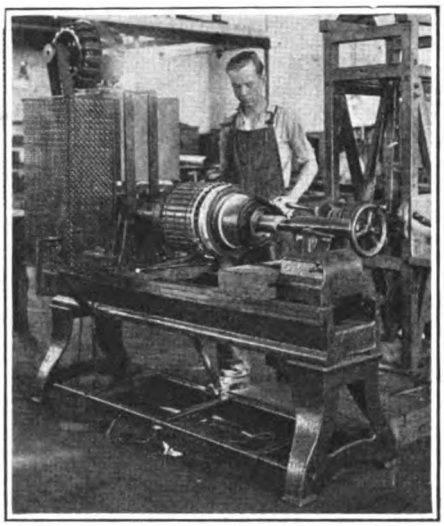
THE following method of washing waste used in motor bearings has been in use on a large Eastern railway system for a number of years with satisfactory results. A tank is used with a screen placed about 20 in. from the bottom. Oil heated to 170 deg. F. is poured over the waste placed on this screen. The hot oil carries the dirt and sediment from the waste and this settles in the bottom of the tank. The top oil from the bottom of the tank is used for the washing, and this can also be used in motor and journal bearings when it has been properly reclaimed.

Shop Lathe Used for Banding Armatures

A LATHE that was formerly used in the machine shop of the Los Angeles (Calif.) Railway has been converted into a satisfactory armature banding machine by J. L. Clark, superintendent of electrical repairs. The lathe has a 25-in. swing and a two-speed gear. It is operated by a 3-hp. motor.

The armature to be wound is lifted into place on the lathe by a pneumatic hoist, and then turned the same as metal or wood is turned on shop lathes. The wire for banding is carried on a spool behind the worker. It runs over a pulley which has weights attached to keep the wire taut.

A pedal for foot control has been



Attachments Added to Lathe for Banding Armatures

constructed of iron pipe. This is connected to the belt shifter by links and a bell-crank lever, so that the lathe can be stopped and started as desired by the operator and still leave his hands free for the banding.

Jacking Out Poles in Birmingham

A NOVEL plan has been used on the Birmingham (England) Corporation Tramways for lifting steel poles out of the ground without excavation. It was devised by the engineering firm of Hollings & Guest of Birmingham, and is described and illustrated in a recent issue of the *Tramway & Railway World*.

A split clamp with projecting flanges is bolted to the pole at a suitable height, and the pole is lifted by means of two hydraulic jacks placed one on each side. Pressure for the jacks is supplied by a hand pump. The travel of the jack plungers is, of course, small, so that it is necessary gradually to lower the split clamp on the pole as the latter rises from the ground.

This plan was used recently on a job where a large number of poles had to be removed in connection with a change in the method of transportation on one route.

New Equipment Available

Dustless Ash Conveyor for Power Plant

A TYPE of ash conveyor which is new in this country, although successfully used in Europe, is being marketed by the Combustion Engineering Corporation, New York, as the "Combusto" ash conveyor.

This conveyor consists of a double chain scraper or drag conveyor moving in a trough containing water, the trough being located under the ash discharge of the stoker. Ashes and clinker fall from the stoker, or through the clinker grinder, directly into this trough and are quenched and immediately carried along by the conveyor and deposited in a large storage hopper or car.

A feature of this conveyor is the water seal, as the chute which forms the ash discharge of the stoker extends below the water level in the trough. This prevents the formation of dust, and further the rapid quenching of the hot clinker breaks it into smaller pieces, thus facilitating removal by the conveyor. The use of a duplex conveyor, consisting of two water troughs, is recommended where there is no ash hopper under the stoker or where the capacity is limited so that in case of a shutdown of one conveyor for any reason, the other may be started immediately. Where there is already a basement and hoppers are of fair capacity, the single conveyor may be used, a suitable door being provided for emptying the hopper periodically into cars or trucks while repairs are made to the conveyor.

The trough may be either of cast-iron or concrete construction. If of the former the sides and bottom are made in sections 4 ft. long and ⅝ in. thick.

The sheet-steel scrapers working in the trough are 18 x 4 x ½ in. in dimensions, and they are attached, on 17-in. centers, to the driving chains. The driving sprockets, situated at the end of the incline which is usually provided so that ashes may be discharged into cars or a bunker or otherwise disposed of, are connected by means of reduction gears to the driving motor or engine so that the maximum speed of the conveyor will be about 14 ft. per minute. At this speed the power consumption is estimated at about ¾ hp. per 1,000 lb. of refuse per hour, depending upon the length of the trough, etc. The capacity of the conveyor under these conditions will be about 2½ tons per hour.

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The News of the Industry

Paving Case Decided

Franchise Requirement Compelling Company to Finance Repaving Between Tracks Held Reasonable

In an opinion handed down on April 17, 1922, of which printed copies have recently been received, the Public Service Commission of Pennsylvania expresses the opinion that the repairs to the tracks of the Reading Transit & Light Company in Pottstown, and the pavement between the rails and on each side thereof as set forth in the report of the engineering conference, are necessary for the public safety and convenience, and are just and reasonable for the respondent to make.

In consequence, the commission entered an order requiring the company within six months from the date of service of the order to do all work necessary to repave and repair the pavement in all streets in the complainant's borough occupied by the company as set forth and described in the report of the engineering conference in this case. All this work was to be done at the company's own cost and expense.

Ordinance Required Paving

In the franchise ordinances granted by the Borough of Pottstown to the company, it was provided that the respondent should pave and keep in repair so much of the street occupied by its track as was between the rails and 2 ft. on each side. The ordinances specified the character of the pavement to be laid. The streets were first occupied by the railway in 1906. The Borough of Pottstown complained that the company had not complied with the terms and conditions of the franchise ordinance alleging: that the condition of the street paving was extremely bad and that the company's attention had repeatedly been called to the existing condition of the paving and that the respondent had been requested to repair the same in compliance with the conditions prescribed in the ordinance. Further, it was charged that notwithstanding such notice and request the company had failed to make the necessary repairs and that the condition of that part of the streets occupied by the company had become an absolute menace to public travel.

The company acknowledged receiving request from the borough, but denied that the paving was in bad condition, and further averred that the duties sought to be imposed upon it by the complainant to repave the several streets as set forth in this complaint were unjust, unreasonable, unlawful and burdensome, and that the company was without the necessary funds to repave the street and maintain it. Furthermore, the railway contended that the franchise ordinances of its constituent companies were unjust, discriminatory, burdensome, and in violation of the Pennsylvania public service company law.

An engineering conference was agreed upon and personal inspection was made by the members of the paving complained of, and a full report relating thereto, duly signed by the three members of the conference including the engineer of the railway, was offered in evidence. In this report it was set forth in detail the work necessary to be done on the several streets in the complaining borough in which the respondent's tracks were laid.

Methods Not Prescribed by Commission

There was a disagreement in the conference, however, as to the kind or type of base which should be laid in the street before the paving was relaid. The commission said that the question of whether or not the repairs shown to be necessary in this case should be made as contended by the borough's engineer or in the manner suggested by the railway engineer was not for the commission to determine. It merely held that the work should be done in some substantial manner as the safety and convenience of the public demanded. The method to be employed was left for the respondent company to determine. In this connection the commission pointed out that as the pavement must hereafter be maintained, it behooved the railway to have the same laid in a substantial manner.

Relieved of Paving Costs in San Diego

At the primary election held on March 20 in San Diego, Calif., the amendment with respect to paving carried by a safe majority. This vote relieves the San Diego Electric Railway of the cost of new paving on streets now occupied by the company's tracks.

Following approval by the voters of this amendment to the city charter exempting street railways from paving between and alongside tracks on streets not now paved but which may hereafter be paved, the San Diego (Calif.) Electric Railway and the Bay Shore Railway have made application to the City Council to have the provision written into their general franchises. A similar amendment was defeated at a special election last fall, but the amendment approved by the voters at the recent primary election was more explicit and apparently suited the voters better, as they approved it along with eight other amendments, all of which were ratified by the California legislature, now in session.

New Transit Bill Appears

Substitute Home Rule Bill Introduced in New York Assembly by Republicans

The Republican counter-proposal to the Hylan-Smith plan for New York City control over transit and other public utilities was laid before the Assembly on April 10. It is in the form of a bill sponsored by Assemblyman George N. Jesse and provides for a city transportation commission appointed by the Mayor. According to the proponents of the Jesse measure, it offers a degree of home rule sufficient to meet the city's needs.

The measure contains definite provisions for:

1. A transportation commission of three members, named by the Mayor, but whose salaries and terms of office are to be fixed by the Board of Estimate.
2. The commission without the consent of any other body to lay out routes, build new subways and contract for their operation at a rate of fare to be agreed on by the city and the operating company.
3. The contracts which the city has made in regard to the present subways or other means of transit now existing being carried out without interference from the State.
4. The commission reducing but not increasing charges over those provided by statute, thus limiting its rate-making powers.
5. Assuring a universal 5-cent fare from any part of the city to any other part of the city.

The measure is said to be satisfactory to Republicans, who felt it would be politically unwise completely to turn down Mayor Hylan's demands for a voice in transit regulation, as at first proposed by some of their colleagues.

In a statement given out in connection with the introduction of the bill Assemblyman Jesse said:

> The predominant feature of the 1921 legislation amending the public service commission law was that the Public Service Commission and the Transit Commission could, if in their judgment necessity demanded, increase a rate, even though a lower rate had been fixed by law, by franchise or contract. The bill now introduced prohibits this by withdrawing power from the commissions. This applies not only to rates of fare on transit lines, but also for gas, electric, steam, telephone and telegraph service.
>
> The 1921 legislation also provided in respect to the plan of readjustment of transit companies that the Transit Commission was empowered to make that such plan could be put into effect over the possible objection of the local Board of Estimate and Apportionment. The pending bill provides explicitly that any such plan must receive the approval of such local board.
>
> The Transit Commission never used these broad powers but the fact that it had them furnished the occasion for all kinds of demagogic charges as to what the Transit Commission was going to do. There was wide-spread criticism of the 1921 legislation on the ground that these provisions violated the principles of home rule. The pending bill should abundantly satisfy the sincere advocates of home rule, because it more than restores the powers claimed to have been taken away in 1921.
>
> The pending bill gives the city full and complete power over rapid transit plans and contracts. The original rapid transit act was passed in 1891, and in 1894 was amended to provide for municipal construction. The original commissioners were named in the act and the rapid transit powers have always been exercised by State officials, in turn by the Rapid Transit

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Board, the Public Service Commission for the first district, and Transit Construction Commissioner, and the Transit Commission. From time to time powers of approval were given to the Board of Estimate and Apportionment, but never powers of initiation and direction. Now it is proposed to take away all these powers from the State agency and turn them over without reservation to the city authorities.

Therefore, the bill not only restores such measures of home rule as existed in the local authorities prior to the legislation of 1921, but goes much further and makes the city authorities thoroughly independent in the planning and building of subways.

$500,000 for Improvements in Albany

The United Traction Company, Albany, N. Y., will spend nearly $500,000 this summer in Albany and the surrounding cities in an effort to improve its service in preparation for the commercial and building developments under way in the capital district.

Announcement of this improvement was made on April 7 by Ernest G. Murphy, superintendent, who outlined its chief features. The greatest construction in Albany will be from Lark to Quail Streets, on Madison Avenue, a distance of about 1 mile, where new trackage will be put down in connection with the new pavement which is to be laid this summer, while additional switching facilities will be built west of the Quail Street carhouse.

Construction of approximately 14,000 ft. of new tracks or improvements all told will follow the paving programs in the various municipalities served.

Most of the work will be done by contract. Bids will soon be opened for paving materials and rails, Mr. Murphy said.

A transfer table capable of moving a car from the storage line will be constructed opposite the Quail Street station.

New tracks will be laid for about 2,000 ft. in Rensselaer Street at the New York Central Railroad shops to facilitate handling of cars for employees who formerly were forced to wait the slow movement of cars over the single line from Central Avenue. The new line will provide switching room at each end of Central Avenue.

In addition several new automatic sectionalizing switches will be installed in various sections of the city with the view of relieving traffic congestion.

In Rensselaer, Troy, Watervliet, Green Island, Cohoes and Waterford traction line improvement will follow the intensive paving program to be put into operation there.

In Watervliet a new high-tension switching station will be constructed at a cost of approximately $100,000 to provide even distribution of energy among lines in that section and remove trouble now experienced. Under the present system high-tension current operating Troy and Watervliet lines is conveyed by means of large feeders to the Twenty-fifth Street station, in Watervliet, through Troy from the main plant at Albany.

If trouble develops in the Albany plant it automatically ties up traffic in the outlying towns. Under the new system the power, though coming from Albany by means of the new switching station, can be continued for car operation, despite trouble in Albany.

In addition to this station, feed lines will be constructed in Green Island to care for the growing traffic at the new Ford plant.

New Wage Agreement in Washington

A new agreement was executed on March 26 between the Capital Traction Company and its employees to remain in force until March 30, 1926. This agreement is identical with the agreement which has been in force for the past three years with the exception of the new wage scale for trainmen entering the service after March 30, 1923, given in Sec. 18 and Sec. 26 in reference to the wages and working conditions of the employees other than trainmen. Sec. 18 says:

> The rate of wages for conductors and motormen and bus operators in the employ of the company on March 30, 1923, shall be as follows:
> First three months' service, 51 cents an hour.
> Next nine months' service, 54 cents an hour.
> After twelve months' service, 56 cents an hour.
> The rate of wages for conductors and motormen and bus operators employed after March 30, 1923, shall be as follows:
> First year, 50 cents an hour.
> Second year, 52 cents an hour.
> Third year, 54 cents an hour.
> Fourth year and thereafter, 56 cents an hour.
> Motormen and conductors acting as instructors or as one-man car operators shall receive 5 cents an hour in addition to their regular rate of wages.

Sec. 26 says:

> The wages and working conditions of shop, substation and other employees, except trainmen and bus operators, now in the company's employ shall remain as at present. Employees in the shop shall receive time and one-half for all overtime and Sunday time, and time and one-half for all holidays if compelled to work.

Platform Employees May Be Appointed Special Policemen

Senator Parton Swift and Assemblyman Nelson W. Cheney of Erie County have introduced a bill in the Legislature at Albany, N. Y., which would amend the railway law to extend to a surface railway operating within or between three or more cities the privilege of having its platform employees appointed special policemen under the jurisdiction of the New York state constabulary.

The law as it stands now allows any steam railway corporation to have any conductor or brakeman appointed a policeman with powers of arrest in cities and villages through which the railway passes.

The members of such a police force would be appointed by the traction company with the approval and authority of the head of the state police and would not be subject to the jurisdiction or dicipline of local municipal authorities of cities through which the railway operates. Compensation for all such special officers would be paid by the railway.

Pittsburgh Receivers Ask Men to Modify Demands

The receivers of the Pittsburgh (Pa.) Railways have sent their reply to their employees who recently presented demands for a wage increase and changes in working conditions. The motormen and conductors are asked to modify their demands or else refer the matter to arbitration according to a clause in the present agreement. The receivers seek a free hand in bringing about further economies in operation. Further it is their contention that a 10-cent fare would be insufficient to meet the proposed increase in the wage scale. The answer of the receivers in part follows:

> It is our purpose to present, as relevant to the consideration of proper working conditions and wage rates, the following:
> 1. Payments now being made for time wherein no service is performed.
> 2. The desirability of allowing our operating officials to assign such men as they deem competent to the operation of cars other than passenger cars used on the system.
> 3. There has been a disposition on the part of your committee to attribute to the receivers a commitment to operate one-man cars only over such routes as may be agreed upon after consultation with your committee. In these days of high operating costs it is absolutely essential that the receivers shall feel free to put into operation such one-man cars as receivers may deem proper.
> 4. The elimination of present limitations on making and putting into effect of schedules and effecting changes when necessary.
> 5. The consideration of suggestions from officers of operating department relative to a more definite statement of some of the paragraphs of the agreement and the elimination of ambiguity therefrom.

The wage scale committee representing 3,000 motormen and conductors of the Pittsburgh (Pa.) Railways recently petitioned receivers Fagan, George and Tone for a wage scale of 80 cents an hour and an eight-hour day to replace the 60 cents an hour scale and the present day of eight and three-quarter hours. These changes were sought for the year beginning May 1.

The schedule asked for was as follows:

For the first three months of service, from 54 to 74 cents and hour; from 58 to 78 cents for the next nine months and from 60 cents to 80 cents an hour after the first year of service.

At the present rate of 60 cents the pay for the eight and three-quarter-hour day amounts to $5.25, and under the new rate and shortened day the daily pay would be $6.40. The increase amounts to 33⅓ per cent but under the shorter day the increase amounts to 22 per cent in daily pay.

Other changes were sought by the men, including time and a half for all overtime work beyond eight hours instead of time and a half for holidays as is the arrangement now.

The so-called 60 cents-an-hour rate now paid, which is the rate the majority receive, was fixed in 1921 and continued in 1922.

Previous to 1921, when the carmen accepted a 10 cents an hour reduction, the pay was: First three months, 64 cents an hour; next nine months, 68 cents an hour, and after the first year, 70 cents an hour, or 10 cents an hour less in all three groups than is now asked.

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Detroit Car Men Seek Twenty per Cent Wage Increase

Following the adoption of a resolution embodying certain requests at a meeting of the platform men employed on the city cars in Detroit, an increase of 20 per cent in salary was asked in a communication presented to Ross Schram, assistant general manager of the Department of Street Railways, and the street railway commission. The men ask that the rate of pay be raised from $5 to $6 per day and that the overtime rate be changed from 75 cents to 90 cents per hour. They ask also that their working hours be kept within a thirteen-hour period.

While no action has been taken by the commission and no information has been given out by the city officials it is believed that the members of the street railway commission oppose the recognition of the street car men's union. An agreement between the city and the organization is asked by the employees. The men base their demand for higher wages on the claim that the present rate does not meet living costs.

The situation is being placed before Frank E. Doremus, Mayor-elect of Detroit, by the street railway commission to determine his stand on the subject of recognition of the union and the increase in pay for the platform men. The new Mayor took up the duties of his office on April 9. It is contended that the union cannot be recognized by the city under the terms of the city charter.

The question arises as to how the increase in wages can be met and whether or not an increase in fares will be necessary if the demands of the men are met. According to the city charter, the operating costs must be met by the income from fares and a sufficient rate must be charged to pay these costs. As pointed out by the city comptroller some time before the last election when the ratification of the $5,000,000 bond issue for extensions to the street railway lines and for the purchase of new cars resulted, if the extensions were to be met out of the income from fares, a 6-cent or higher fare would be necessary.

Some time before the request for an increase for the platform employees of the municipal lines, platform men employed on the Detroit United Railway's interurban lines took similar action in asking for a 20 per cent increase.

Dayton Property Praised

A recent issue of the *Daily Court Reporter*, the only business newspaper published in Dayton, Ohio, calls attention to the work being done by the City Railway and emphasizes what an important factor the railway has been in the development of the city. The splendid relationship existing between the employees and the management is also made a subject of praise. The article urges the co-operation of the people of Dayton in order that the company can continue on a sound stable financial basis. It states that expansion can come only through steadily increasing sums of money and nobody will invest his money unless there is reasonable assurance of the safety of the principal together with a satisfactory return. Further, money will not be attracted for investment in the City Railway unless operations show a satisfactory margin of profit.

Fort Worth Road Will Spend $500,000

The Northern Texas Traction Company, Fort Worth, Tex., announces that negotiations have been completed whereby this company will take over and operate the independent road operated by the Southwestern Baptist Seminary Line. The Seminary line was built at a cost of $34,000, according to officials of the school, and it has been operated in connection with the school plant since its construction. There is an indebtedness of $1,500 against it, the note being held by the Northern Texas Traction Company.

The offer of the Seminary was that it would relinquish its right-of-way and all physical property to the Northern Texas Traction Company in consideration of the cancellation of the $1,500 note and the entering of an agreement that the Northern Texas Traction Company would operate the Seminary line under the regular 7-cent fare as a part of the Fort Worth system.

In agreeing to take over and operate the Seminary line, the Northern Texas Traction Company has also filed notice with the City Commission that it will soon begin work on extensions on the Riverside and Sycamore Heights lines. The question of extensions has been a point at issue in the controversy between the company and the city. The two extensions will represent a cost of more than $500,000, according to George H. Clifford, vice-president and general manager of the company. Money for making the extensions is being raised by the sale of 7 per cent preferred cumulative stock of the company to employees and patrons and an intensive campaign to advertise the sale of this stock has just been started.

Wisconsin Companies Are Expanding

A large number of cities and towns in Wisconsin will benefit by the 1923 expansion program and improvement plans already prepared and estimated by the electric light and power and railway companies operating in their communities, according to returns made in a questionnaire sent to them by the Wisconsin Public Utilities Bureau. The grand total runs into millions of dollars.

The Wisconsin Public Service Corporation, Milwaukee, which is furnishing electric light and power and operates the electric railway services in Green Bay, Oshkosh, Manitowoc, Chilton, Sheboygan, Algoma, Kewanee, Sturgeon Bay and other cities and towns in the Peninsular territory, has under consideration the expenditure of the following sums of money for improvements and additions to its system located in the foregoing cities: Substation equipment $100,000; extension of local rural lines and transmission lines $310,000; power house and outside equipment improvements $55,000; general reconstruction work $100,000. The Menominee (Mich.) & Marinette (Wis.) Light & Traction Company (a subsidiary of the Wisconsin Public Service Corporation) has a program for 1923 that calls for improvements to its electric distribution system amounting to $45,000.

The Wisconsin Traction, Light, Heat & Power Company, Appleton, has a 1923 building plan calling for an expenditure of $200,000 for new and replacement equipment to its electric light and power and railway systems.

The 1923 Wisconsin building program outlined by the L. E. Myers Company for its Wisconsin subsidiary, the Lake Superior District Power Company with headquarters at Ashland, operating in the northern parts of Wisconsin and Michigan indicates that this company intends to expand and enlarge its operations and hold its own as one of the largest operating companies in the State. Improvement plans already prepared call for an expenditure of $700,000 on steam and hydro-electric plant equipment and line improvements. L. N. Boisen, Chicago, is vice-president in charge of operations.

News Notes

Ford May Assist Railway Construction.—It is forecasted that Henry Ford will give financial assistance to the cities of Dearbon, River Rouge and Springwells in the construction of electric railway lines which will be coupled up with extensions to be made to the Detroit Municipal Railway. The increase in the number of employees at the Ford plants is so great that something must be done to provide adequate service for the additional workmen.

Agreement Renewed.—Following a series of conferences, the working agreement of the Trenton & Mercer County Traction Corporation, Trenton, N. J., and Division No. 540, carmen's union, has been adopted for another year with only three slight amendments. Hereafter the men who complete a steady run will receive time and a quarter for operating a tripper. Mail coats will be furnished to the men operating mail cars on the suburban divisions of the company.

Planning Celebration. — Citizens of East San Diego, co-operating with the city trustees, are preparing a carnival April 18 to 23 in celebration of the completion of the reconstruction work of the San Diego (Calif.) Electric Railway on its East San Diego line. This is now the finest street car line in San Diego, and on it on April 3 the company started a peak-hour express service designed to give patrons speedy access to the downtown business district.

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Financial and Corporate

Common Dividend Earned Twice

Public Service Corporation Shows Increase in Gross and Net—Railway Revenues Improving

The fourteenth annual report of the Public Service Corporation of New Jersey for the year ended Dec. 31, 1922, shows gross operating revenue of the subsidiary companies amounting to $78,356,963, which is an increase of $3,045,455 over the previous year. The net income after taxes and interest charges was $5,570,239, which was an increase of $1,975,611 over 1921. Payments of preferred dividends amounting to $1,316,839 and common dividends of $1,950,000 were made, the latter totaling 6½ per cent for the year.

The report states that the customer ownership plan of selling the corporation's 8 per cent cumulative preferred stock proved so successful in attracting customers of the operating companies to become investors that it was continued last year with more than satisfactory results. Securities of the Public Service Corporation and its underlying companies are now held by upward of 60,000 individual owners.

Regarding the operations of the railway company, President Thomas N. McCarter, says:

> With gross operating revenues showing an increase and gross operating revenue deductions a decrease, the railway company came through the year 1922 in much better condition, both physically and financially, than had been the case for several years preceding. This notwithstanding the fact that the 2-cent transfer charge fixed by the Board of Public Utility Commissioners, and subsequently set aside by the United States District Court, had diverted traffic in 1921 which was not regained last year. A marked business depression which had continued over from the previous year also made its effect felt, but since May, 1922, there has been a gradual improvement noted in general conditions, as is shown by the increasing numbers of employees in various factories served by the railway lines. The railroad and coal strikes adversely affected industries for a time, with a resultant effect on railway revenue, and an unusually large number of rainy Saturdays and Sundays last summer undoubtedly militated against the railway's receipts attaining a higher level. As it was, the ratio of operating revenue deductions to operating revenue was 78.5 per cent, as against 80.8 per cent in 1921, and the gross income of Public Service Railway, railroad and affiliated companies, after making operating and non-operating revenue deductors, increased $633,209.

Speaking of the jitney situation, Mr. McCarter says that the competition to which the railways have been subjected from jitneys whose operators are permitted to parallel railway lines on the same streets was not diminished during the year, but, on the contrary, it was increased because the jitneurs were allowed to substitute vehicles of much greater carrying capacity than those formerly in use. He states, however, that no additional permits for this class of jitneys were sanctioned by the Board of Public Utility Commissioners during the last year. Nevertheless, this situation is creating a very serious condition of congestion in the main arteries of the larger cities, which, in turn, is causing serious inconvenience to shops, banks and places of business along these thoroughfares, and, if allowed to continue indefinitely, is bound to have a deleterious effect upon real estate values.

It is stated that the transportation department experienced some difficulty in keeping its force of trained men up to the required number.

Expenditures for all purposes by the claim department amounted to $1,016,917, a reduction of $147,007 from the previous year. This represents a saving of 12.63 per cent and brings the percentage of total expenditures to gross passenger receipts to the low figure of 4 per cent.

Details of operating results of the Public Service Railway and its affiliated companies are given in the accompanying table.

PUBLIC SERVICE RAILWAY AND AFFILIATED COMPANIES
Income account for the twelve months ended Dec. 31, 1922

	Public Service Railway Company	Public Service Railroad Company	Other Affiliated Companies	Total
Operating revenues	$26,165,656	$298,419	$1,080,435	$27,544,510
Operating expenses and taxes	19,429,065	241,027	741,643	20,411,735
Amortization charges	1,102,079	.....	107,500	1,209,579
Operating revenue deductions	20,531,144	241,027	849,143	21,621,314
Operating income	5,634,511	57,392	231,292	5,923,195
Non-operating income (exclusive of dividends of affiliated companies)	101,510	632	25,045	127,187
Gross income	5,736,021	58,024	256,337	6,050,382
Income deductions (bond interest, rentals and miscellaneous interest charges)	5,316,194	108,999	49,409	5,474,602
Net income or loss	419,827	*50,975	206,928	575,780
Profit and loss accounts (excluding dividends)	19,906	†200	6,498	26,204
Surplus—before dividends	399,921	*50,775	200,430	549,576
Dividends (all to P. S. Corporation except directors' dividends)	†124,734	.....	124,800	66
Net increase or decrease in surplus	$524,655	*$50,775	$75,630	$549,510

* Deficit. † Credit.

Readjustment Explained

Report of American Railways Shows Net Income of $1,134,520—Conditions of New Financing Explained

The American Railways, Philadelphia, Pa., now known as the American Electric Power Company, reports a net income of $1,134,520 for the fiscal year ended Dec. 31, 1922. As there was a surplus at the beginning of the year of $1,522,192, the total surplus is $2 656,713, from which was deducted $1,086,879, consisting of transfers of dividends accrued on the preferred capital stock to the open account and sundry adjustments. With these charges taken care of, the balance of the surplus at the close of the year was $1,569,833.

Van Horn Ely, president of the company, in the report presented to the stockholders as of Feb. 16, 1923, reviews the work of the directors in planning for financing of some of the subsidiary companies, so that the American Railways might be reimbursed for funds advanced these companies during the period of the war and subsequent thereto, also to place the subsidiary companies in a position so that additional securities in the form of bonds or preferred stock could be issued from time to time, to care for extensions and settlements of the property.

NAME CHANGED FOLLOWING REORGANIZATION

The reorganization and change of name of the company have been referred to previously in the ELECTRIC RAILWAY JOURNAL. Mr. Ely says that the work of the directors resulted in arrangements being perfected with a strong group of bankers which had purchased a bond issue of $7,000,000 and $1,500,000 of 7 per cent preferred stock and the Consolidated Power & Light Company, Huntington, W. Va., and that these same interests cared for the maturing obligation of $2,305,000 of Wilmington & Chester Traction Company bonds, due April 1, 1923.

He also explained that arrangements had been made for funding the accumulated dividends on the preferred stock to the extent of 19½ per cent to Feb. 15, 1923; for retiring $6,000,000 of collateral trust bonds and $3,000,000 of three-year 7½ per cent notes, retiring and canceling $1,100,000 of the $3,500,000 of five-year 8 per cent notes, and for increasing the authorized first preferred stock from $4,000,000 to $8,000,000 and retiring and canceling the $4,000,000 of second preferred stock.

Mr. Ely says that the board of directors decided that the property of the Bridgeton & Millville Traction Company could not be operated profitably and arranged to retire the bond issue of $500,000, surrender the charter, abandon operation, take up the tracks and liquidate the company. He explains that this was accomplished for the entire line except for the track between Bridgeton and Millville, which was sold to local interests.

He says that during the year the

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COMBINED INCOME STATEMENT OF THE SUBSIDIARY AND AFFILIATED COMPANIES OF THE AMERICAN RAILWAYS COMPANY
For the Year Ended Dec. 31, 1922

Operating revenues		$19,342,697
Operating expenses, including depreciation reserves		13,302,912
Net revenue		$6,039,785
Taxes		973,788
Operating income		$5,065,997
Non-operating income		92,512
Gross income		$5,158,509
Interest, deductions, rentals, amortization of discount on funded debt and other charges	$2,663,643	
Sinking fund deductions	68,613	
Total deductions		2,732,256
Income for year		$2,426,253
Less income available for other stockholders		1,365
Income available for the American Railways Company, including interest on bonds, advances, etc		$2,424,887

REPORT OF TREASURER OF AMERICAN RAILWAYS COMPANY
For the Fiscal Year Ended Dec. 31, 1922

Income		
Income from subsidiary companies	$2,410,309	
Miscellaneous income	65,588	
Gross income		$2,475,897
Deductions from Income		
Interest accrued on funded debt	$930,318	
Interest accrued on floating debt	15,279	
Amortization of debt discount and expenses	91,799	
General administrative expenses	249,286	
Depreciation of office furniture and engineering instruments	2,175	
Taxes accrued	40,000	
Discount on securities sold during the year	3,354	
Premium retirement three-year 7½% notes	9,166	
Total deductions		1,341,377
Net income		$1,134,520
Surplus at the beginning of the year		1,522,193
		$2,656,713
Transfer of dividends accrued on preferred capital stock to open account	$735,000	
Sundry adjustments, mainly cost of the abandonment of the Bridgeton & Millville Traction Co., Bridgeton, N. J.	351,879	
		1,086,879
Balance in surplus at the close of the year		$1,569,834
Preferred stock dividends:		
Accrued in 1920—4.375 per cent	$175,000	
Accrued in 1921—7.0 per cent	280,000	
Accrued in 1922—7.0 per cent	280,000	
Per cent 18.375	$735,000	

maturing three-year $3,000,000 7 per cent note issue was extended for three years at 7½ per cent, and the American Railways Company-National Gas Company collateral trust bonds amounting to $962,000 were extended for a period of five years.

He further explained that the valuations of the properties of the various subsidiaries were progressing under A. L. Drum & Company, and during the year the Public Service Commission of Pennsylvania fixed fair values for the physical properties of the Scranton Railways, Altoona & Logan Valley Electric Railway, the Southern Pennsylvania Traction Company, operating in and about Chester, Pa., and the Chester County Light & Power Company, Chester, Pa.

Interstate Earnings Up

Net Increased $195,928, or 25.51 per Cent in 1922—Freight Traffic Almost Doubled

The gross operating income of the Interstate Public Service Company, Indianapolis, Ind., operating more than 90 miles of electric railway and doing a general light and power business is greater for the year ended Dec. 31, 1922, by $320,257 than the income for the year 1921. This is an increase of 8.09 per cent. Miscellaneous income of the company increased $83,000, or 128.64 per cent. The net earnings show an increase of $195,928, or 25.51 per cent. These facts are all contained in the report of the company for the year, presented to the stockholders at the recent annual meeting.

Harry Reid, president of the company, explained that in 1922 the number of customers served by the company was increased by 4,492. The connected lighting load increased 11.8 per cent and the power load was 10.2 per cent greater at Dec. 31, 1922, than at the close of the year of 1921. Mr. Reid said that the gain in volume of business in the railway department was in some respects even more noteworthy in figures of percentage. The freight tonnage on the interurban railway increased 83 per cent.

Mr. Reid further explained that the company arranged near the close of the year, with the approval of the Public Service Commission of Indiana, to acquire as of Jan. 1, 1923, all property and business of the Indianapolis & Louisville Traction Railway, the Southern Indiana Power Company, the Hydro-Electric Light & Power Company, the Hawkes Electric Company, the Winona Electric Light & Water Company, the Middlebury Electric Company and the Electric Transmission Company of Northern Illinois. The Indianapolis & Louisville Traction Railway owns the interurban line from Seymour south to Sellersburg, a distance of 41 miles.

He also explained briefly for the benefit of the stockholders the extent of the territory served by the other companies which were taken over. As these properties were not taken over by the company until Jan. 1, 1923, the financial results of the merger are not reflected in the report which was presented to the stockholders.

The company issued and sold in 1922 $721,000 in face amount of its prior lien stock and $372,000, par value, of its preferred stock, also $302,000 in principal amount of its first and refunding mortgage 5 per cent gold bonds. The proceeds of these sales were used for the company's corporate purposes. During the year prior lien bonds in principal amount of $123,500 were retired. Mr. Reid explains that the policy of offering the company's prior lien stock to customers, inviting them to become part owners of the company, has resulted in a wider personal interest in its affairs. The company's stockholders increased in number during the fiscal period from 1,009 to 1,980.

STATEMENT OF EARNINGS OF THE INTER STATE PUBLIC SERVICE COMPANY FOR YEAR ENDED DEC. 31, 1922

Gross earnings, including merchandise sales		$4,276,664
Operating expenses (including taxes)		3,305,826
		$970,838
Miscellaneous income		148,082
		$1,118,920
Rental of leased railway property		155,100
Net earnings		$963,820
Interest on funded debt		478,738
		$485,082
General interest and amortization of bond discount		82,238
Available for dividends		$402,844
Dividends paid and accrued: Prior lien stock dividend		65,833
		$337,011
Preferred stock dividend		283,020
Balance carried to surplus		$53,991

The report is particularly interesting in that it contains an appendix of seven pages giving general information about the company and illustrating some of its properties. There is also a map showing the territory served.

Segregation Plan Explained

At the recent annual meeting of the Quebec Railway, Light, Heat & Power Company, Quebec, Canada, protests were lodged against what was termed the segregation of the gas, tramways and power services of the company. In reply E. A. Robert, president, denied that the recent reorganization of the company constituted segregation of the services and said that only one stock issue, that of the holding company, would be listed for trading on the exchange.

In answer to the inquiry of a shareholder, he also said that at present the company was not prepared to make payments on the $3,307,200 issue of income bonds.

The board of directors was re-elected with the addition of J. P. B. Casgrain to replace George E. Amyot, resigned.

Mr. Robert said that he had not been prepared to give a lengthy outline of the plans at the meeting he was addressing.

When he took his position on the board, Mr. Robert said he found that all future bond issues would have had to have the status of second mortgages, which means that they could be marketed only at prohibitive rates. More rolling stock was needed to meet the demands of the city for better service, but there were no funds for this purpose. Even bond interest had to be met by bank loans. It was lack of working capital that caused the reorganization.

Mr. Robert said that the plan was to separate the companies in order to allow earnings from gas, electricity and tramways to be differentiated so that it would be possible to give the city authoritative figures in fixing the rate of return guaranteed by the city. The stock of the operating companies would be held in the treasury of the holding company, the securities of which could in turn be dealt in on the public exchanges.

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$835,731 Surplus for Hudson & Manhattan Railroad

The report of Hudson & Manhattan Railway, operating under the Hudson River between New York and New Jersey for the year ended Dec. 31, 1922, shows a surplus of $835,731 after taxes and bond interest, including 5 per cent on adjustment income bonds. Allowing for 1 per cent accumulated interest unpaid at the end of the year on the adjustment bonds and for 5 per cent dividend requirements on the preferred stock, the balance was equivalent to 60 cents a share earned on $39,994,890 outstanding common stock. In the previous year the surplus was $331,824 after taxes and all interest charges. The income account for 1922 compares as follows:

	1922	1921
Oper. revenue	$7,862,419	$7,683,662
Expenses and taxes	4,494,372	4,545,084
Operating income	$3,368,047	$3,138,578
Other income	1,291,356	1,029,192
Non-operating income	264,154	245,715
Total income	$4,923,557	$4,413,485
*Bond interest, etc.	2,432,726	2,426,561
Reserve for contingencies	.....	.....
Balance	$2,490,831	$1,986,924
Adj. inc. bond inter.	1,655,100	1,655,100
Surplus	$835,731	$331,824

* Exclusive of interest on adjustment income bonds

Tri-City Railway Wants to Abandon Short Parallel Lines

Abandonment of nearly 3 miles of line in the cities of Rock Island and Moline, Ill., has been asked by the Tri-City Railway of the Illinois Commerce Commission.

The principal abandonment for which permission is sought is that of the Third Avenue line in Moline, where the relocation of the business district has brought about a condition that has resulted in the Third Avenue line running parallel to the Fourth Avenue line and forming, as the traction line holds, a dead appendage.

A like condition exists in Rock Island. There the company proposes to abandon the Fifth Avenue line between Forty-third and Forty-sixth Streets and the Seventeenth Street tracks between Second and Seventh Avenues.

Detroit's Plans for Bond Proceeds

At the last Detroit election the Board of Street Railway Commissioners by popular vote was authorized to issue $5,000,000 to extend the system, but under the present limitation of 2 per cent of the assessed valuation which a city in Michigan can spend for public utilities not all of this money is at present available. With the new property assessment it is expected that a greater part of this sum can be spent before long.

It is expected that the first $1,400,000 will be used to complete the payment of $2,400,000 for the 200 Peter Witt cars ordered last August by the Municipal Railway. No definite plans have been made for further expenditure, but some will undoubtedly go for track extensions. Some 40 miles have been projected in the building program, and probably hearings will be held when the funds become available to determine which of these track extensions is the most important.

City Administration Seeks to Delay B.R.T. Reorganization

The city administration of New York, through Corporation Counsel George P. Nicholson, objected to the proposed Brooklyn Rapid Transit reorganization at the hearing held on April 10 by the Transit Commission. He said the plan should await action by the Legislature on the transit bills, and expressed the belief that the present Transit Commission probably would be abolished.

George McAneny, chairman of the commission, said the commission was not disposed to take into consideration in making its decisions the present condition of current politics. The hearing was adjourned until April 20, after Mr. Nicholson and his assistants had protested against the plan generally and specifically.

Mr. McAneny said in part:

> Mr. Nicholson, the commission is not disposed to take into account the condition of current politics in determining its calendars or its course of action here. This is a matter of very large public moment, and will go through lengthy discussion, from time to time, on its several phases. The commission will continue to function, as the law requires it to function, to act upon matters that come before it as rapidly as it may act after they are presented. Therefore it must deny your request for an adjournment.
>
> I might add, as to the public importance of this matter, that these reorganizations, designed to put these great properties upon their feet, to permit them to go ahead with the resumption of uninterrupted service and the expansion of their facilities, should, in my judgment and the judgment of the commission, never be delayed.
>
> The proposed reorganization of the B. R. T. properties will take them out of receiverships and will put the B. R. T. companies, we assume, in a position similar to that in which the Interborough Company has found itself since its reorganization.

Authority Sought to Issue Securities Under Maine Reorganization

A hearing was held recently before the Public Utilities Commission of Maine on petition of the York Utilities Company for authority to issue stocks and bonds as the successor company to the Atlantic Shore Line Railway. Foreclosure and sale, by decree of the United States District Court, enabled the committee, representing the bondholders, to reorganize and try to place the property on a sound basis. The new corporation seeks authority to create $2,393,500 of capital stock, and to issue $482,300 in common and $179,100 in preferred at this time. This petition seeks the right to acquire rights, privileges, properties and franchises of the system. It is proposed to finance the project as follows:

To issue to the Alfred Light & Power Company $50,000 in preferred stock, $75,000 in common, $75,000 in first mortgage 5 per cent bonds and $50,000 in second mortgage 5 per cent bonds.

To issue to the Sanford & Cape Porpoise Railway $10,000 in common stock, $81,000 in first mortgage 5 per cent bonds and $54,000 in second mortgage bonds.

To issue to the holders of first mortgage bonds of the Atlantic Shore Line Railway $36,000 in preferred stock, a like amount of common, $24,000 in first mortgage 5 per cent bonds and a like amount in second mortgage 5 per cent bonds.

To issue to holders of the consolidated mortgage bonds of the Atlantic $289,200 first mortgage 5 per cent bonds, and $216,900 in second mortgage 5 per cent bonds, $93,100 in preferred stock and $39,900 in common stock.

Auction Sales in New York.—At the public auction rooms in New York there were no sales of electric railway securities this week.

Operations to Cease.—According to a recent decision of Judge Peters in the United States District Court the receiver of the Portsmouth, Dover & York Street Railway, Dover, N. H., has been authorized to discontinue further operation of the property.

Net Increases.—The net balance of the Lehigh Valley Transit Company, Allentown, Pa., increased $25,812 in 1922 after all charges. The gain was remarkable in view of a decrease of $177,517 in the combined gross business. During the year 66,996,655 passengers were carried. The report shows that tne property of the Easton Transit Company, a subsidiary, had been leased during the year.

Park to Be Sold to Satisfy Judgment.—Notice of sale of a portion of the assets of the Southwestern (Tex.) Traction Company, which operates an interurban line between Temple and Belton, Tex., a distance of 10 miles, has been posted at Temple. The property to be sold consists of a tract of 37.64 acres of land midway between Temple and Belton now used as a pleasure park. The sale is to be made to satisfy a judgment of $6,000.

Surplus Earnings Increase $350,000.—The gross earnings of the United Light & Railways Company, Grand Rapids, Mich., for the twelve months ended Feb. 28, 1923, are $12,029,087 against $11,235,195 for the same period ended February, 1922. The surplus earnings available for depreciation, debt discount and common stock dividends amounted to $1,215,476 compared with $857,994 for the twelve months ended Feb. 28, 1922.

Interurban Elects New Director.—At the annual meeting of the stockholders of the Washington, Baltimore & Annapolis Electric Railroad, Washington, D. C., C. M. Mason, New York, was elected a director to fill the vacancy caused by the death of James A. Hemenway. Other directors and former officers were re-elected. The company reports for the year ended Dec. 31, 1922, gross earnings of $2,433,066, as compared with $2,512,540 the previous year. The income after providing for taxes and charges was $230,152, against $230,531 in 1921.

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Traffic and Transportation

Service Order Issued

Schenectady Railway Directed by Public Service Commission to Carry Out Service Changes

Orders have been issued by the Public Service Commission directing improvement of the Schenectady (N. Y.) Railway's equipment and service, and calling for eighteen new cars and an investigation into the practicability of establishing supplementary bus service in Schenectady. The orders make mandatory suggestions made more than a month ago.

The commission directed that six new interurban cars be obtained for use between Schenectady, Albany, Troy and Saratoga, and twelve new double-truck cars for Schenectady. The new cars must be in operation by Sept. 1.

The company, however, has anticipated the order by announcing it would order twelve cars for Schenectady, and establish supplementary bus line service for sections not served adequately by the company's trolley lines.

In addition to requiring eighteen new cars, the commission directed the company to obtain at least one double-truck snow plow and one ice chopping machine.

Three other important orders were issued by the commission, with the requirement that the company reply within a month whether it will carry them out. These are that either a new substation be constructed at the McClelland Street carhouse or at State and Elbert Streets with adequate transformer apparatus, or that an increase be made in the size of the units at the Dock Street station; that during the morning and evening rush hours all interurban cars going to and from the General Electric Company's plant be routed via Broadway and Edison Street; and that during the morning rush hours most of the State Street and Mount Pleasant cars be operated inbound via Veeder Avenue, Smith Street, Broadway, Edison Avenue and River Road, reversing the operation during the evening rush hours.

The company also is directed to comply "forthwith" with fifteen recommendations for improvement in operating and general service conditions as follows:

That car overhaul be made on a proper time or mileage basis.

That an effort be made to secure a standardization of equipment.

That the operation of cars with flat wheels for more than one round trip, except in extreme cases of emergency, be strictly prohibited.

That the force employed in car cleaning be increased, and the methods employed be improved.

That a system of double berth operation be installed in the business district.

That passenger stops within the city of Schenectady be reduced to the smallest number consistent with convenience of riders generally and with the greatest benefit to the transportation system as a whole, such reduction to be submitted to the commission for approval.

That no cars be turned back before reaching signed destination, except in cases now provided by its rules.

That the changing of car signs before reaching destination be strictly prohibited, except in cases provided for by rule.

That methods be employed to eliminate the practice of crews of operators running by passengers waiting for car, except in cases now provided for by rule.

That all cars not disabled, returning to car house and carrying sign "car house" carry passengers while doing so, passengers on board to be notified of the destination of the car.

Buses for Schenectady

The Schenectady (N. Y.) Railway is to operate passenger carrying automobile buses, according to an announcement made on April 7 by James F. Hamilton, president of the company. The buses will be used in districts which are not now sufficiently served by trolley cars.

The number of buses to be purchased and the routes to be followed are details which Mr. Hamilton would not disclose at this time. However, it is probable a bus line will be operated between the General Electric plant and the Mount Pleasant section. This route was suggested by the Public Service Commission in connection with its report of a survey of conditions in Schenectady.

It is probable buses will also be operated in Erie Boulevard. Deliveries of buses for use in Schenectady will probably not be made for sixty days, Mr. Hamilton stated.

Another Weekly Pass on Trial

The Seattle & Rainier Valley Railway of Seattle, Wash., has placed in effect the weekly pass system, permitting a passenger to ride any number of times during a week for $1.25, with the pass interchangeable. Walter M. Brown, general manager of the company, states that a very careful analysis of the average amount of service obtainable to each passholder will be made, and if it develops later that it is possible to reduce the purchase price of the pass, the company plans to do so. He stated that the company did not expect to increase its earnings, but that it did expect to increase its service to the line's patrons. Mr. Brown states that an average of 22.7 rides a week is given as the probable result, which would mean 5½-cents transportation. In Tacoma, the average number of rides is twenty-six a week, his figures show.

In the meantime, the State Department of Public Works has conducted a hearing on the application of forty-seven residents of the Rainier Valley district for a 5-cent fare on the company's lines. The company's chief defense was that the average haul on its lines is 6 miles, against 3.7 miles on the Seattle municipal lines, and that a reduction in fare from 8⅓ cents is not possible.

Railways Answer Board

Los Angeles Lines Offer Plans for Improvements Costing $6,000,000 to Better Service

The managements of the two railway systems at Los Angeles, Cal., on April 5 filed an answer to the report of the Board of Public Utilities of the city on the transportation problem of the city. The companies agree to make extensive improvements, involving the extension of six lines, and also to construct four new lines and give temporary bus service on twelve other lines. Delay is, however, requested on nine, while the companies refuse to make the changes suggested by the board on eight lines.

The estimated cost of the improvements that the rail lines agree to carry out is $6,000,000. The companies urge that the two important questions of universal transfers and extension of the Los Angeles Railway lines into the territory in Hollywood now exclusively served by the Pacific Electric Lines be delayed until it is decided whether the two lines are to be unified. This question is now being made a matter of study by Richard Sachse, former chief engineer of the California State Railroad Commission.

The board's report, referred to at length elsewhere in this issue, included forty-one suggested improvements. In some cases where the board recommended motor bus "feeder" lines be installed, the railway systems refused to accept the board's report, claiming that the business to be had did not warrant such bus lines, and in other cases certain unimproved streets made bus service impossible.

The railway managements state that in their judgment there will not be any reasons for an increase in fares in Los Angeles unless buses are awarded franchises to run on streets parallel to existing railway lines.

The railways recommend that the City Council appropriate $3,000 to send the chief engineer of the Board of Public Utilities and a member of the board to Eastern cities to study motor-bus and electric railway conditions.

Two of the commissioners on the board who form a majority have refused to accept the railway companies' plans. They take the stand that the railways refuse immediately to meet the demand of the commission on the points set forth in the board's report and recommendations.

Commissioner Bogardus claims the railways have refused to accept the full program demanded by the board, and that other means must be found to obtain the transportation needed. This may contemplate bringing in the bus.

In regard to the proposed subway system whereby it was proposed to use Pershing Square, the city's central park, as an underground subway passenger terminal, the city attorney states that the present city charter gives the City Council power to authorize railway lines to build subways under

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city property, but does not permit them to authorize the construction of underground passenger stations; therefore, the Pacific Electric's new $20,500,000 subway system, must be authorized by an amendment to the city charter. In consequence the necessary amendment may be placed upon the ballot at the May 1 primaries or the June 5 city election.

The People's Motor Bus Company is conducting a very active campaign in behalf of two petitions certified and placed on the ballot for May 1 election. One of these repeals the existing "jitney" bus ordinance. This measure prohibits bus operation in the congested downtown district. The other petition would compel the City Council to give a franchise to the motorbus company to operate a motorbus system on 61 miles of streets, some of the routes paralleling the railway lines.

Some of the members of the City Council contend the rail lines should have an opportunity to work out their program, but the City Council has not as yet taken any action on the board's report.

The City Council does not plan to take any action on the motorbus question until after the election of May 1, when the voters will express themselves on the subject.

More Attractive Service Proposed for Elevated

By direction of the new board of directors, Frank Hedley, president of the Interborough Rapid Transit Company, New York, has been considering, in conference with the Transit Commission, ways and means to improve and make more attractive the service to the public furnished by the elevated lines. A careful survey has indicated that a substantial number of people would be glad to take advantage of the greater comfort and the open air riding on the elevated roads, especially on express trains, if the elevated express service were made an all-day instead of a "part time" service during rush hours only.

The board at its meeting on April 10 therefore authorized changes in the train operations which, it is believed, should lead to a greater use of the elevated lines by the public, thereby relieving congestion elsewhere pending the opening of new subways.

The new schedules will call for an increase of 428 trains a day, and the major part of this will become effective on Monday, April 16.

Not only will the number of trains be greatly increased, but the intervals of time between trains will be greatly reduced. The time-tables are in course of preparation and the resultant lessening of the intervals will be announced later.

These changes will involve the expenditure of more than $2,000,000. While the added service will greatly increase the daily operating expenses, it is hoped that the public will help the company in its efforts to give better service and justify these expenditures by traveling to a greater extent upon the elevated lines in the open air and sunlight.

Electrification Rumors Plentiful

Several Texas Roads Reported to Be Contemplating Adoption of Electricity as Motive Power

Electrification of the St. Louis Southwestern (Cotton Belt) between Dallas and Greenville, Tex., is being discussed. Willingness of the railroad to undertake electrification was expressed by Daniel Upthegrove, president of the Cotton Belt. He indicated that the Cotton Belt might undertake the work of electrifying its line, or that a proposition might be considered under which some private company would undertake to electrify the line and operate it.

The distance between Dallas and Greenville is slightly more than 50 miles, and it is declared that the line can be electrified and used for passenger and light freight and express traffic, while steam trains use the line for hauling heavy freight.

C. W. Hobson, Dallas, Southwestern representative of the General Electric Company, declared the electrification of the Dallas-Greenville line of the Cotton Belt is entirely feasible. He is said to have indicated that his company would be willing to open negotiations with the Cotton Belt officials looking to the carrying out of a plan something like that entered into between the company and the Missouri, Kansas & Texas road for the electrification of the line of the Katy from Dallas to Denton.

Electrification of the Dallas-Greenville branch of the Missouri-Kansas-Texas Railway is being considered by Katy officials, according to W. M. Whitenton, Dallas, assistant chief operating officer of the Texas Katy lines.

Electrification of the Trinity & Brazos River Railway's line from Cleburne to Hillsboro, Tex., is being urged upon the company. The distance is about 30 miles. Cleburne now has an interurban to Fort Worth and Hillsboro is on a line out of Dallas. The connection between Cleburne and Hillsboro would prove a valuable line, it is declared.

Plans are said to be under way for the electrification of the Atoka-Oklahoma City Division of the Missouri-Kansas-Texas Railway's lines. Official confirmation of the report is lacking, but it is regarded as certain that the electrification program will be undertaken during the summer. The Atoka-Oklahoma City Division embraces the line between these two towns and is 100 miles in length. Construction of a line from Atoka to Denison, Tex., would also be included in the electrification program, thus affording a connection with the Texas lines of the Texas Electric Railway (the consolidated Strickland lines). This would afford an electric line from Waco, Tex., to Oklahoma City, a distance of considerably more than 300 miles.

No More Trolleys in Newburgh

The Newburgh (N. Y.) Public Service Corporation has absorbed the Hudson Transit Corporation. The former corporation is headed by Benjamin B. Odell, ex-Governor of New York State. The latter concern was controlled by Didsbury, Aber & Didsbury, Walden. With the Hudson Transit Corporation, the Newburgh Public Service Corporation acquired an additional eleven buses, giving it a total of twenty-five buses, all in operation. Fourteen are Fifth Avenue Coach Company buses; eight Mack buses and three Dodge Brothers buses. The two latter came in with the Hudson Transit Corporation purchase. Daniel G. Aber has been retained as manager of the Newburgh Public Service Corporation.

The Hudson Transit Corporation had been an inland passenger carrier in Orange County, and enjoyed numerous operating privileges, one giving the right to the company to run south from Newburgh to Nyack. The buying concern is keeping alive all of the franchises, and plans to develop them even further inland during the coming summer.

On March 31 the three remaining trolley cars were taken off the streets of Newburgh, making it exclusively a bus city. According to officials of the Newburgh Public Service Corporation, 33 per cent more persons have ridden in buses during the past winter when they were put on routes, than rode in trolley cars during the similar period in 1922. A bus terminal 200 ft. x 25 ft. is now in course of construction by the Newburgh bus concern. Five additional buses have been ordered from the Fifth Avenue Coach Company.

Service Greatly Improved in Des Moines

Another good illustration of the consistent efforts which the Des Moines (Ia.) City Railway is making to provide satisfactory service to its patrons is the announcement that the company will shortly start crosstown service. Two lines will be linked into the crosstown service within a very short time and it is planned to extend the system gradually over a majority of the lines in the city. For some time the congestion in the loop district has been a decided traffic problem and this has been particularly true during such emergencies as parades. At such a time it has been practically impossible to restore service to its normal state short of several hours. Des Moines tried crosstown service on one or two lines several years ago but it was abandoned.

Concrete evidence that the city is appreciating the efforts for good service which the company is making is contained in a highly complimentary editorial which appeared in the Des Moines *Daily Capital* recently. The editorial compared the experiences of Des Moines and Seattle in dealing with their railway problems, much to the disfavor of the Washington city which took over the car lines.

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Another Ohio Railway Starts Interurban Bus Service

Bus operation by the Indiana, Columbus & Eastern Traction Company in Ohio, held in abeyance pending action by the State Legislature on the motor-bus licensing and regulatory bill, was started between Columbus and Zanesville on April 8, following adoption of the bus measure a few days before. The Columbus-Zanesville bus service supplements the regular electric railway service. It is the forerunner of other bus lines in Ohio to follow the regular routes of the electric railway and to be operated between the periods at which cars on the traction line leave the terminal.

Copies of the new schedule have been filed with the Public Utilities Commission, together with tariff rates, as required by the new state law. The bus service is under the general management of R. L. Jacobs, Springfield, who has been relieved from duty as dispatcher in the Springfield offices of the traction company.

The bus company, known as the Zanesville & Dayton Motorbus Company, was organized several weeks ago, as outlined in a previous number of the ELECTRIC RAILWAY JOURNAL, for the expressed purpose of helping the traction company in its campaign against outside bus competition which had been making extensive inroads into its revenue. Terminals of the traction line are used as stations in the various cities by the buses.

Conductor Tenders Dinner to Co-employees of Carhouse

At Louisville, Ky., on March 22, an unusual event took place. One of the conductors at the Market Street carhouse, C. W. Wingate, gave a dinner to the seventy-odd employees of the carhouse and to all of the officials of the transportation department.

There are nine carhouses in Louisville and for the past few years President J. P. Barnes has been giving a dinner to men at the carhouse operating the greatest number of car-miles per accident during the preceding month. When a carhouse won the accident elimination contest two months in succession the ladies were invited to attend and a special dinner and special entertainment were provided.

The Market Street carhouse won the contest for the month of January. At the dinner which was given early in February Conductor Wingate announced that his pride in his carhouse and his interest in the welfare of the company were such that if his carhouse won the contest for the month of February, he would give a dinner to all the employees of his carhouse, at his own expense, in addition to the dinner President Barnes gave to the employees and their ladies.

Mr. Wingate's carhouse came in an easy winner for the month of February and President Barnes was host to the men and their ladies on March 19. On March 22, Conductor Wingate gave his dinner at the Market Street carhouse. He had as his guests seventy trainmen and carhouse employees and twenty-five or thirty officials and employees of the transportation department.

Director of Safety Neil W. Funk acted as toastmaster for the dinner and in addition to addresses by the various transportation department officials Conductor Wingate made a very able address on the necessity of furthering the efforts of the company in accident elimination.

Suburban Fare Increased at Dallas

The Dallas (Tex.) Railway has increased fares from the city of Dallas into Highland Park and from Highland Park into the city of Dallas. Highland Park is a suburb adjoining the city of Dallas on the North. It has a separate municipal government from that of Dallas.

The fare to and from Highland Park will be 8 cents, while the rate in the city of Dallas remains 6 cents. The increase in fares was approved by the City Council of Highland Park after an agreement with officials of the company that the company would bear its share of paving and make other specified improvements. The matter of paving had been in litigation between Highland Park and the company.

Passengers boarding cars in Dallas pay cash fare of 6 cents or present transfers. After crossing the Katy Railroad on Knox Street (Highland Park city limits) conductors announce that all passengers leaving cars after passing into Highland Park shall deposit 2 cents each in the fare box. Passengers boarding cars after crossing the Katy Railroad pay 6 cents. To these passengers transfers are issued which they surrender when leaving cars, as an indication that they are passengers who boarded cars of the company within the city limits of Highland Park.

Children under twelve years of age boarding cars in the city of Dallas pay 3 cents and deposit 1 cent on leaving cars in Highland Park.

Day students attending S. M. U. pay regular fare in the city of Dallas, and on leaving cars at S. M. U. (north of Mocking Bird Lane) show special students' cards. No additional fare is collected on presentation of this card.

Passengers boarding cars in Highland Park, coming to the city of Dallas, deposit 8 cents in the fare box. Passengers, however, who do not intend to come to the city of Dallas are permitted to ride for 6 cents.

Students boarding cars at S. M. U. (north of Mocking Bird Lane) are permitted to ride on 6-cent fare or students' tickets upon presentation of students' cards.

Children under twelve years of age boarding cars in Highland Park, coming to the city of Dallas, pay 4 cents. Children under twelve years of age who do not intend to come to the city of Dallas are permitted to ride for 3 cents.

Service and Number of Runs Increased

A new grouping of cars of the various divisions has been completed by the Los Angeles (Calif.) Railway, so that all cars of a line run out of the same division, and are under the direction of one division superintendent. Heretofore, most of the lines have been divided between two divisions with a resulting division of responsibility over the crews by division superintendents. New schedules on all lines were prepared and a general choice of runs according to seniority was conducted.

The rearrangement has increased service and has enabled the schedule department to build an increased number of runs. By placing all cars of a line at one division, it has been possible to join morning and evening trippers and increase the midday service, so as to make an additional number of desirable runs. Trainmen are given the option of working six or seven days a week.

The new plan of operation was put into effect by the company on April 1.

Will Start Bus Service.—Southern Indiana Gas & Electric Company, Evansville, Ind., will operate a bus service between Dixon, Ky., and Henderson.

Bus to Replace Railway.—The Richmond-Fairfield Railroad, operating from Richmond, Va., through Fair Oaks, Seven Pines and to the National Cemetery, has announced that on the completion of the Nine Mile Road concrete paving it will substitute buses.

"Technology Review" Reprints "Journal" Article.—The *Technology Review* reprinted in its April number the article and photograph of J. P. Barnes, recently published in the ELECTRIC RAILWAY JOURNAL. The story was published in the JOURNAL on the occasion of Mr. Barnes' election as head of the Central Electric Railway Association.

San Antonio Would Bar One-Man Cars.—The City Council of San Antonio, Tex., has adopted an ordinance barring the use of one-man cars in that city. Passage of the ordinance brought a protest from W. C. Tuttle, president of the San Antonio Public Service Company, who declared that enforcement of the ordinance would bring about a condition that would demand an increase in fares, as his company could not operate double crew cars and meet operating costs under the rate.

Accident Warnings in Davenport.—Coincident with the "safety week" to be undertaken in Davenport Ia., under the auspices of the good roads committee of the Chamber of Commerce, the Davenport police department and traffic squads, the Tri-City Railway is launching its own safety campaign. Large posters of warning to pedestrians and patrons of the lines are being installed in all the cars on the Davenport lines calling the attention of all who ride to the necessity of being continuously alert to guard against accidents. The warning signs will be changed weekly.

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Personal Items

Mr. Wales at Winnipeg

Engineer of Wide Experience Appointed to Important Post with Winnipeg Electric Railway

M. W. Wales has been appointed engineer of maintenance of way and structures for the Winnipeg (Man.) Electric Railway in succession to S. Wilkins, who resigned last November and is now in Los Angeles, Calif.

Mr. Wales is a technical graduate in naval architecture, marine and civil engineering, with fifteen years of practical experience. From June, 1907, until September, 1909, he was employed by the Pennsylvania Tunnel & Terminal Railway, New York City, as instrument man on the construction of the East River tunnels and Sunny Side yard.

M. W. Wales

In this capacity he had charge of survey parties on tunnel excavation, concrete lining, track layout, etc.

After a year of private engineering practice in New York City, Mr. Wales, in 1910, was appointed engineer inspector of the Board of Water Supply, New York City, on the construction of Kensico dam and appurtenances. This work included the construction of 8 miles of relocated state highway, three reinforced concrete bridges, one of which was a five-span arch-design, 1,000 ft. between abutments. The dam proper was a cyclopean masonry structure with cut-stone and precast concrete block facings, with a three-span cut-stone arch bridge over spillway, and all roadways, walks, etc., paved with asphalt blocks.

From April, 1917, to August, 1918, he was engaged on naval architecture for the Continental Shipbuilding Corporation, New York City, and from August, 1918, until his connection with the Winnipeg Electric Railway he was employed by Fraser-Brace, Ltd., contractors, Montreal, first as engineer and assistant superintendent in charge of construction on a hydro-electric development for Price Brothers, Ltd., at Chicoutimi, Que., and later as construction engineer on the Great Falls development built for the Manitoba Power Company just outside Winnipeg. In connection with the Great Falls development, Mr. Wales had charge of the layout and construction of the transmission tie line and had charge of all the form and concrete work, reinforcing steel, etc., for the power house and dam.

J. H. Klinck to Supervise Westinghouse Production

J. H. Klinck has been appointed assistant supervisor of production of the Westinghouse Electric & Manufacturing Company. After completing a course in electrical engineering at Cornell, Mr. Klinck took up post-graduate work at the same institution, but before he had finished the course he received an appointment as instructor in electrical engineering at Lehigh University, where he continued his post-graduate studies. Some years later, as electrical engineer for the Lehigh Valley Railroad, he was closely associated with the installation of power, heating and lighting equipment in the various repair shops of that road.

In 1904 Mr. Klinck became connected with the Westinghouse Electric & Manufacturing Company in the industrial and power sales department as commercial engineer on railway shop equipment, with headquarters at East Pittsburgh. In 1910 he was transferred to the Atlanta sales district and was located first at Charlotte, N. C., and later at Birmingham, Ala. He was manager of the industrial and power division for the Atlanta territory for several years.

In 1918 he entered the army as a major in the construction division. He served as chief of the procurement section of the construction division, acting chairman of the board of claims of that division, and as one of the army representatives on the War Industries Board, being chairman of the army commodity committee on steam and electric equipment. Upon his discharge from the army in 1920, Mr. Klinck returned to the employ of the Westinghouse Electric & Manufacturing Company at East Pittsburgh.

S. M. Quinn has been appointed chief engineer of the Batavia power plant of the Chicago, Aurora & Elgin Railroad. Mr. Quinn, in this capacity, succeeded J. F. Martin, who has resigned to accept a position in the coal industry. The new engineer for the Chicago, Aurora & Elgin property goes from the Ford Motor Company at Detroit, Mich., where he performed the duties of engineer. This new appointment became effective on April 1, 1923.

Mr. Simonds in New York

Vice-President and General Manager at Dubuque Joins Electric Bond & Share Organization

O. H. Simonds has resigned as vice-president and general manager of the Dubuque (Iowa) Electric Company to accept an important position with the Electric Bond & Share Company, New York, one of the largest owners and operators of utility properties in the United States. The announcement was made at the local electric company's office on April 12.

Recently Mr. Simonds was elected vice-president and director of the Dubuque Electric Company. He has long been called the "Sphinx" by Dubuquers who know him. He does things for the interest of the company and the betterment of civic interests and says nothing. That's the reason for the sobriquet. When his activities are discovered he still maintains a discreet silence and lets actions and figures speak for themselves. His efforts to hide his light of genius under a bushel fail, however, to keep it concealed.

O. H. Simonds

Mr. Simonds, unlike many other public utility executives, takes an active part in civic affairs. He has been a member of the board of governors of the Chamber of Commerce for two years and has worked strenuously for the acquisition of new industries for the city.

Mr. Simonds was born in Duluth, Minn. He was graduated with the degree of mechanical engineer from Cornell University in 1908. For seven years thereafter he was employed in various capacities with the General Electric Company, spending the last four years of that period in the lighting and railway department of the General Electric Company's Chicago office. He then resigned to enter the engineering department of Elston, Clifford & Company, Chicago, and later became general manager of the Vicksburg Light & Traction Company, Vicksburg, Miss.

While he was in that state he served two years as president of the Mississippi Section of the National Electric Light Association.

Mr. Simonds was the first president

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of the Mid-West division, N. E. L. A., comprising the states of Iowa, Missouri, Nebraska and Kansas. He served for two terms as president. He was also largely instrumental in the formation of the Iowa Committee on Public Utility Information.

He has served the Iowa Section, N. E. L. A., as president and is on the executive committee of the Iowa Electric Railway Association at the present time.

If Mr. Simonds has a hobby it is Union Park, a sylvan retreat in the hills of Dubuque County. In addition to his myriad duties he has had time to supervise the creation of this natural park, open to the autoist as well as electric railway patron, and has transformed a losing venture into a revenue producer.

Mr. Simonds will be located in New York in offices immediately adjacent to the building occupied by the Albert Emanuel Company, which recently took over control of the Dubuque Electric Company, and will thereby be able to assist materially by his advice and counsel in the completion of plans for the improvement of the local company which he had so much at heart.

His successor at Dubuque will be Thomas Parker, who comes from the Emporia, Kan., division of the Kansas Power Company, owned and controlled by the Albert Emanuel Company. Mr. Parker and Mr. Simonds are friends of long standing and associated in the activities of the Mid-West section of the National Electric Light Association. Mr. Parker is equipped technically and fitted temperamentally to continue in Dubuque the policies that have developed the Kansas properties.

New Officers Elected

As a result of the purchase by the North American Company some time ago of the Milwaukee Northern Railway, new officers for the purchased property have been elected. They are as follows: President, John I. Beggs; first vice-president, S. B. Way; second vice-president and general manager, F. W. Walker; assistant general manager, John St. John; master mechanic, Frank T. Kittsley; purchasing agent, Fred V. Benz; claim agent, A. Kordich.

Edward M. Merrill in Cincinnati

Establishment of a department of schedules in charge of Edward M. Merrill, formerly of the Philadelphia (Pa.) Rapid Transit Company, has been announced by Walter Draper, vice-president of the Cincinnati (Ohio) Traction Company. Mr. Merrill until April 1 was assistant superintendent of transportation of the Philadelphia Rapid Transit Company. He was graduated from the Massachusetts Institute of Technology in 1909. For several years Mr. Merrill was engaged with the Union Pacific Railroad as a civil engineer and then entered the employ of the Puget Sound Traction, Light & Power Company, with which company he remained from 1914 to 1918. He next became connected with the Milwaukee Electric Railway & Light Company with the title of assistant superintendent of transportation. He resigned from the company at Milwaukee to go to Philadelphia. Mr. Draper said that the department of which Mr. Merrill will be in charge was organized for the purpose of working out a complete schedule of operations of the various routes.

W. R. Dunham Made Executive Engineer of Detroit Municipal Railway

W. R. Dunham, Jr., has been appointed executive engineer for the Department of Street Railways, Detroit, Mich., reporting to the Street Railway Commission and the general manager of the municipal railway. Mr. Dunham was connected with the Department of Street Railways at Detroit in connection with the building of the new lines in 1921. In April, 1922, he was engaged by the International Steel Tie Company to do special work as assigned. In November, 1922, he was called to Detroit by the Department of Street Railways in a consulting capacity in connection with arbitration proceedings between the city and the Detroit United Railway in the matter of the rate case to determine a base and rate for the use of the city's tracks by the D. U. R. interurban passenger and freight cars.

W. R. Dunham, Jr.

Mr. Dunham has been engaged in engineering work in the electric railway field for more than thirty years. His first connection with the industry was as a student in an engineering office in Providence, R. I., where work was done for the Union Railroad, a horse railway of that city. When the railway organized its own engineering department Mr. Dunham joined it, and as the system developed he was rapidly promoted. When, in 1893, the Union Railroad was merged in the United Traction & Electric Company he became principal assistant in track matters.

In 1902, when the United Gas Improvement Company took over the Providence property and formed the Rhode Island Company, Mr. Dunham's duties were radically changed for a time. Due to his familiarity with the layout of the property he was assigned to develop a system of transfers, for which purpose a new department was formed. However, two years later he went back with the engineering department in charge of all civil engineering matters.

In 1906 Mr. Dunham went to New Haven to become assistant engineer in the maintenance-of-way department of the Consolidated Railway (now the Connecticut Company), becoming engineer of maintenance-of-way in July, 1914. In this position he did most valuable construction, maintenance and valuation work.

V. W. Burley Becomes General Superintendent

Announcement has just been made of the promotion of V. W. Burley to the position of general superintendent of the Binghamton (N. Y.) Railway effective on April 1.

For the past thirteen years Mr. Burley has been connected with the Binghamton Railway, having first entered its employ as a conductor in 1910. Prior to that he had been with the Pennsylvania Railroad for ten years. At Binghamton Mr. Burley has been conductor, inspector, dispatcher and claim agent. In 1917 he became superintendent of transportation, and he has held that position until his present promotion.

Thomas Larimer has succeeded Otis McCormick as secretary and auditor of the Southern Cambria Railway, Johnstown, Pa.

Garfield Scott has succeeded C. R. Warden as general counsel of the United Gas Improvement Company, Philadelphia, Pa.

Amzi Smith has assumed the position of vice-president of the Johnston City (Tenn.) Traction Corporation, in addition to his duties as general manager.

Lewis A. Keen has been added as vice-president to the Ponce (Porto Rico) Electric Company. In this capacity he will work along with Marcey L. Sperry, who is also a vice-president of that property.

C. B. Brownell has succeeded Best Shaw as engineer of the power Station of the Burlington (Vt.) Traction Company. The new engineer of overhead construction is Frank Warner, who succeeds N. Young.

G. L. Enfors has succeeded M. T. Montgomery as superintendent of the Porto Rico Railway, Light & Power Company, San Juan, Porto Rico. C. B. Castro has succeeded A. Jimeney as purchasing agent of that company.

Sam Smith is now engineer of overhead construction of the Ephrata & Lebanon Street Railway and the Ephrata & Lebanon Traction Company, which operates the former railway property. Mr. Smith's office is located in Reistville, Pa. George E. Carson was

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formerly manager of overhead construction of both properties.

J. L. Alexander, manager of the Keokuk (Iowa) Electric Company, will be transferred to the Haverhill (Mass.) Gas & Electric Company as manager. Mr. Alexander has been in Keokuk three years.

Miss Florence A. Snyder has been appointed auditor of the Marion & Bluffton Traction Company, Bluffton, Ind. The appointment became effective on April 1. Miss Snyder was formerly cashier and bookkeeper of the company.

Herbert B. Reynolds, mechanical-research engineer in the motive power department of the Interborough Rapid Transit Company, New York City, has been appointed secretary of the power division of the American Society of Mechanical Engineers for 1923.

William T. Crawford has succeeded George A. Peirce as secretary of the Rio Grande Valley Traction Company, the Northern Texas Traction Company, the Houston Electric Company and the Tarrant County Traction Company, all Stone & Webster properties. Mr. Crawford is located in Boston, at the main office.

Charles Fields has been appointed superintendent of the Morris County Traction Company, Morristown, N. J. Mr. Fields was with the New York & Queens County Railway, Long Island City, as chief inspector for seven years. In that same capacity he served with the Binghamton (N. Y.) Railway for five years. He was also associated with the J. G. White Management Corporation for eighteen months.

H. J. Sheeran some time ago was appointed assistant to the general manager for the receiver and secretary for the receiver of the New York Railways. In that position he succeeded F. T. Wood, who resigned to accept the position of president and general manager of the Fifth Avenue Coach Company. Mr. Sheeran has been connected with the New York Railways and its predecessors for more than twenty years. During that period he was associated with Mr. Wood in executive and operating capacities.

Frederick W. Gnichtel has been appointed by Governor Silzer as a member of the Board of Public Utility Commissioners of New Jersey. He will succeed Harry Bacharach, Republican, Atlantic City, whose term has expired. The appointment is for six years, at $12,000 annually. Judge Gnichtel was admitted to the New Jersey bar in 1893. Chancellor Walker appointed him an advisory master of the Court of Chancery a year ago. Mr. Gnichtel was formerly Mayor of Trenton. He is a Republican.

Clement Studebaker, Jr., has been elected a director of the Mississippi Valley Trust Company, St. Louis, Mo. Mr. Studebaker is the son of the late Clement Studebaker, Sr., financier and automobile manufacturer. He is identified with large public utility properties in Indiana, Illinois and Missouri, and is president of the Citizens' National Bank of South Bend, Ind. He is the chairman of the board of directors of the North American Light & Power Company, which it is proposed to consolidate with the Illinois Traction System into a new company to be known as the Illinois Power & Light Corporation, of which he will be president.

D. W. Snyder Heads Illinois Electric Association

D. W. Snyder, general manager of the Bloomington & Normal Railway & Light Company, Bloomington, Ill., since 1917, was recently elected president of the Illinois State Electric Association. After his graduation from Lafayette College in 1907 with an E.E. degree Mr. Snyder entered the East Pittsburgh works of the Westinghouse Electric & Manufacturing Company. The year 1909 was spent in construction work, and one year later he joined the Northampton Traction Company, Easton, Pa., as superintendent. From 1911 to 1914 he served as manager of the Clinton Gas & Electric Company, Clinton, Ill., and in 1915 he became connected as general superintendent with the Jefferson City Light & Power Company. Subsequently he was appointed to the position he now holds in Bloomington, Ill.

D. W. Snyder

Sir Henry Thornton has succeeded D. B. Hanna as president of the Niagara, St. Catherines & Toronto Railway, St. Catherines, Ont., and of the Toronto (Ont.) Suburban Railway. Major Graham Bell has succeeded A. J. Mitchell as vice-president of both properties mentioned. W. J. Oliver, who was formerly purchasing agent of the Niagara, St. Catherines & Toronto Railway, has been replaced by H. T. Brown, and Fred Jones has succeeded J. W. Walker as master mechanic of the Toronto Suburban Railway.

M. T. Montgomery, formerly general storekeeper and later "Suggestion Man" of the Pittsburgh (Pa.) Railways, has succeeded R. A. Cale as superintendent, claim and purchasing agent of the Atlantic & Suburban Railway, Pleasantville, N. J. Mr. Montgomery's railway experience began in 1898 with the Union Traction Company, which is now a part of the Pittsburgh Railways. In July, 1919, after having been manager of railways of the Monterey Railway, Light & Power Company, Monterey, Mexico, for six years, Mr. Montgomery became special assistant to the general manager of the Pittsburgh Railways.

C. D. Emmons, president of the American Electric Railway Association, is announced as one of the speakers at the session on motor buses to be held at the automotive transportation meeting of the Society of Automotive Engineers at Cleveland, Ohio, on April 26 and 27. Mr. Emmons is down on the program to speak at the session on the morning of April 27.

W. S. Wells, freight claim agent of the South Brooklyn Railway, New York, N. Y., has been appointed general freight agent. Besides his new duties Mr. Wells will continue in the capacity of freight claim agent. He started with the company in 1905 as a clerk in the freight office at Twenty-third Street. Since then he has served as agent at the Bush Docks, clerk in the main office of the freight department and as chief clerk in the office at Twenty-third Street. In 1906 he was made freight agent at Twenty-third Street and on March 1, 1920, was appointed freight claim agent. Prior to connection with the South Brooklyn property he was identified with the Philadelphia & Reading Railway.

David Elwell has been appointed manager of the New York office of Lockwood, Greene & Company, succeeding W. H. Rose. Mr. Elwell was graduated from the Massachusetts Institute of Technology in 1904. During his college years he did work for the Massachusetts Harbor and Land Commission and, after graduation, was with the Edison Electric Illuminating Company of Boston, the Westinghouse Electric & Manufacturing Company at East Pittsburgh and was superintendent on electrifications of the New York division of the New York, New Haven & Hartford Railroad, representing the electrical construction department of the Westinghouse company. The four following years he was in the sales department of the Westinghouse company in New York City and for five years was electrical engineer in the Boston office of Lockwood, Greene & Company. He was transferred to the New York office in 1920 and has been with the company in that city ever since.

Obituary

Roderick John Mackenzie, Canadian railroad man, died in Los Angeles on March 1. He was for a number of years a director of the Winnipeg (Man.) Electric Railway, from which position he resigned in 1918. Mr. Mackenzie's activities in western Canada were confined largely to steam railroad interests. His father, Sir William Mackenzie, until 1918 was the president of the Winnipeg Electric Railway and also president of the Canadian Northern Railway System.

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Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

New Car Building Plant

Missouri Car Company, with Works in East St. Louis, Ready to Engage in Construction

The Missouri Car Company, designer and builder of steel cars and auto bus bodies, plans to open its plant at Twenty-fourth Street and McCasland Avenue, East St. Louis, Ill., on April 15.

This company maintains general offices in the Chemical Building, St. Louis, Mo. It was organized about a year ago by Theodore A. Brewster, Edward S. Stebbins and others. The company is capitalized for $500,000 and has more than $300,000 invested in its large plant and the ten-acre tract on which it stands.

The building, although not constructed for the company, required few alterations to comply with the firm's plant requirements. It is situated on the Terminal Railroad Association's belt and through it has physical connections with twenty-six trunk line railroads that enter the East St. Louis gateway. On the other side of the plant is the Southern Railroad. The facilities for securing raw material are almost ideal, with the plant in the center of the East St. Louis industrial district. Electric power is obtainable from the East St. Louis Light & Power Company.

The company is equipped to manufacture electric cars of all patterns and automobile chassis. The plant has an estimated capacity of 600 to 800 street cars annually. It is expected that it will be capable of attaining quantity production within three months after starting operations. Among the other products of the plant will be a non-rollicking truck for which Mr. Brewster holds the patent. It is also planned to make a stock motor bus body, but the facilities of the company will permit the manufacture of a bus body according to any desired pattern.

Because of the uncertainty as to the date on which the plant would be in operation the company prior to April 5 had not contracted for any orders, but it has received inquiries from four large transportations systems. One Eastern company indicated its desire to order 250 cars, deliveries to be made within three months. The other inquiries were for smaller amounts.

The plant building is of semi-fireproof construction, one story high and 105 ft. by 567 ft. It has been equipped with a modern sprinkler system at a cost of $55,000. The walls and partition walls are of brick laid in cement and provided with a saw-tooth roof. The shop is divided into three principal sections, the steel shop, the wood mill and the fabricating department.

Mr. Stebbins, the president of the company, has had considerable experience in the selling and financial fields. He will direct the sales organization and handle the financial details for the company. He was formerly Western district manager for a large Cleveland industrial plant.

Mr. Brewster, the vice-president and chief engineer, was for fourteen years with the J. G. Brill Company of Philadelphia, seven years with the St. Louis Car Company and four years with the Kuhlman Car Company of Cleveland and other concerns. He has acted as plant manager, production director and chief engineer, and will be in charge of production for the Missouri Car Company. He has designed the plant so as to take full advantage of his past experience, a feature of his planning being an arrangement whereby physical handling of materials is practically eliminated, conveyors carrying wood, steel, etc., from one department to another as required.

The other officers are:

Alfred H. Palmer, second vice-president, with the George L. Dyer Insurance Agency Company; Wilbur L. McKim, treasurer, also vice-president of the Koken Companies, St. Louis, the Chisholm-Koken Barber Supply Company, New York, and Illmo Supply Company, St. Louis; Lawrence J. McKim, secretary, a graduate of Missouri University and the Washington University Law School. These officers and Dr. W. P. Henrich and A. G. Muesenfechter constitute the board of directors.

3,000-Volt D. C. Locomotives Shipped to Spain

Three of the six 100-ton, 3,000-volt electric locomotives comprising part of the $1,500,000 contract for the electrification of 40 miles of the Spanish Northern Railway were shipped by the International General Electric Company on the *S.S. Florinda* on April 9 from South Brooklyn in the presence of a party of engineers and officials, including the Spanish Consul General and his staff.

These locomotives are of particular interest since they are a somewhat novel design using three-axle instead of the usual two-axle trucks. Each locomotive is equipped with two trucks and six 400-hp. motors, giving a capacity sufficient to handle a full tonnage train up the 2 per cent grades at 22 m.p.h. On the return trip the trains will be held by regenerative electric brakes, thus saving wear on brakeshoes and wheels.

In addition to the locomotives, the contracts placed by the Spanish Company include equipment of two 300-kw. substations and material for overhead distribution for the entire electric zone. Shipment of this latter equipment has already been made and is being installed by the Spanish Company. It is understood that six additional locomotives are also on order, which will be for the most part built by Spanish manufacturers.

The photograph shows the cab of one locomotive in position on deck and the Spanish Consul and his staff standing in front of the machine.

Spanish Consul and Staff See Shipment of Locomotives Put on Shipboard

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Price of Steel Is Not Expected to Advance at Once—Production Greatest in History

A significant development of the week in trade was the announcement of an advance of 11 per cent in steel plant wages effective April 16. According to *Iron Age*, on the basis of 40 cents an hour for common labor instead of 36 cents, steel making costs are increased to the producer about $1.75 a ton. Prices to the consumer have advanced much more than this since Sept. 1 when steel works wages went up, but the great bulk of mills shipments, especially in the case of the Steel Corporation. are still at the lower prices of last fall. At 146,500 tons a day as the estimated March output for the country, steel production was at a yearly rate of 45,500,000 tons whereas the greatest year's record was 43,619,200 in 1917. Important buyers are said to be covered well ahead now. The opinion is that the 11 per cent increase in wages will not result in further advances in prices to the consumer at this time. It is said that the advance in wages had long been expected and had virtually been written into present-day prices. This is the feeling both in Pittsburgh and in Chicago.

Chilean Locomotive Order Being Filled Rapidly

The Westinghouse Electric & Manufacturing Company has recently delivered six express passenger locomotives for the electrification of the Chilean State Railways. To date, twenty of the thirty-nine locomotives included in the contract for locomotives of several types have been shipped. The substation and line material went forward during the latter part of 1922.

The State Railways officials hope to have in operation at the time of the Pan-American Exposition one section of the railway system which is now being electrified.

Metal, Coal and Material Prices

	April 10, 1923
Metals—New York	
Copper, electrolytic, cents per lb	17.625
Copper wire base, cents per lb	19.625
Lead, cents per lb	8.25
Zinc, cents per lb	7.75
Tin, Straits, cents per lb	46.625
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	6.25
Somerset mine run, Boston, net tons	3.375
Pittsburgh mine run, Pittsburgh, net tons	2.00
Franklin, Ill., screenings, Chicago, net tons	2.075
Central, Ill., screenings, Chicago, net tons	1.625
Kansas screenings, Kansas City, net tons	2.625
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft	7.50
Weatherproof wire base, N. Y., cents per lb.	19.50
Cement, Chicago net prices, without bags	$2.20
Linseed oil (5-bbl. lots), N. Y., per gal	$1.17
White lead, (100-lb. keg), N.Y., cents per lb	13.375
Turpentine, (bbl. lots), N.Y., per gal	$1.61

Rolling Stock

Detroit (Mich.) Municipal Railway is building twenty-five cars in its own shops largely from material taken over from the Detroit United Railway. The cars will be ready for service about June 1. If traffic continues to grow, more cars will be needed but no immediate purchase is contemplated.

Hydro-Electric Power Commission, Toronto, Ont., will shortly place an order for twelve cars. It is expected that this number will be made up of eight one-man two-men cars, two large interurban cars and two express cars. This number is in addition to the order placed recently for four cars of the one-man two-man type.

Schenectady (N. Y.) Railway will buy new equipment to carry out a recent order of the commission. The ruling includes the purchase of six new interurban cars for use on the Albany-Schenectady line, and the Troy-Schenectady line, and the purchase of an additional twelve cars for use in the city of Schenectady. The company is also instructed to secure one new double-truck snow plow before Nov. 1.

Danville Traction & Power Company, Danville, Va., has placed an order for five cars with the Perley A. Thomas Car Works. They are described as follows:

Date order was placed	Jan. 17, 1923
Date of delivery	June 15, 1923
Type of car	Double-truck, semi-convertible motor
Seating capacity	Forty
Total weight	32,600 lb.
Bolster centers, length	15 ft. 10¾ in.
Length over all	39 ft. 8 in.
Truck wheelbase	5 ft. 4 in.
Width overall	8 ft. 4½ in.
Height, rail to trolley base	10 ft. 11⅜ in.
Body	Steel
Interior trim	Cherry
Headlining	Agasote
Roof	Arch
Air brakes	Westinghouse Traction Brake Company
Car signal system	Consolidated Car Heating Company
Car trimmings	Bronze
Control	General Electric Company
Couplers	Pocket type
Curtain fixtures	Curtain Supply Company
Curtain material	Pantasote Company
Designation signs	Keystone Electric Service Supplies Company
Door operating mechanism	Manual
Fare boxes	Johnson Fare Box Company
Fenders or wheelguards	Consolidated Car Fender Company
Gears and Pinions	General Electric Company
Hand brakes	National Brake Company
Heater equipment	Consolidated Car Heating Company
Headlights	Golden Glow
Lightning arresters	General Electric Company
Motors, type and number	Four GE No. 265
Motors	Inside hung
Registers	International
Sanders	Air
Sash fixtures	O. M. Edmonds
Seats	Heywood Brothers & Wakefield
Seating material	Wood slat
Slack adjuster	American
Step treads	Mason Safety
Trolley catchers or retrievers	Earll
Trolley base	U. S. No. 13-E
Trucks	Taylor reduced height, 26-in. wheels
Wheels	Cast iron, 26 in.

Track and Roadway

Wisconsin Rapids (Wis.) Street Railroad will spend $8,000 during the year for additional equipment, improvements and new construction work to its system.

Market Street Railway, San Francisco, Calif., is reconstructing all four tracks on Market Street from Sansome to the Embarcadero.

Twin City Rapid Transit Company, St. Paul, Minn., will begin work at once on the laying of tracks to the site of the Ford Motor Company at High Dam. At this point a new Ford plant is soon to be started.

Lake Shore Electric Railway, Cleveland, Ohio, through general manager Coen, has signed an agreement with Fremont city officials whereby the company agrees to pay its share of East State Street improvement.

Portland (Ore.) Railway, Light & Power Company plans repairs to street car tracks in various parts of the city at a cost of $500,000 during 1923, according to F. I. Fuller, vice-president of the company.

Trade Notes

Bridgeport (Conn.) Brass Company has moved its Chicago district sales office from the State Lake Building to the Wrigley Building.

Samuel P. McGough has been appointed Western sales agent of the Lorain Steel Company with headquarters at 1320 Monadnock Building, Chicago. In this capacity he succeeds Andrew Sylvester Littlefield, whose death was referred to in the ELECTRIC RAILWAY JOURNAL, issue of March 24.

The Pennsylvania Crusher Company announces the opening of a Chicago office under the management of Clinton S. Darling. Until May 1 the office will be in the Monadnock Building, after which it will be permanently in the Illinois Merchants' Bank Building, 230 South Clark Street.

Ralph W. Read, formerly with the McGraw-Hill Company as copy writer on various papers at Chicago, and later as advertising manager of *Electrical Merchandising* at Cleveland, has joined the J. A. Snyder Company, advertising agency, with offices in Chicago. More recently he was advertising manager of the F. H. Roberts Company, Boston. Mr. Read will be in charge of the technical department created and equipped to render the special service required by advertisers in the equipment field.

New Advertising Literature

Irving Iron Works Company, Long Island City, N. Y., in its Catalogue 3A describes with illustrations the complete story of the fireproof ventilating flooring and Irving safstep. The pamphlet contains some seventy-two pages.

Uehling Instrument Company, Paterson, N. J., is mailing to its friends copies of a folder describing several Uehling products which have for their purpose the increase in boiler-room and turbine-room efficiency. The folder contains useful technical data in this field.

Pennsylvania Crusher Company, Philadelphia, Pa., has issued a new bulletin, No. 1005, describing the company's coal-preparation machinery, such as is used in power plants and elsewhere. The bulletin also covers primary and secondary crushers for cement, rock and limestone.

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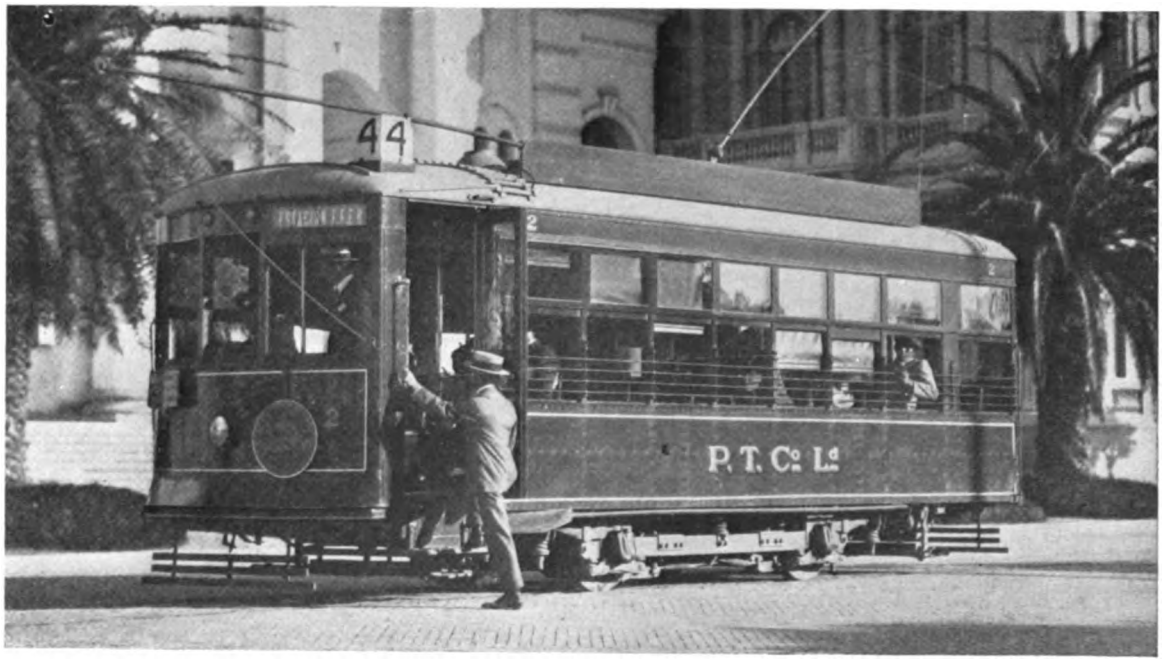

Parana, Argentine

Universal Service

The low operating cost, modern equipment, and the increased revenue resulting from their more frequent service has resulted in the universal introduction of lightweight Birney Safety Cars. In the United States, Canada, Mexico, Brazil, Argentine, Colombia, Holland, Manchuria and Australia, it is being demonstrated that with the little Birney Safety Cars more service can be furnished to the public at less cost.

Pelotas, Brazil

Petropolis, Brazil

THE J. G. BRILL COMPANY
PHILADELPHIA, PA.
AMERICAN CAR CO. ST. LOUIS MO. — G. C. KUHLMAN CAR CO. CLEVELAND, OHIO. — WASON MANF'G CO. SPRINGFIELD, MASS.

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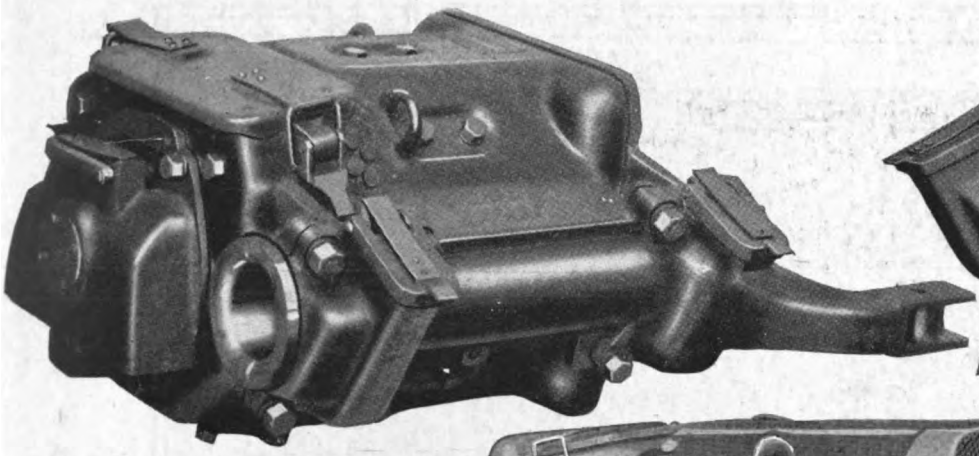
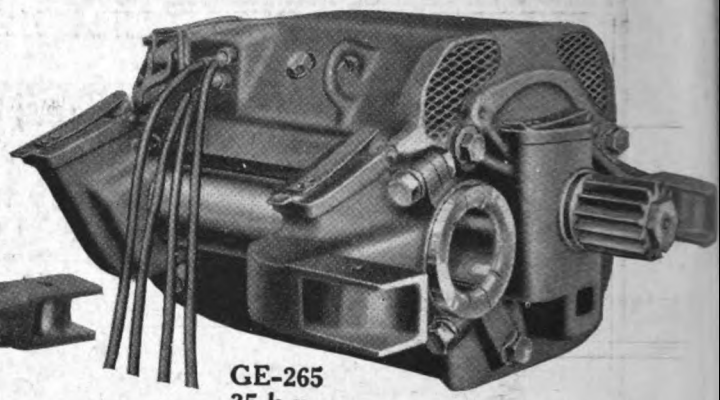
G-E Modern Railway Motors



GE-264
25 h.p.



GE-265
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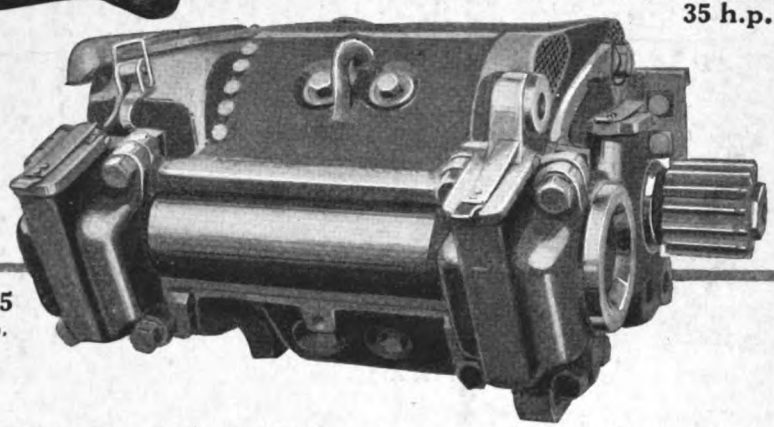
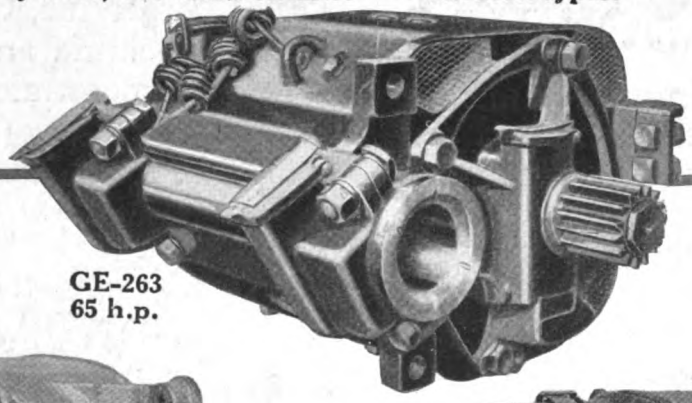


GE-275
60 h.p.

These six standard G-E Motors will meet the motive power requirements of any city, suburban or interurban service. On an average they cost, for maintenance and inspection, only $35 per motor per year. Consider the economy accruing from replacement of your old motors by one of these modern types.



GE-263
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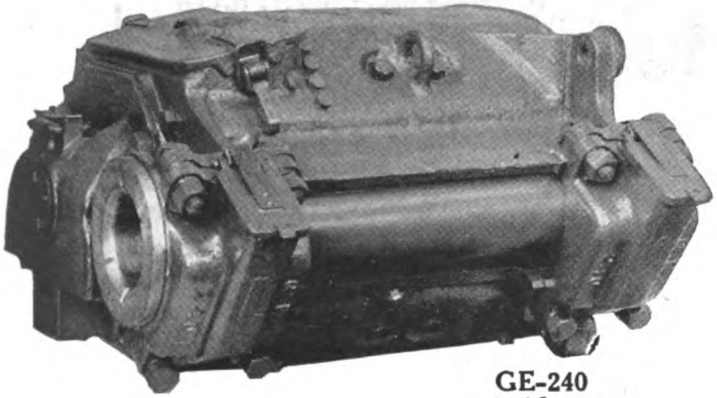

GE-240
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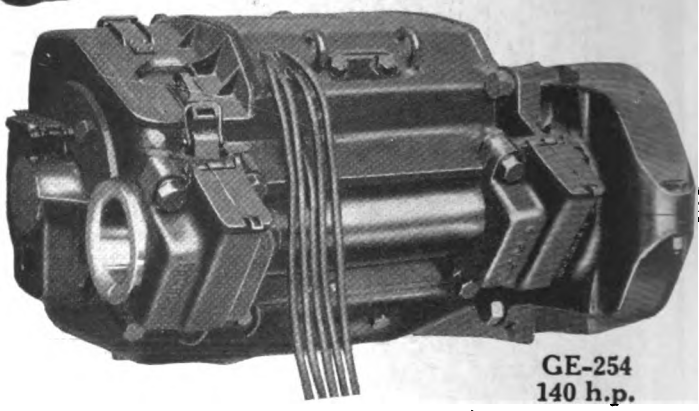

GE-254
140 h.p.

General Electric Company

General Office
Schenectady, N.Y.

Sales Offices in
all large cities

25-170

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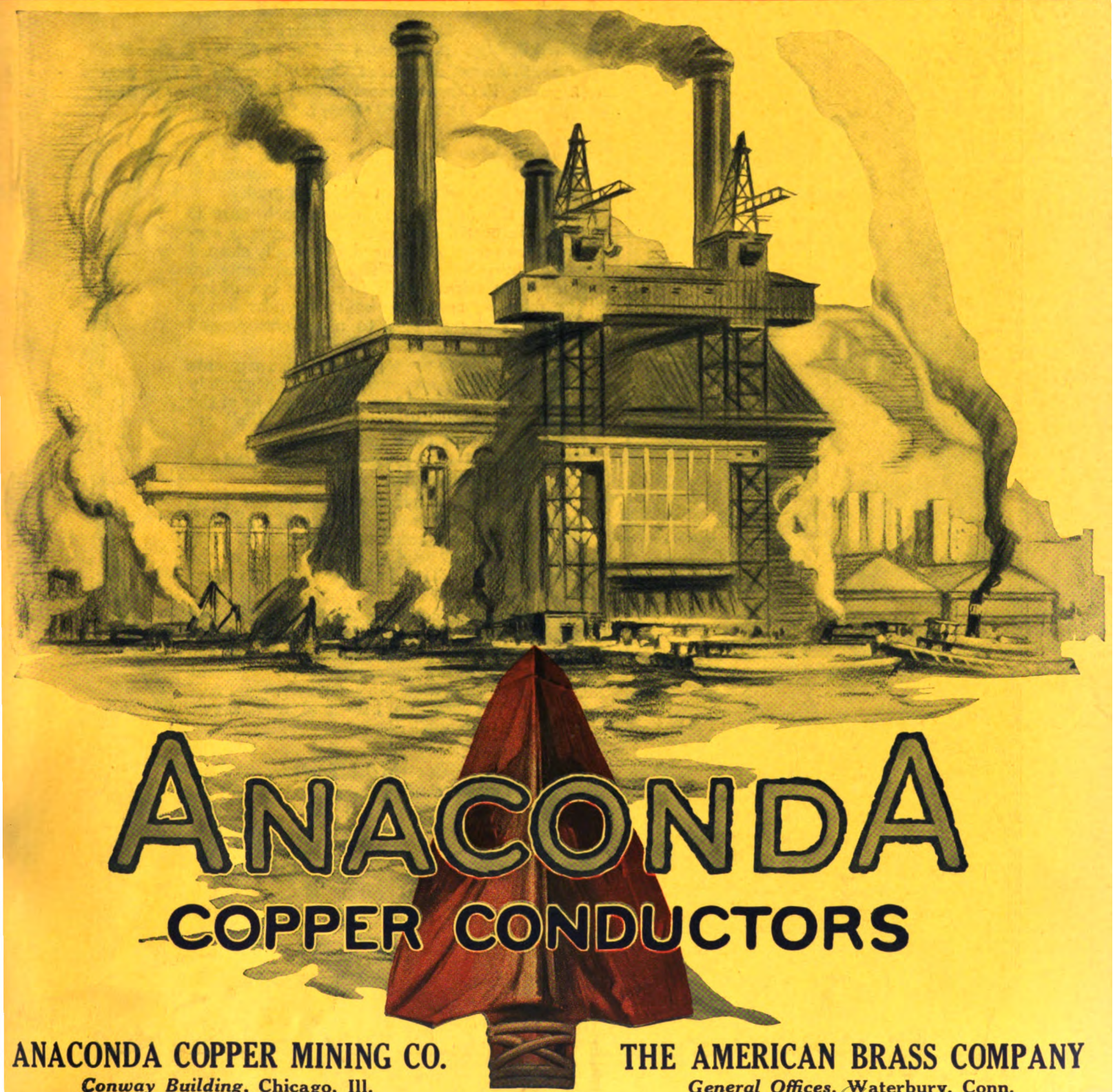
McGraw-Hill Company, Inc. April 21, 1923 Twenty Cents per Copy

MONTHLY MAINTENANCE ISSUE

ELECTRIC RAILWAY JOURNAL



ANACONDA
COPPER CONDUCTORS

ANACONDA COPPER MINING CO.
Conway Building, Chicago, Ill.

THE AMERICAN BRASS COMPANY
General Offices, Waterbury, Conn.

Mills and Factories:—Ansonia, Conn. Torrington, Conn. Waterbury, Conn. Buffalo, N. Y. Kenosha, Wis. Great Falls, Mont.
In Canada:—Anaconda American Brass Limited, New Toronto, Ontario

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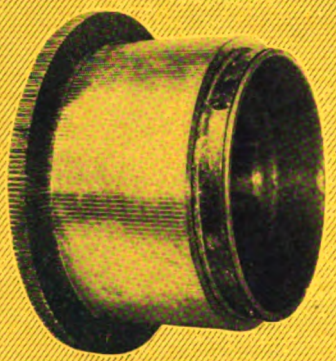
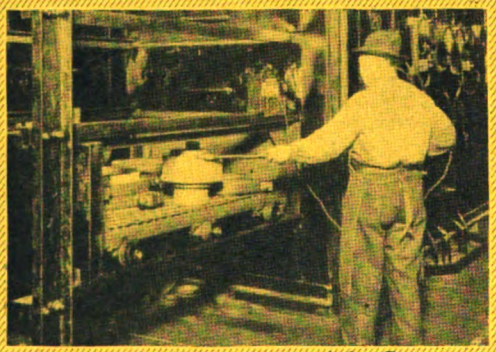
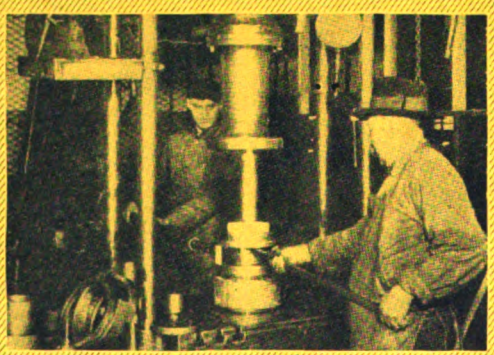
What it Means to Build A Westinghouse Commutator



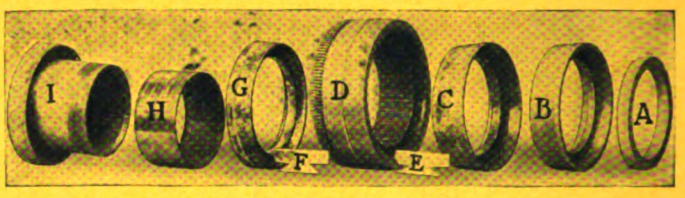
Complete Commutator.



Checking the Temperature of the Commutator with a Pyrometer before pressing.



Final tightening of Commutator while hot and under pressure.



Details of Commutator Parts

A. Metal Bushing; B. Insulating Bushing or Sleeve; C. Rear Mica "V" Ring; D. Assembled Mica and Copper Segments; E. Mica Strip or Segment; F. Copper Segment or Bar; G. Front Mica "V" Ring; H. Metal "V" Ring; I. Ring Nut.

The material used for each part entering into the construction of a Westinghouse commutator is carefully selected and of the highest grade.

During the assembling process each part is rigidly inspected and tested. The copper segments are accurately gauged, chemically cleaned and all burrs removed. The mica segments are made from mica that is free from impurities. The mica segments are built up under heavy pressure and machined to a uniform gauged thickness.

The "V's" of both the copper and mica segments after assembling are carefully and accurately machined and gauged to secure a tight fit of the metal and mica "V' rings. The "V's" are shellaced for protection from moisture.

The assembled segments are then assembled and tested for short circuits.

The assembled commutator is heated to a temperature of 125 to 150 deg. C. and, while hot, the "V's" are subjected to a pressure of from 10 to 40 tons (depending upon the size of the commutator). The locking device is then tightened.

After accurate machining, final inspection and tests are made. These include a check of the accuracy of the over-all dimensions and the tightness of the segments, also of the alignment of the segments with the keyway. Finally, a 500-volt test between bars and a 5000-volt ground test are applied.

Westinghouse Electric & Mfg. Co.
East Pittsburgh, Pa.

MEMBER ELECTRIC RAILWAY ASSOCIATION AERA

W WESTINGHOUSE ELECTRIC

Westinghouse

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ELECTRIC RAILWAY JOURNAL

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Company, Inc.

HENRY W. BLAKE and HARRY L. BROWN, *Editors*

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Electric Furnace an Economy for Maintenance Repairs

PARTICULAR interest attaches to the installation of an electric furnace in the shop of the Lehigh Valley Transit Company, Allentown, Pa., described in this issue, and the economies effected thereby.

While the general practice of manufacturing parts by an electric railway, where any considerable quantity is needed, is a very questionable economy, the very high cost of an order for a few castings of any kind is practically forcing electric railways to undertake the manufacture of these miscellaneous parts. Very few manufacturers are interested in taking these small orders, and the prices which they quote are rather clearly designed to discourage them. As a direct evidence of this the Steel Foundrymen's Association recently met in Pittsburgh and put the base price on steel castings up to 50 cents a pound on small quantities.

It will frequently cost as much to negotiate purchases, to inspect the work, to pay freight on patterns two ways and on the new casting one way, as the entire cost of the molding amounts to when done by the company itself. The railway must keep its equipment in operating condition, and where long delays are involved, as is often the case when buying these miscellaneous parts, emergency repairs have to be made, and in such cases the work is really done twice.

The Lehigh Valley Transit Company has found that the use of an electric furnace for such miscellaneous repairs has enabled it to do much useful work with a very small outlay of money. Furthermore, this has been accomplished on a property where at the outset the men were entirely without steel or iron foundry experience.

An important economy in this home casting of parts results from the fact that electric railways have large quantities of scrap, which as a rule is sold for small prices. Axle and tire turnings bring from $5 to $10 a ton. This scrap is excellent material for melting into high-grade castings which run from 50 per cent to 100 per cent stronger than cupola iron castings. A large reduction in the number of replacement castings required has resulted from the use of steel in place of iron, and as these steel castings are produced at less cost than that for which iron castings can be bought, the latter product has ceased to be of interest.

Extensive manufacturing of parts used in considerable quantity is usually done by the electric railway with fictitious economy. Either the railway does not know what its costs are or it is producing an inferior product, which will usually result in earlier and more frequent necessity for replacement, involving expense quite offsetting the seeming economy in a lesser first cost. But limited manufacture for maintenance repairs seems to have a real justification and to represent a real economy. In this work, the experience of the Allentown company would indicate that the use of the small electric furnace, with which castings weighing up to 1,000 lb. can be produced, will be found to be a great convenience and a valuable investment.

There Is Economic Necessity Behind the Wood Preservation Movement

TIMBER is being cut in this country much faster than it is being replaced. While there is still a large reserve it is going fast, and it is up to the wood-consuming industries to be familiar with all of the means available for getting the greatest possible length of life from the timber which they use. It is difficult to get this idea over unless the relation between the depletion of the timber reserve and the accompanying increase in timber cost is driven home, or unless the use of preservative methods brings about a demonstrable lessening in annual cost. No amount of abstract sentiment in favor of conservation of national resources will bring about a change in practice unless this comes through legislative enactment.

However, the reaction of depletion on prices is reasonably prompt, and important timber users are beginning to see that preservative treatment must be adopted eventually, if not now. An increasing number believe in doing it now.

Electric railways use vast quantities of wood in the form of ties, poles, bridge and trestle timbers, buildings, etc. Much of this is exposed to alternate wetting and drying under the action of the weather and thus needs protective treatment of some kind. This may be anything from a simple brush treatment with creosote or carbolineum at one extreme to an elaborate pressure treatment with these antiseptics at the other. Whatever the treatment is it will do some good, and if circumstances permit, the use of the more expensive treatment is to be preferred because in general it insures the longer life, and the longer a piece of timber lasts the less the replacement cost in terms of annual expense during its life. Brush treatment, however, is better than nothing and may lead to better practice.

Another item, sometimes lost sight of, is the fact that timber now installed at a given cost will probably cost more when replaced at the end of its life, or must be replaced with inferior material, or both; hence the economy of long life.

The American Electric Railway Engineering Association has at work this year a special committee on wood preservation. Heretofore the committee on way matters has handled the subject, but it has grown to be important enough for specialized attention. The main purpose of this committee is educational; to show the industry exactly what the facts are. The result should be increased interest, as evidenced by larger appropriations for making timber last longer.

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Paint and Publicity Help to Draw Patronage

FOR years the Manhattan Elevated lines have been giving service to New York's multitudes. Year after year the cars and structures have become dingier and dingier. The company is not altogether responsible for this. Mayor Hylan's influence excuses it of much that might seem to be shortcoming. But it is not surprising that the public began to desert the "L" when the subway was opened, with its seeming greater speed because of the noise and the fleeting walls close to the windows. The growth of the elevated traffic has not kept pace with that of the newer system. So much attention has been given the subway that the "L" has been almost forgotten, relatively, by both management and public. Furthermore, service has been curtailed so that crowding is as severe as on the subway.

Now that the financial relations between the companies have been readjusted the management has found that much can be done to increase the capacity of the elevated system. So, to develop the "L," and perhaps to relieve the subway, some 428 trains have just been added to the daily elevated schedule and express service extended from rush hours only to the entire day.

Also, a campaign has been started by the company to induce riding. The slogan "Ride on the Open Air Elevated" has been adopted. More aggressive is the adoption of a bright color scheme of orange and black to replace the combination of grime and brake-shoe dust which has long featured the car exteriors. Doubtless it will cost more with these colors to keep the cars looking well, but it is worth the price. Railways that have adopted such a policy have usually been more than repaid by more riding, improved relations with the public and better morale among employees.

"Paint, Publicity and Politeness" might well be adopted as a motto on more than one property.

Header Wall Construction for Track Paving

AS A further chapter to the editorial published in the Nov. 18 issue entitled "The Square Deal in Regard to Track Paving," it appears from the article on page 677 that at least two of the various state highway departments, those of New Jersey and Pennsylvania, in co-operation with a local electric railway, have adopted improved construction for reducing their troubles. The respective obligations of construction and maintenance in track and roadway areas are now well defined, however inequitable the various utilities may consider them. The continual improvement in design and replacement of types of track and track pavement shows the good faith and fair intent of the utilities to spare neither time nor money in the development of types of construction which will be effective in obviating trouble.

Impact is incidental to operation of car wheels over rails, and the track in paved streets will transmit vibrations from the rails to the pavement within the track area and thence to the adjoining street pavement as long as complete isolation is not effected between the track and roadway area. The State Highway Departments of New Jersey and Pennsylvania have come to the conclusion that, whatever the type of construction in track areas, whether these be rigid or semi-rigid some form of effective isolation must be provided. The relatively slight additional cost involved in the changes from standard construction is more than offset by the factor of the desirable insurance of a maximum of protection and a minimum of maintenance. It is obvious that any isolating agency or barrier to be effective must be independent of the vibrating track and its constituent parts, the paved strips adjoining the rail, which are in more or less immediate contact with the underlying ties. By the use of a barrier incorporated with the roadway slabs an opportunity is found to kill three birds with one stone. These are to protect the slab foundation from vibration, substantially to reinforce the edge of the slab and to add a very desirable element of insurance against damage by frost.

Competition as a Regulator of Fares and Service

THE advantages to all concerned when city transportation is a regulated monopoly are so evident that a reversion to the competitive plan seems a backward step. When the only public transportation was furnished by electric cars the danger of a departure from the monopoly plan was remote, because it was not easy to start a competitive line. Usually the best streets were practically pre-empted by the existing transportation system, and it was usually in such a position that it could offer to passengers a much more extended ride by a transfer system than was possible for a new company. Moreover, considerable capital is required to build an electric railway of even moderate length, and the financial institutions to which application for any such enterprise would have to be made would be apt to be conservative in regard to embarking in a competitive electric railway. The development of the autobus has changed this situation. In some cities, notably New York, there has been much talk recently of the starting of bus lines on routes competitive to electric railways, and it is often difficult to convince merchants and others, who have been used to competition in their own lines of business, that monopoly is the best plan for local transportation.

It is an interesting coincidence that the question of monopoly versus competition as regards bus service is an active one in London as well as in New York, though in somewhat different form. In its bearing on this point and also the general subject of regulation versus competition the remarks at the meeting on Feb. 22 of the London General Omnibus Company of Lord Ashfield, well known in this country, are of interest. He said, in part:

> Competition is a dangerous weapon. It may seem to offer immediate gains, but they are at the expense of future losses. This is the universal experience. Competition causes congestion on the more remunerative routes, destroys reliable services on the less remunerative routes and curtails the unremunerative routes. Competition weakens the undertaking, so that the fresh capital required for progress cannot be obtained on reasonable terms, and therefore becomes a greater burden upon the passengers who ultimately have to meet the interest charges in the fares paid. The improvements which your companies are now making are a sure consequence of the measure of prosperity which has at last come to them. Is it all again to be cast away? Competition ends in obsolete vehicles being retained in service, when they should have reached the scrap heap, and this means a poor, slow service instead of a fast one.

Much has been said in political circles in New York State and city recently about the merits of bus competition, but here is direct evidence.

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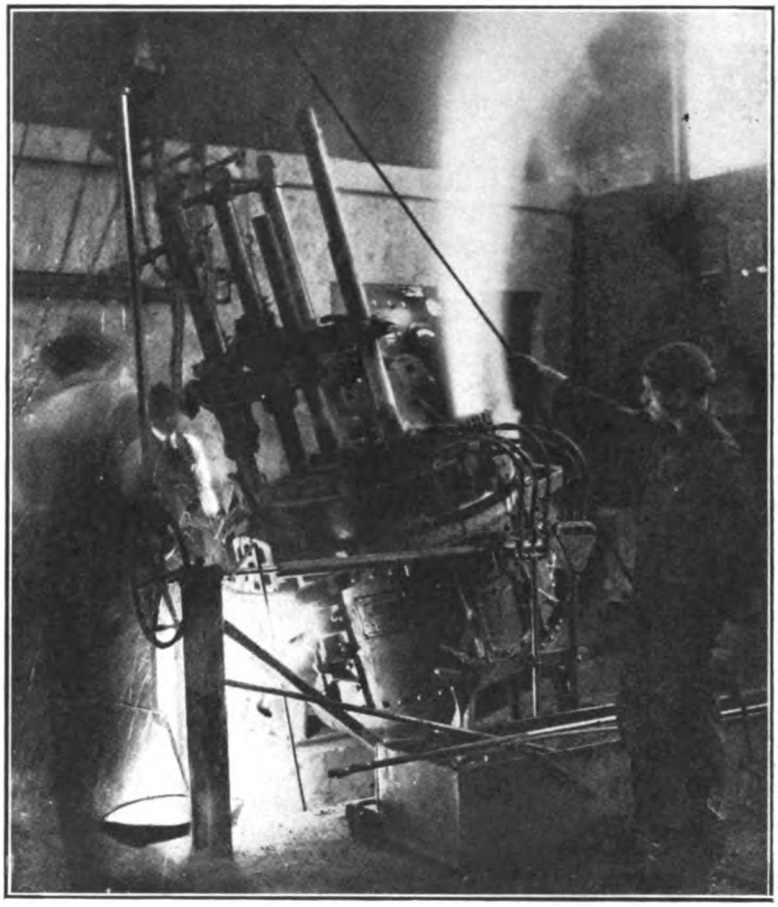
Reducing Railway Maintenance Costs with an Electric Furnace

The Lehigh Valley Transit Company, Allentown, Pa., Has Been Making the Steel Castings Necessary for Its Maintenance Repairs for Two and One-Half Years, and, in Addition to Obtaining Economies, Has Reduced Departmental Work

THE need for an electric steel furnace by the Lehigh Valley Transit Company, Allentown, Pa., for making various castings became apparent during the world war. At that time it was almost impossible to obtain steel or iron castings in the small quantities necessary for maintaining electric railway equipment, and even where manufacturers accepted orders the best delivery that could be obtained was from six to twelve months, using United States priority influence. The prices asked for castings during this period were exceptionally high, and the long time required for delivery made some emergency measures necessary in order to maintain service on the various railway lines. The installation of an electric steel furnace was thus given consideration by the officials of the railway for producing emergency castings and particularly for making a quantity of wheel bushings which were necessary. The practice of the railway, whenever wheels became worn to small diameters and still had sufficient metal for additional service, was to remove these wheels and re-turn them for smaller axles for use under cars using smaller diameter wheels. This practice required a steel bushing between the axle and the wheel in order to provide proper fit. At that time old steel scrap was selling at from $16 to $20 per ton and, considering the high price asked for steel castings, the officials thought they would be able to produce wheel bushings and emergency castings by using the old scrap at such a low cost as to be able to pay for the furnace in a very short period. An order was accordingly placed with the Pittsburgh Electric Furnace Corporation for a 500-lb. "Lectromelt" furnace. This furnace was received Oct. 1, 1920, and was placed in operation immediately so that the first casting was made Oct. 21.



Pouring Steel Into a Ladle from the Electric Furnace

When the question as to the size of furnace to be purchased was first considered, it was thought that the 250-lb. size would be satisfactory, but further consideration of the weight of other castings which were required showed the necessity of the 500-lb. size. In order that the usefulness of the furnace could be demonstrated before an excessive amount of money was used, the first installation had hand control, but provision was made in the installation so that automatic control could be added without difficulty. From the start the furnace was kept busy making small steel castings and the sizes produced gradually increased. After about a year's operation its great value was seen and the economies showed that automatic control should be installed. Accordingly, a Westinghouse type control board was purchased from the Pittsburgh Electric Furnace Corporation.

Automatic Control Installed

In addition to the electric furnace itself, other equipment necessary consists of a 200-kva. Pittsburgh Transformer Company's transformer. The power supply is three-phase, 2,200-volt, and the transformer used is both oil and water cooled. The secondary side of the transformer has low and high voltage taps. When beginning a heat the low tap is used for about five minutes, necessary connections being obtained from the switchboard by throwing a handle. After contact has been established the high tap is used to accelerate melting and after the melting is completed the low tap is again used.

The regulator panel carries the control element, the magnetically operated switches which control the electrode motors, and the necessary resistances, condensers, switches and fuses, etc. A small rheostat is mounted on the back of the panel for each electrode which the regulator is to control, and is connected in the voltage-

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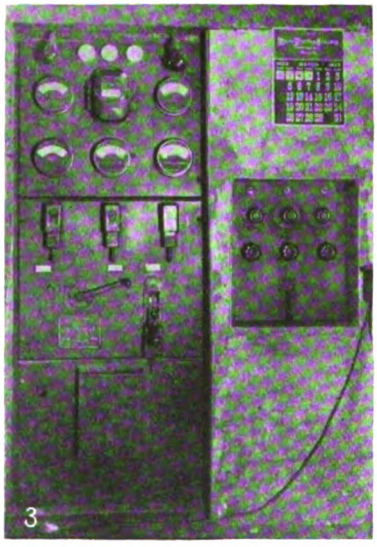
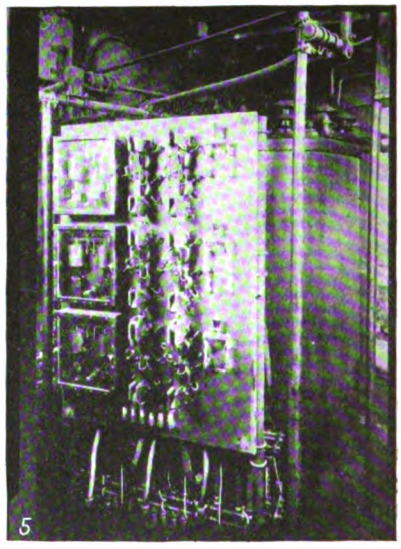


Auxiliaries to Steel Foundry Reduce Cost of Castings



No. 1—The sand mixer is an efficient help in making molds.

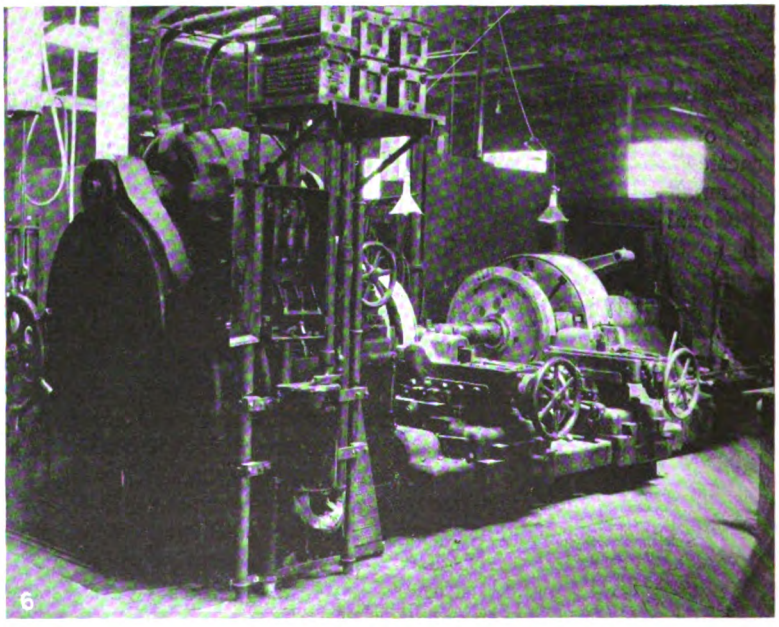
No. 2—The core room and baking oven are necessary auxiliaries.

No. 3 — The control board provides for automatic regulation and shows what is taking place in the furnace.

No. 4—Making a mold for a steel wheel by aid of the molding machine.

No. 5—The automatic control equipment is housed in a separate brick room.

No. 6—Turning a pair of cast steel wheels on a wheel lathe adjacent to the company's foundry.



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coil circuit. Its purpose is to limit the maximum current for which the rheostat on the control panel can be set. It also provides a means of balancing the current between electrodes for any setting of the rheostat on the control panel.

The regulator is particularly rapid, since an electrode speed of 2½ to 3 ft. per minute is possible under automatic control. The current can be held to within 5 per cent of its normal value. The furnace with a cold charge of steel can be placed under automatic regulation with the rheostats set at full power, and at the end of eight to ten minutes a sufficient pool of steel will have been formed to give stable electrical conditions. The freedom from having to watch regulation of the furnace allows the melting crew to give its entire attention to the metallurgical aspect of melting.

The steel is melted in the furnace from an electric arc between three graphite electrodes and the metal itself. The graphite electrodes are 3 in. in diameter and are supported by three water-cooled glands. One hundred and thirty volts a.c. is used for melting.

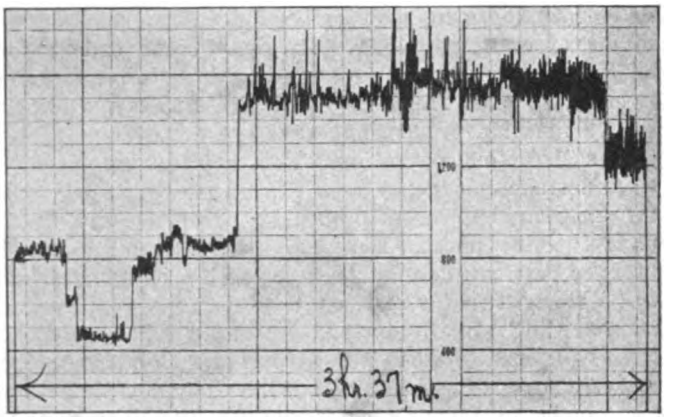
The lining of the furnace used by the Lehigh Valley Transit Company is of the acid type. Silica brick is used for both sides and roof with a ganister bottom. The furnace tub is constructed of plate steel and rests on rocker castings, so as to permit the necessary tilting for pouring. The furnace has a front spout for pouring and a charging door in the rear for loading with scrap. This rear door is also used for removing slag and for inspecting the metal during the operation of the heat.

The automatic control equipment, together with the 200-kva. transformer and a motor-generator set, is housed in a brick compartment built in the corner of the shop. This room is approximately 15 ft. square. The motor-generator set is used for supplying direct current at 220 volts to operate the various solenoids on the automatic switchboard. The control panel with necessary meters and switches is built into this compartment with the face of the control board immediately back of and to the right of the furnace. Accompanying illustrations show the interior of the control room and also the control panel, which is on the outside. The three heavy cables which reach from the wall to the furnace conduct the current to the electrodes. In addition three flexible connections conduct the water along these cables and through the glands which surround the electrodes. The connections are made so that the water passes in series through the various glands, after which it returns to a drain pipe at the wall and runs into the sewer. The tilting of the furnace is accomplished by turning a hand wheel which operates the necessary gearing for tilting as required. This tilting screw is operated by hand and pours the contents of the furnace into the ladle. From the ladle the metal is poured directly into the sand molds, which are placed within convenient radius so that they can be reached readily with a jib crane of 2-ton capacity, which serves the foundry floor, handling the ladles, castings, mold boxes, etc.

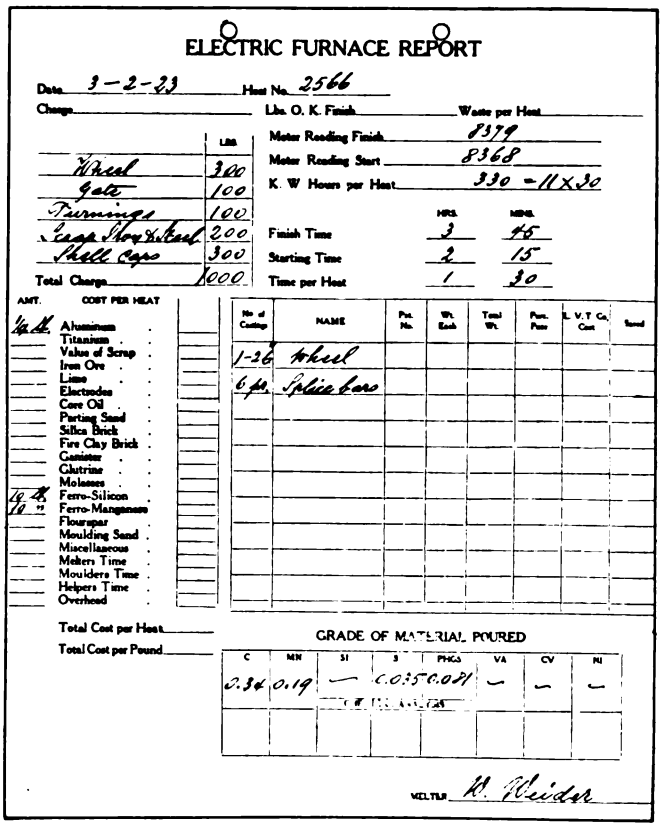
USE MADE OF THE FURNACE

The first use made of the furnace was to supply necessary wheel bushings and small castings. In the first two weeks of operation a year's supply of steel bushings could have been made up, and figuring the cost of the bushings at that time, which, as already stated, was exceptionally high due to war conditions, a saving was found sufficient to meet the entire first cost of the furnace. The field of usefulness for this furnace in supplying castings for emergency repairs was soon found to exceed all expectations. The maintenance of electric railway equipment requires a large number of castings, which are essentially not wearing parts and so are required in small quantities, the requirements often consisting of from one to less than ten castings at a time. Manufacturers apparently are not looking for this type of business and direct their attention particularly to obtaining orders where large quantities of the same castings are required. Consequently the prices asked for castings of this nature, singly or in small quantities, are exceptionally high.

In many cases these castings are required for old or obsolete equipment, so that the manufacturers have to make up new patterns, and as the quantity required is small, of course this increases the price considerably. There is also a very long time required for the making of the pattern and the producing of the casting, so that even where particular attention is given toward



Graphical Chart of Power Input of Electric Furnace



ELECTRIC FURNACE REPORT

Date 3-2-23 Heat No. 2566

Charge Lbs. O. K. Finish Waste per Heat

	Lbs.
Wheel	300
Gate	100
Turnings	100
Scrap Shop & Steel	200
Shell Caps	300
Total Charge	1000

Motor Reading Finish 8379

Motor Reading Start 8368

K. W. Hours per Heat 330 = 11 x 30

	HRS.	MINS.
Finish Time	3	45
Starting Time	2	15
Time per Heat	1	30

AMT.	COST PER HEAT
1/4 lb.	Aluminum
	Titanium
	Value of Scrap
	Iron Ore
	Lime
	Electrodes
	Core Oil
	Parting Sand
	Silica Brick
	Fire Clay Brick
	Ganister
	Glutrine
	Molasses
10 lb.	Ferro-Silicon
10 "	Ferro-Manganese
	Flourspar
	Moulding Sand
	Miscellaneous
	Melters Time
	Moulders Time
	Helpers Time
	Overhead

No. of Castings	NAME	Pat. No.	Wt. Each	Total Wt.	Pure Pure	L. V. T. Co. Cost	Saved
1-26	Wheel						
6 pr.	Splice bars						

Total Cost per Heat

Total Cost per Pound

GRADE OF MATERIAL POURED

C	MN	SI	S	PHOS	VA	CV	NI
0.34	0.19	—	0.035	0.081	—	—	—

MELTER W. Weider

Report Blank Used in the Electric Steel Foundry

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delivering these as soon as possible, the time still remains exceptionally long. In many cases orders for small quantities are not followed up to obtain short deliveries, so that frequently railways wait from six to twelve months for castings that are quite essential to give satisfactory operation. This has left many roads to undertake emergency repairs by welding or patching up parts so that the equipment can continue in service until the new part is received. This method of maintenance requires double the labor as the equipment has to be brought in for making the emergency repairs and then has to be again shopped for the installation of the new equipment when it is received. Sometimes the material after it is received is not found satisfactory and must be returned, and frequently entirely new castings must be made. By having a small electric furnace, the railway is relieved of a wonderful amount of worry and trouble, and in addition by making the castings themselves the railway obtains fairly correct material at a very low figure.

In Allentown castings for emergency repairs are produced and placed in service in much less time than it would take to put through an order. In order to take care of the emergency repairs, railways are carrying stocks of material, some of which are not called for over long periods. By being able to make such castings themselves, the stores department is thus relieved of the necessity of carrying large amounts of material, which on some systems run into many thousands of dollars. Much unnecessary correspondence is also prevented. Thus, in placing an order it is usual first to ask for bids, and after these have been checked by the various departments there is considerable routine work necessary to place the requisition, order, invoice and payment in operation. Frequently much additional correspondence is necessary before the castings are received, and where these are found unsatisfactory additional work is entailed. In addition to relieving the various departments of this work, the cost of trucking castings from the freight station to the shop is done away with, and also the payment of necessary freight bills.

The big field then for the use of a small electric furnace appears to be in taking care of such requirements as are essentially a maintenance proposition rather than a manufacturing proposition. Of course, where large quantities are required, manufacturers are in position to turn out the work much more speedily and the cost should be less and the product superior.

Amount of Work Done in Allentown

During the two years and a half that the electric steel furnace has been in operation in the shops at Allentown 2,600 heats have been completed, and the operators have been particularly successful in producing steel castings of a very fine quality. At first considerable attention was given to tests and to the analysis which would show the grade of material poured, but experience has enabled the operators to tell in advance the various metals required in the charge to give the material desired. The foundry force at present consists of twelve men, and six heats are poured per day. While the furnace is a 500-lb. size, it is being continually overloaded, and heats of from 600 to 800 lb. are being poured constantly. In emergency cases castings weighing 900 and 1,000 lb. have been made. The number of heats that could be made per day could be increased from these figures if necessary, as it is found that the first can be produced in approximately one hour's time and following heats can be run off at from forty-five to fifty-minute intervals.

The material used for charging the furnace in Allentown is entirely old scrap, such as scrap wheels, steel turnings, machine shop turnings, old brake shoes, or whatever scrap may be on hand. Of course, the various parts and quantities which constitute a charge are carefully selected so as to give the desired grade of material. The large scrap parts, such as wheels, have to be cut up into pieces approximately 12 in. square. This is done with an acetylene cutting outfit. In charging the furnace at Allentown large chunks of metal are usually placed at the bottom with some fine turnings on top. The melting process is thus started more easily and the arcs which melt the metal play between the electrodes and the metal itself. When the metal is hot necessary additions are made as required. The various quantities of scrap are carefully weighed before they are placed in the furnace.

Large Variety of Castings Made

A list of the castings made in the steel foundry of the Lehigh Valley Transit Company would occupy several pages. Some of the principal ones include such castings as brake hangers, brake shoe heads, third rail shoes, gusset plates, center plates, side bearings, clevices, filler blocks, bushings of all descriptions, bearings, housings, door step treads, spring seats, several types of brake jaws, truck guides and steel wheels. As required, of course, all necessary castings can be turned out, which electric railway operators will appreciate include a very large variety. In addition to the equipment used for rolling stock repairs, the foundry in Allentown also makes filler blocks, sewer grates and miscellaneous track department castings, among which are several complete special trackwork parts. A description of the manufacture of these will be described in another article. A large variety of castings is also made for the line department, and, in fact, the electric steel furnace provides castings for all the departments of the railway. The Lehigh Valley Transit Company has two amusement parks, and there is a large variety of equipment in these which require maintenance, and the steel foundry has been found of particular value for these.

An undertaking of this kind by an electric railway, which is quite out of the ordinary, of course, has been followed very closely by the management, and detailed costs have been made very carefully and conservatively so as to make certain that no one was misled as to any economies produced. These costs show that during the period of operation steel castings have been produced at such a low cost that cast-iron as a material for the railway has really ceased to be of interest, since the steel castings produced are much stronger and more reliable than either malleable iron or the cast iron which has heretofore been used in the electric railway maintenance. The malleable iron market has been very irregular during the past few years. Prices were high, and deliveries very unsatisfactory and irregular.

Some of the beneficial results obtained from replacing cast iron with steel are of interest. The track department uses a considerable number of grates for sewer covers, which were previously made of cast iron. The practice was to order these from a particular manufacturer who had patterns for the type and size required, and so no consideration was given to the material used. With the introduction of the steel furnace

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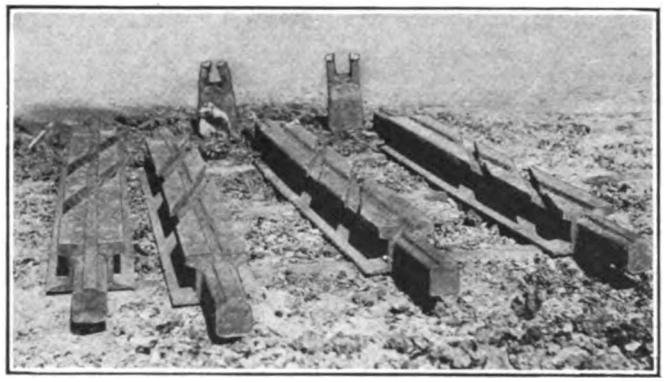
some grates were made for replacement in the steel foundry. At first a considerable number were required for replacement, but the orders for new grates decreased quite rapidly. An investigation showed that maintenance replacement consisted entirely of replacing broken iron gratings. By the use of steel the gratings did not break and so the demand for new castings decreased as the number of steel gratings increased. While these gratings were no doubt of sufficient strength when they were first introduced, the increase in traffic and in the capacity of trucks which operate through the streets made them of insufficient strength to withstand the increased load.



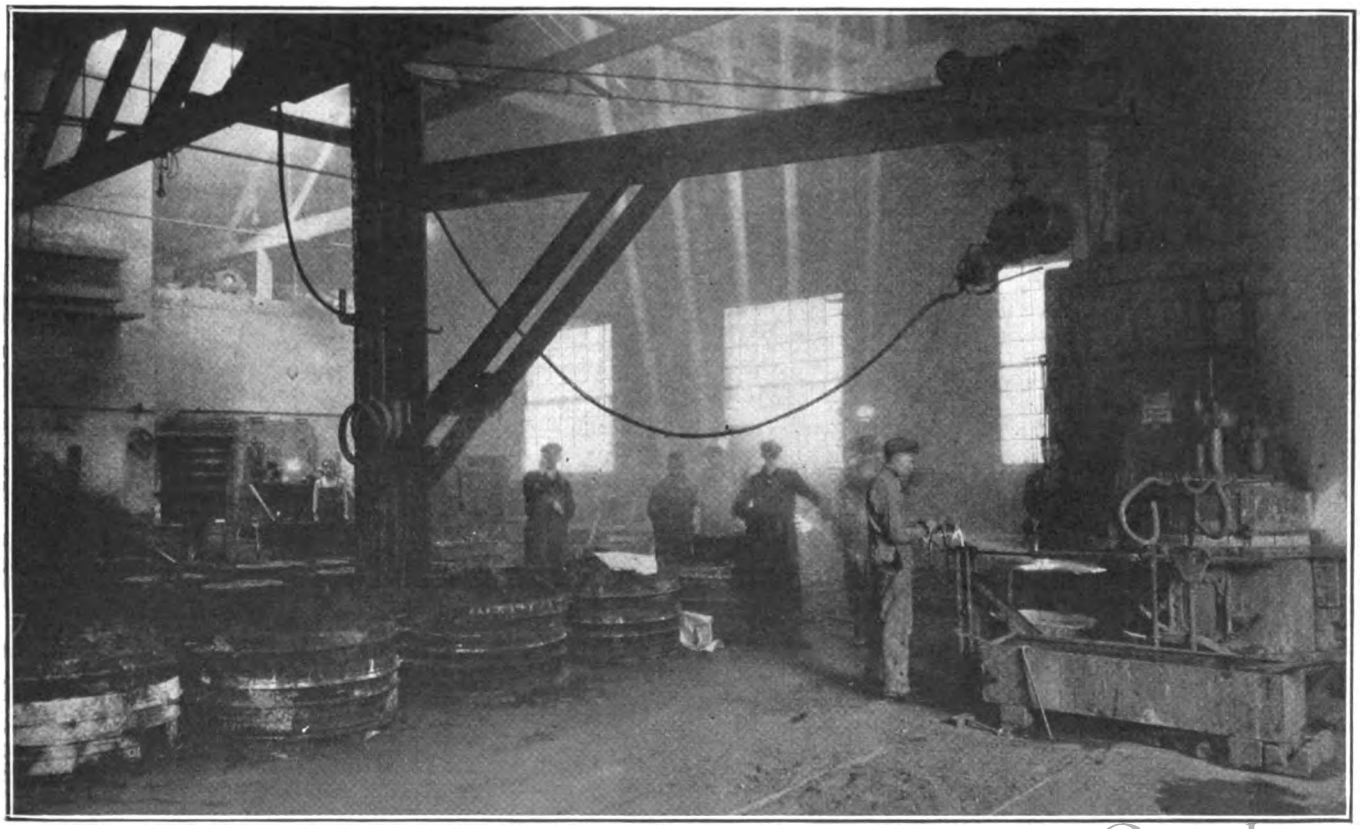
Steam Road Crossing Cast in Company's Steel Foundry
Test pieces shown at back. The bent projections of that at left resulted from blows with a sledge and show ductility of castings.

Another example of the beneficial results obtained from replacing cast iron with steel is in connection with the wedges for journal boxes. When the steel foundry first started to make these there were orders for a considerable number, and so the wedges were made up in advance and a few were kept ahead to fill orders as they came in. Eventually it was discovered that the supply kept on hand was not decreasing, and an investigation was made to find out the cause. It was found that the original replacements of these wedges were due to breakage of an end lug which was of small section and that very few were replaced for being worn out. The use of steel gave additional strength to the end lugs, so that these did not break off, and consequently the number of replacements decreased considerably as the new wedges were installed.

When the steel furnace was first installed, wooden molds were used and the tamping was done by hand. Gradually wood has been replaced by steel and a molding machine has been added to the equipment so that the tamping is now done by compressed air. This, of course, results in increased economy and also permits the use of unskilled labor, while a certain amount of experience was required for the hand tamping. Experience has shown that no particular skill is required in the operation of the electric furnace and that aside from having a man in charge with a knowledge of the composition of the various steel castings used by electric railways, and one experienced molder, who takes care of the difficult work and serves as a leader for the others, unskilled labor can be used.

Other economies are gradually resulting from experience in connection with the work. Thus, in connection with risers and gates, at first some of these were of considerable cross-section, so that it was necessary to cut them off with the acetylene torch. A study of the construction of the risers has shown that the section at the castings can be reduced in most cases so that while a large body of metal is still retained in the riser, the reduced section at the castings permits of their being knocked off with a sledge.

The most complicated and difficult castings which are being made in the Allentown foundry are shoe heads, third rail shoes and journal boxes. A considerable number of cores are required for these castings, but in



General View of the Foundry, Showing How Large Jib Crane Serves Furnace and All Molds

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spite of the additional labor involved, castings like these are being produced at about one-fourth the invoiced price at which they can be purchased outside. This 75 per cent saving does not include such savings as result from decreased stores and decreased work in connection with correspondence and auditing. A core room has been installed in a room adjacent to the foundry. Baking ovens equipped for gas heat are used.

MAINTENANCE REPAIRS TO THE FURNACE AND EQUIPMENT

During the two and a half years that the furnace has been in service the only repairs necessary have been relining the top side walls and the roof rings. At first the furnace was operated for 134 heats with the original roof rings. Later it was decided that the life of one set of silica brick was about 100 heats. The furnace consumes from 1 in. to 1½ in. of carbon from each electrode per heat. These two items are practically the only things against which maintenance charges have been necessary for the furnace since its installation. Other parts will probably last for many years, provided lightning or fire does not damage the transformer. In addition to the maintenance of the furnace itself, the ladles require relining. At present native clay is used for relining these, and it is found necessary to reline them about once in every two or three weeks. Mold boxes of course require repairs, but from the general observation, these are comparatively light, and aside from the items mentioned, the furnace continues in operation day after day with practically no other attention.

The performance and results obtained through the use of the electric steel furnace of the Lehigh Valley Transit Company have proved to all the officials that it is a very essential item for any electric railway. Through its use correct castings at a low cost are not only produced, but in a very short time and with little inconvenience, so that it is unnecessary to withhold the equipment from service to any considerable extent while making repairs.

The use of the steel furnace also enables the heads of various departments to make up special devices which result in labor saving and additional economies. As an example of this, the maintenance of way department has just constructed a new type of rail bender. This has proved a very efficient machine, and as a number of steel castings are used in this construction, the cost of these would have been prohibitive if it had been necessary to make up designs and have the patterns and castings made outside.

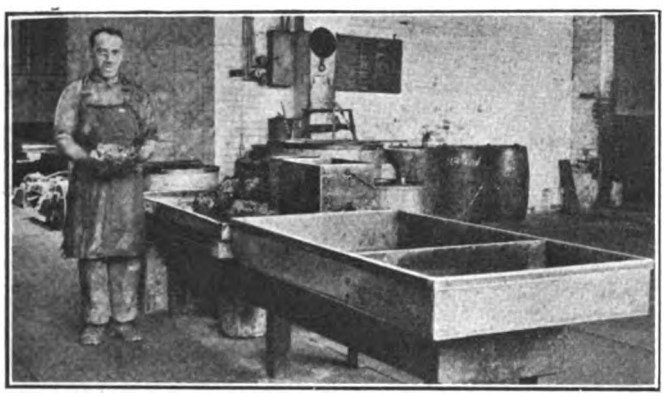
Waste Saturation Plant Halves Oil Consumption

The United Railways of St. Louis Is Obtaining Very Satisfactory Results from Its Oiling of Equipment Through Close Attention to Waste Saturation

AN EXTRAORDINARY, if not unique, lubrication practice is followed on the United Railways of St. Louis. Journal bearings, after they are once packed at the time a car is overhauled, are never lubricated by the addition of any raw oil, but are run until the next overhauling, a year or fourteen months later, when the journals are again repacked. During this period the bearings are of course inspected and the waste loosened and shaken up. It is necessary, however, to add oil to axles and motor bearings at each inspection.

Being able to follow such an unusual practice with respect to journal bearings is the result of thorough saturation of the waste with oil by means of a specially devised waste-saturating apparatus. Accompanying photographs and a drawing show how this waste-saturating plant is constructed and how it operates. The idea is to have the waste soak in the oil until it absorbs all the oil that it can hold. The saturating outfit is composed of two double bottom tanks filled with oil. The space between the two bottoms is filled with water, which is heated by means of hot water pipes to a temperature of about 125 deg. F. The waste is thrown into these tanks and allowed to soak from eight to twelve hours. At each end of the apparatus is a tilted draining pan that supports screens onto which the waste is thrown when it is removed from the oil. These pans are also heated with hot water pipes so that the same temperature is maintained during draining. The normal consumption of saturated waste is such that about two batches a day are turned out. The plant is heated with a small coal-fired hot water heater which is piped like a hot water heater on a car.

This apparatus, which is installed in the Newstead and Fairfax carhouse, has been in use for about six years. Previous to that time the waste used in packing all bearings was saturated with cold oil when used in each of the thirteen separate carhouses of the United Railways of St. Louis. This work is now centralized so that all waste used on the system is saturated with warm oil and sent out to the various carhouses as needed in covered cans holding 100 lb. each. Since



At Left, Sorting Out and Cleaning Used Waste for Resaturation. At Right, Covered Metal Cans for Dispatching Saturated Waste to the Various Carhouses

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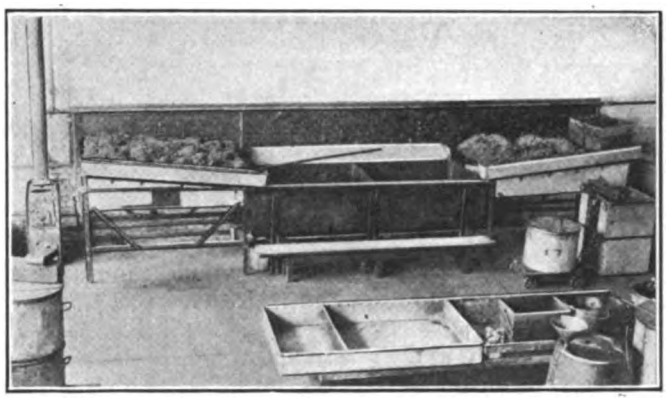
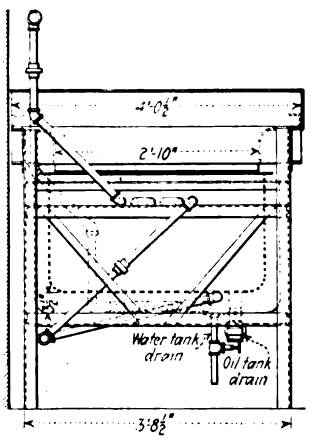


All Saturating of Waste Is Centralized in One Carhouse

the institution of this new system for handling and saturating waste the oil consumption has been reduced from about 4,000 gal. per year to about 2,000 gal. per year. This amount of lubricant is all that was required for all equipment, which was operated over 43,000,000 car-miles last year.

In the saturating process the new waste is not mixed with that which has been reclaimed. As mentioned before, the saturating apparatus is composed of two separate tanks. One of these is used for the new waste and the other for that which is to be resaturated. Only new waste is used in motor and axle bearings. This is packed in cans, which are plainly marked, for distribution to the various carhouses. Thus two grades of waste that must be kept separate are issued to each carhouse. The old waste from each carhouse is returned to the central saturating plant, where it is hand picked to loosen up the fibers and to remove the dirt. In sorting over the waste the longest fibers are thrown into a pile at one side, while the shorter ones are tossed into a perforated box which is immersed bodily in the oil. In this way it is not possible for the shorter pieces to separate from the rest and settle in the bottom of the tank.



End View of Waste-Saturating Apparatus

At one end of the saturating tank stand is an oil filter through which the lubricating oil in the tank is passed every fifteen days. In this way the oil is kept as pure as possible by removing any collection of small fibers and dirt that may be separated from the reclaimed waste.

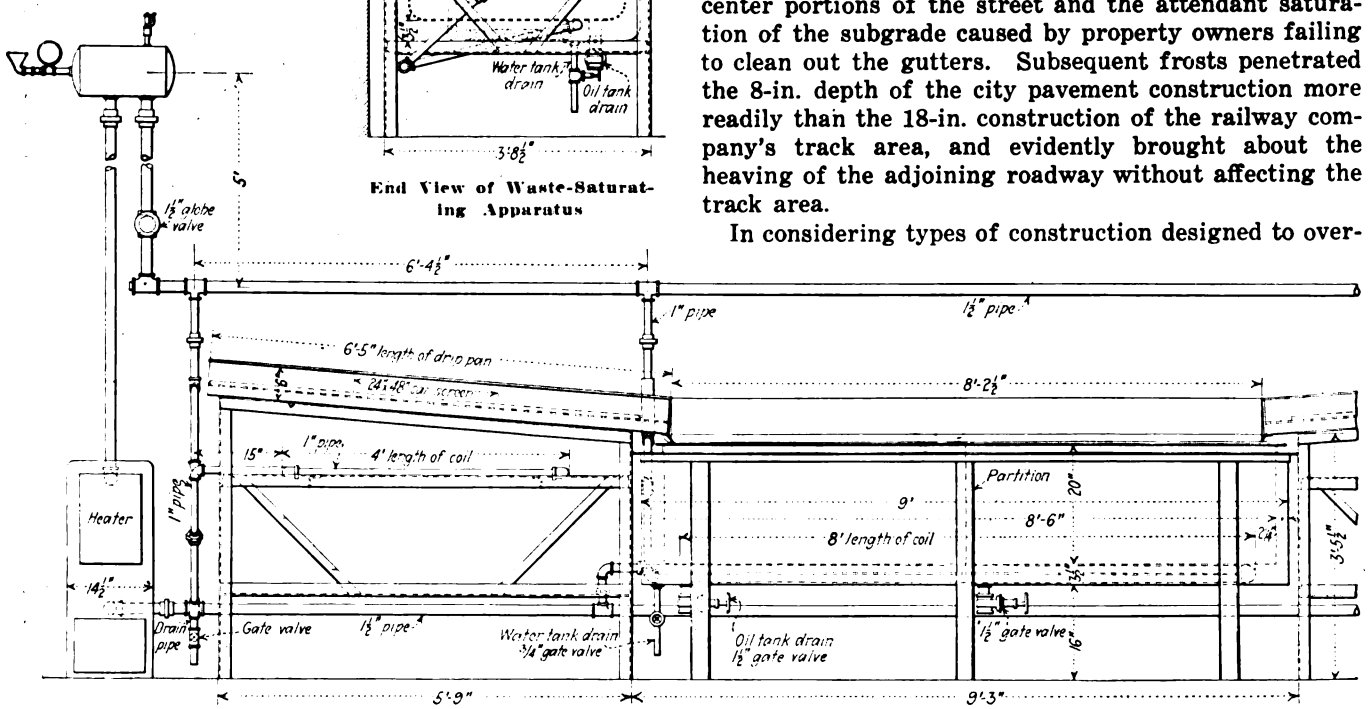
Extreme Heaving of Pavement Adjacent to Track Construction

Checking of Levels on a Stretch of Track in Allentown, Pa., Shows that What Appeared to Be a Settling of the Track Construction Was in Reality a Heaving of the Adjacent Asphalt Paving

THE accompanying halftone illustrates in a very striking manner the condition of some track construction and the paving adjacent to it on Seventeenth Street, between Hamilton and Turner Streets, in Allentown, Pa. The photograph was taken on March 1. Check levels taken by the city engineers to determine whether the track had settled from the original construction grade showed that there was no appreciable settlement in the top of the rail or the paving in the track area. The paving and track construction was put in last fall and at the time of the investigation was five months old. The asphalt paving was on a concrete foundation, and measurements showed that in some cases the paving in the outside area was from 4 in. to 5 in. higher than when laid last fall. Since the original levels were taken, the engineers of the railway have been following up conditions carefully, and a month after the first levels were taken it was found that the pavement had dropped back from 1½ in. to 1¾ in.

The depth of the city paving construction is 8 in., and that in the track area 18 in. The primary cause of the heaving of the asphalt adjacent to the track construction evidently was due to the flooding of the center portions of the street and the attendant saturation of the subgrade caused by property owners failing to clean out the gutters. Subsequent frosts penetrated the 8-in. depth of the city pavement construction more readily than the 18-in. construction of the railway company's track area, and evidently brought about the heaving of the adjoining roadway without affecting the track area.

In considering types of construction designed to over-



Construction Details of the St. Louis Waste-Saturating Apparatus

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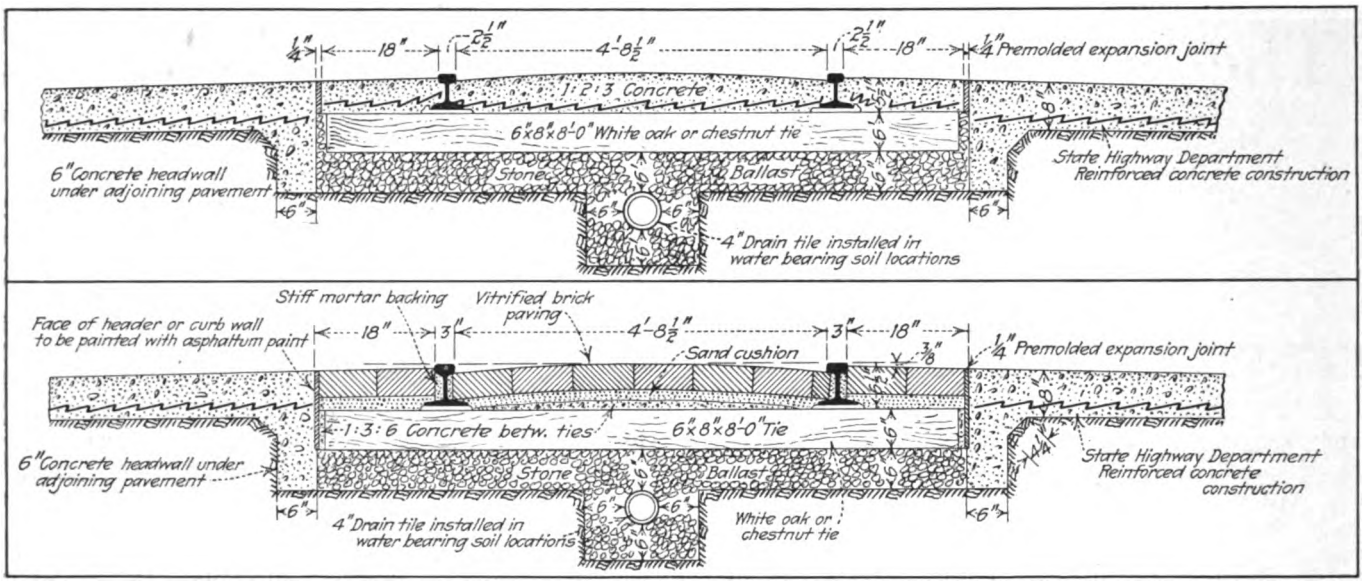

At Top, Concrete Paving Construction with 80-Lb. A. S. C. E. T-Rail. At Botton, Construction with Vitrified Brick Paving and 105-Lb. Dudley T-Rail

come such difficulties, a new type of construction advanced by W. R. Harris in the *Highway Engineer & Contractor*, July, 1919, was adopted by the Lehigh Valley Transit Company as the most promising and recommended by it to the various city and borough engineers in the territory served. This type was independently picked up and adopted by the New Jersey State Highway Department while the Lehigh Valley Transit Company was working with the Pennsylvania engineers, with the result that it now has been adopted by the Pennsylvania State Highway Department and assurance given of such a course by the city engineers of Allentown and Bethlehem, Pa., as well as in other localities.

Accompanying illustrations show this construction for standard vitrified brick paving with 105-lb. Dudley T-rail and for concrete paving with 80-lb. A.S.C.E. T-rail. It is evident that if such designs of track construction as illustrated, and others which have been worked out to overcome such conditions by other railways, are adopted, the damage to adjoining pavement in track areas can be decreased materially if not entirely eliminated, and that certain improvements in design of the roadway construction is necessary. In adopting this type of construction, it is evident that the state highway departments of New Jersey and Pennsylvania have come to the conclusion that whatever the type of construction in the track areas, complete and effective isolation therefrom is the first prerequisite for obtaining adequate life of the adjoining roadway pavement, and that such additions or changes to the standard construction as are necessary to accomplish this end are a part of their obligations.

The construction recommended by the Lehigh Valley Transit Company provides a header 18 in. deep along the edge of the track area. A premolded expansion joint is also installed between this inner wall and the track area. With this construction, frost must first penetrate to a depth of 18 in., whereas with no header wall, only an 8-in. penetration of frost is required to start trouble. The premolded type of expansion joint was adopted by the Lehigh Valley Transit Company due to its ease of installation. The use of such an expansion joint not only closes the joint more effectively against leakage of water, but also acts as a desirable shock absorber. A material reduction, if not the entire elimination, of vibration from the adjacent track is thus brought about. The filler used, of course, varies in depth with the type of construction and extends down only as far as the solid portion of the track construction, that is, the paving and its foundation.

Heaving of Asphalt Paving Adjacent to Track Areas Caused This Condition in Allentown, Pa.

The Boston "L" and the "Tech."

The special course in electric railway training, which is being conducted by the Massachusetts Institute of Technology in co-operation with the Boston Elevated Railway, is the subject of an article in the April, 1923, issue of the *Technology Review*. This is the alumni publication of the Institute. This course was outlined in the report of the committee on education of the American Electric Railway Association, presented at the Chicago convention in 1922. Edward Dana, general manager of the Boston Elevated, is chairman of this committee. The co-operative course is modeled on those which have been successfully conducted for years by educational institutions and manufacturing concerns in collaboration. In this case the student, after two years at the Institute, spends alternate periods of three months in the employ of the co-operative company and at his studies.

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The Salvage of Worn Steel Car Wheels

The Local Heating to Fusion of a Small Portion of the Metal in Car Wheels While Building Up Worn Flanges or Treads Produces Complex Internal Wheel Stresses and Strains, a Method for Neutralizing Which Is Given

By W. J. Merten

Metallurgical Engineer, Material and Process Engineering Department, Westinghouse Electric & Manufacturing Company

THE reclaiming of worn steel car wheels by arc deposition of metal on treads and flanges presents a problem of considerable economical importance and is a fascinating one for electric railway master mechanics, the welding engineer and the metallurgist. Automatic arc-welding machines employed for this work contribute considerably to the need for exact and correct processes to obtain a wheel that will perform satisfactorily and to permit prediction of successful service with a fair degree of assurance.

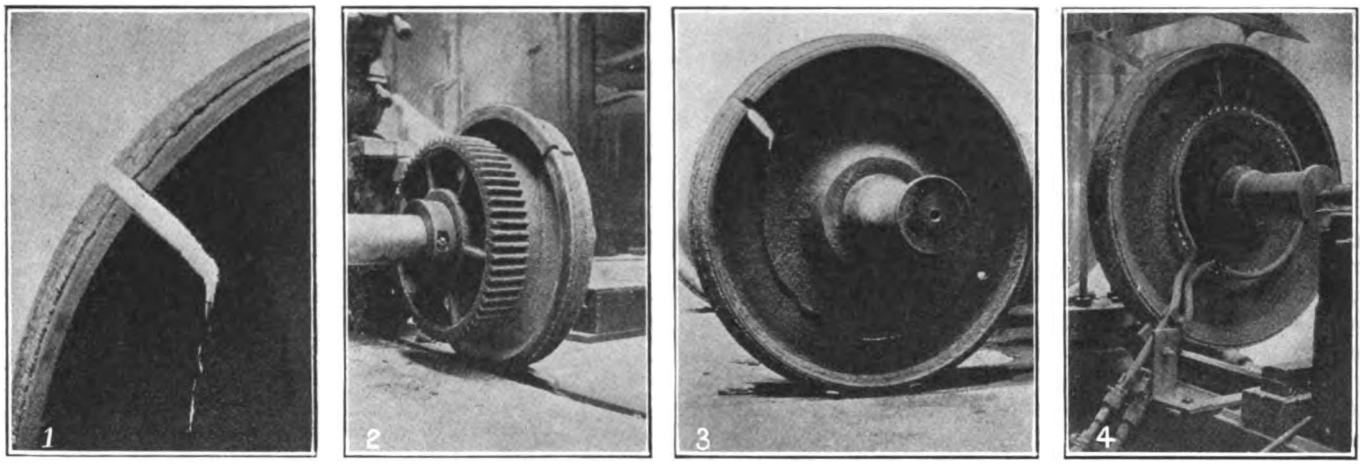
To salvage worn wheels economically they must not be removed from the axle for the building up of the tread and flange. A high temperature anneal or preheat is, therefore, not feasible. Obviously, continuous welding upon a cold wheel subjects the metal to a repetition of expansions and contractions, causing an additional disturbance of the already meta-stable equilibrium of the metal, resulting ultimately in a fracture. It is a well-known fact that the failure of wheels or their spontaneous cracking during welding is frequently caused by residual strains due to manufacturing processes accentuated by disturbances resulting from local heating.

The analysis of such a failure occurring during welding while immersed in cold water, or immediately after finishing the first layer on the tread, indicated a high degree of internal straining and enormous additional external stressing due to shrinkage of the band of arc-deposited metal. The recognition and consideration of the magnitude and distribution of these stresses and strains and their influence upon the successful repairing of wheels is all important.

The existence of residual internal stresses in car wheels, resulting from the respective manufacturing processes, has always been recognized and conceded. However, little is known of their amplitude and distribution. The state or form of these internal strains demands consideration when subjecting the wheel to stresses induced by means other than by loading and service applications. It is evident that any work done upon the wheel producing stresses that are cumulative with the residual stresses must be considered dangerous and compel the application of processes for neutralization of these stresses or for entire elimination of them.

An example of such work is autogenous welding by the electric arc, or by the oxyacetylene gas flame. The local heating to fusion of only a small portion of metal produces a tremendous straining in the adjacent portions or parts, which, in turn, influences the freezing of the arc-deposited metal by causing heavy straining in it, by a rapid abstraction of the heat or rapid cooling from the liquid condition. This welding is especially dangerous since the operation is conducted while the wheels are mounted on the axle, therefore abounding in stresses and strains in the hub and plate caused by the mounting or pressing of the wheel on the axle. These stresses are additive in character with the residual manufacturing stresses.

In building up worn treads and sharp flanges on rolled steel car wheels by arc-deposited metal, this localizing of heat is even more pronounced than in oxyacetylene flame heating where a spreading of the heat is greater because of the required amount of preheating before fusion occurs, and for this reason it is of greater importance to guard against the amplification of the internal stresses and strains when arc deposition of metal is employed for this work than with oxyacetylene flame welding.



Fracture in Car Wheels Due to Stresses Caused by Differential Cooling of the Rim, Plate and Hub and from Rolling Heat During Arc Welding of the Tread

Fig. 1—Fracture at rim. Fig. 2—View of fracture at gear side. Fig. 3—The fracture extends around the web of the wheel. Fig. 4—Method of preheating employed to prevent fracture of wheels during arc welding by neutralizing the stresses.

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It is generally held that mounting of the wheel on its axle produces compression in the wheel radially. The intensity or magnitude of these compressive stresses is greatest in the hub and decreases in the plate toward the rim and becomes very small at the tread. Tangentially, tensional stresses are produced by mounting and while they probably decrease appreciably toward the rim, their magnitude must be appreciable, and in conjunction with the tensional stresses and strains caused by differential cooling of rim, plate and hub from the rolling heat they are of sufficient intensity to cause rupture at comparatively small additional straining as is illustrated by the fracture of two 38-in. rolled-steel car wheels during arc welding of tread in Figs. 1, 2 and 3. While structural coarseness of grains may have contributed considerably to this failure, it is probably not far from correct to attribute the cause to internal straining of the steel. The microstructural examination made at the positions as shown in the sketch, Fig. 5, did not show abnormal conditions. Figs. 6, 7 and 8 are photographic reproductions of microstructural characteristics of the parts near the weld and from the fractured portion.

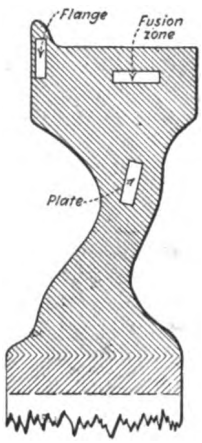

Fig. 5
Location on wheel where microscopic observations were made.

STRESSES AND STRAINS DUE TO COOLING FROM THE ROLLING HEAT

The cooling of steel wheels from the rolling, pressing, or forging heat involves changes of volumes not occurring at the same time, resulting in elastic strains set up to equalize the disturbed equilibrium. A considerable amount of inelastic straining, however, takes place at the junction of the rim and plate and at the junction of the hub and plate, due to this differential cooling resulting from non-uniformity of cross-sectional dimensions or non-uniformity of mass. It is this inelastic straining, coupled with the strains produced by local heating from a partial fusion of spots or areas that are arc welded, and the differential expansion and subsequent contraction inevitably resulting in heavy stresses, that can be held responsible for most failures such as are shown on the photographs which have been referred to previously.

The success of a welding operation for the salvage of worn wheels obviously depends upon the successful reduction of the internal stresses to a magnitude or value permitting the additional straining without exceeding the elastic or endurance limit of the metal. A favored method to keep stresses down in a wheel that is subjected to welding is to interrupt the continuity of the deposit and let the welded section cool while welding is practiced on a portion diametrically opposite or some distance removed from the preceding one. In this manner a fracture due to an accumulation of stresses is less likely to occur. However, its degree of suppression is uncertain and may not be sufficient to permit the addition of stresses due to loading, track irregularities, curves and brake pressures.

Another still more questionable practice to keep down cumulative straining is the cooling of the wheel during welding by water sprays or by immersion in water except for a small part left exposed for welding. This particular method was employed on wheels shown in Figs. 1, 2 and 3 and clearly illustrates the fallacy of such a procedure.

Fig. 4 illustrates the method employed by the writer to overcome the difficulty. A patent application for this process assigned to the Westinghouse Electric & Manufacturing Company is pending. The principal feature of this process is the selective heating of parts of the wheel prior to, during, and after the deposition of metal by automatic, continuous arc-welding machinery, so as to change the magnitude or physical dimensions of the wheel a desired amount, thereby producing a band or series of bands of arc-deposited metal of linear dimensions or lengths to fit snugly around the periphery of the tread and flange without increasing unduly the stresses in the wheel caused by contraction when cooling. The operation of the process follows:

The wheels mounted on the axle and suspended on the centers of a lathe should have a pair of semicircular burners attached and set at approximately one-fourth the radial distance of the plate or between the hub and rim and close to the concaved side of the plate as shown in the photograph. If heating is done by gas as illustrated, a ½-in. gas pipe drilled with three ⅛-in. holes in a 45-deg. angle around the inner quadrant of the circumference should be used, directing flames against the hub plate and rim of the wheel.

The wheel should be preheated to approximately 250 deg. C. before starting the welding heat. As the first layer of strands is deposited on the tread, the temperature of the wheel toward the end of the deposition of the first layer should be increased to above 350 deg. C. but not exceeding 450 deg. C. The second and third layers should be deposited while keeping the wheel at this heat. The flange can then be built up while gradually reducing the temperature during this period to approximately 200 deg. C. When the deposition of metal is completed, the heat should be turned down to reduce the temperature in the plate to about 150 deg. C. and to dissipate the heat in the rim and the hub to a point where the temperature is approximately 60 deg. C. or where the hand can touch the wheel without danger of being burned. The heat can then be turned off entirely, allowing the plate and wheel to cool to room temperature. The heat application is fairly uniform, of sufficient intensity and is applied for an adequate period of time to reduce internal straining to values that will permit the additional external stressing due to the contraction of the arc-deposited metal on cooling and not exceed the ultimate strength of the material.

The low starting temperature (250 deg. C.) was employed to bring about a gradual release of the internal straining and disturbances which may happen in the throat of the wheel and fillets of the plate and rim and those in the hub due to mounting of the wheel on the axle. The higher heat of 350 deg. C. to 450 deg. C. is sufficiently high to remove completely internal straining and to remove all or any accidental local chilling effect to which the wheel may have been subjected after rolling on cooling from the high rolling heat.

However, the maximum temperature of 450 deg. C. is not sufficient to cause any structural or grain refinement, nor is it high enough to result in coarsening the structure or grain growth. The enhanced physical strength of the steel at these elevated temperatures also contributes to the success of this method of procedure. Obviously the second and third layers of arc-deposited metal are approximately ½ in. longer on this hot 37-in. diameter wheel than when put on a cold

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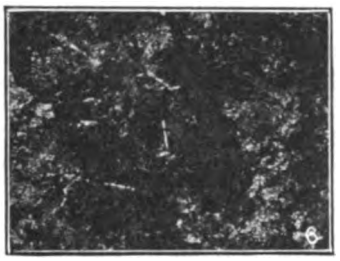
metal, and on cooling they contract to the natural dimensions of the wheel with the rest of the metal, without subjecting the wheel to abnormal and compound stresses.

By lowering the heat in a wheel during the deposition of the first layer and then raising the temperature for the additional metal deposition, the first layer is put under tensional stresses. The effect of these stresses is similar to hot working of this layer, when on deposition of the succeeding layer it is heated to almost a fusion temperature, so that by judicious selection of conditions an appreciable increase in physical strength will result.

A drastic cooling from a very high or superheated liquid heat, such as is encountered in arc-deposition, puts the metal in a turbulent condition and produces a grain structure such as is illustrated in Fig. 10.



The characteristic markings of this microstructure present a twining of metallic crystals, primarily of exceedingly small size and produced by drastic cooling of the liquid metal while in a state of violent motion. The sudden growth of these crystals while subjected to external stresses causes a deformation of the crystals, which produces a fold or gliding and slipping action upon the crystallographic planes.

Such a structure offers a region of metal of low resistance to compressive stresses, to which the tread of the wheel is subjected at the time of its contact with the rail head, causing a formation of a series of small cracks and fissures similar in appearance to shattered zones in railheads. Reheating to an annealing temperature modifies this structure to a more desirable form and will result in more successful and longer service.

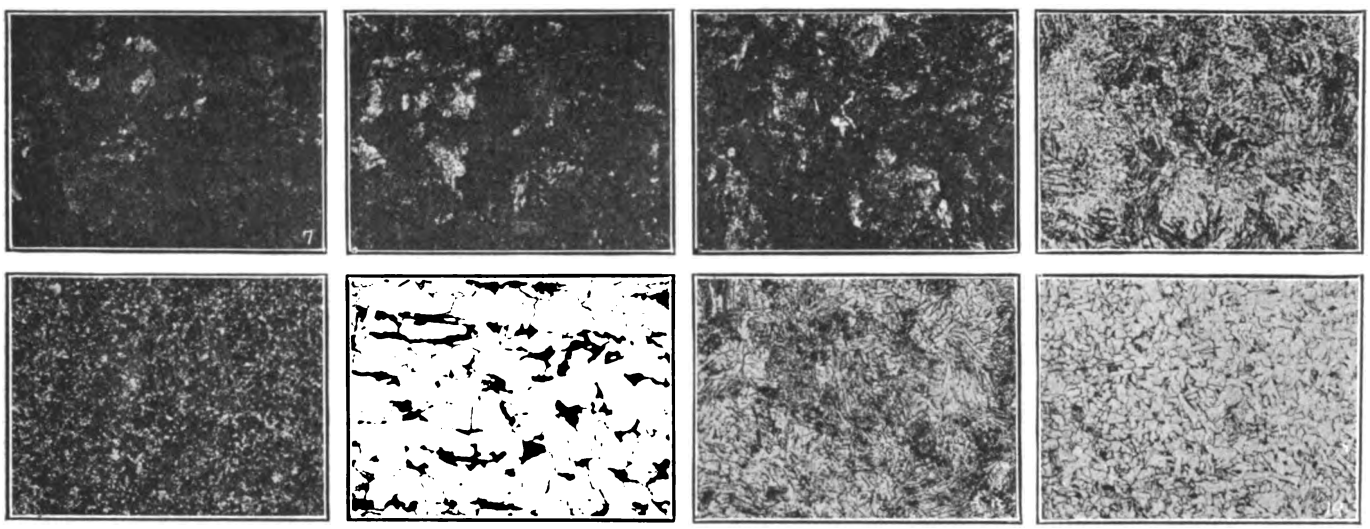
Fig. 11 shows a microstructure of the fusion zone and illustrates clearly the diffusion of the low-carbon electrode metal into the higher carbon wheel metal, the white markings being free ferrite crystals. Fig. 9 is a microphotograph of the original car-wheel metal and is a sorbitic structure of fairly good grain size and fairly high physical strength.

Fig. 12 is a section from a built-up journal of a car axle and exhibits the same structural characteristics of arc deposited metal as described above.

Fig. 13, however, shows very markedly the effect of the welding heat on the modification of the banded condition of the original axle steel. A decided twining has taken place, and a pronounced weakness to resist fatigue-inducing stresses is characteristic of this.

Fig. 14 presents the grain structure of the original shaft and shows the banded condition resulting from rolling the bar, no heat treatment of any kind having been employed to bring about structural refinement and higher strength. Obviously the presence of these three zones of entirely different steels within the cross-section of the axle is very objectionable and unfavorable to the exacting requirement of a car wheel axle, and endurance under continued alternate stresses is very doubtful.

A process to diffuse or broaden the band of this fusion zone in arc-welded axles, to neutralize its weakening effect, and to improve the arc deposited material, has been developed by the Westinghouse Electric & Manufacturing Company. This process consists of heating the welded shaft portion to an annealing heat and quenching it from this temperature. The heat is applied by an electrically heated muffle furnace and is concentrated upon the welded portion. Water cooling keeps the rest of the shaft from materially changing its sorbitic structure. Then, after thoroughly diffusing the band, the heated part of shaft is cooled rapidly by a water spraying system to ordinary room temperature.



Microscopic Views Showing Structural Characteristics of Sections of Wheels Near the Welded and Fractured Portions

Fig. 6—Plate.
Fig. 7—Flange.
Fig. 8—Fusion.
Fig. 9—Microscopic structure of wheel metal before heat was applied.

Fig. 10—Microscopic structure of arc-deposited metal.
Fig. 11—Microscopic structure of fusion zone metal after arc deposition of metal on tread of wheel.

Fig. 12 — Microscopic grain structure of a section taken from a built-up shaft before application of heat. This shows a fairly good grain size and high physical strength.

Fig. 13—Microscopic structure of metal deposited on axle journal by arc welding.
Fig. 14—Microscopic appearance of metal in fusion zone after arc deposition.

IMPORTANT FACTORS INFLUENCING SUCCESSFUL SALVAGE OF WHEELS

A careful examination of the information presented points out a number of interesting and important factors which influence the successful salvage of car wheels by arc deposition of metal upon the worn parts: (1)

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The internal straining of a wheel due to air cooling from a high rolling heat is of a magnitude not infrequently reaching the elastic limit of the material in sections or parts cooling more rapidly due to drastic or abrupt changes in cross-sectional dimensions. (2) Unequal heating as well as unequal cooling of such wheels introduces additional straining, resulting in overstraining and failure of the material. (3) Even a comparatively low temperature preheating operation, followed by a slight raising of this heat during the process of arc deposition of the metal, will neutralize and modify these strains to a degree that assures the success of an economically very important process.

Roller-Bearing Tests in England

The National Physical Laboratory, Teddington, has Carried Out Tests in London and Wigan on Hoffmann Bearings

DURING 1921 and 1922, the Hoffmann Manufacturing Company, Ltd., arranged with the National Physical Laboratory, Teddington, England, for tests on two single-truck cars of the Wigan Corporation Tramways, and one double-truck car of the London County Council. The tests carried out consisted of (1) electric power consumption measurements on service runs, including determination of time and distance; (2) tractive resistance tests along straight tracks; (3) determination of starting effort, and (4) retardation tests. The essential data which were secured are shown in the curves which are reproduced, where, for convenience, the data for the two sets of tests are combined. The results speak for themselves and no comment is necessary. In interpreting these results, however, it will be necessary to know something about the cars, the characteristics of the routes on which the tests were made and the methods employed in the tests.

THE WIGAN TESTS

The cars selected for the tests at Wigan were built by the English Electric Company, Ltd., Portsmouth, and were double-deck cars fitted with Brill type 21-E trucks, with wide-wing axle boxes. Each car weighed 23,500 lb. empty.

The apparatus used in the tests comprised an Elliott recording voltmeter, a recording ammeter, a recording drawbar dynamometer, and a recording distance-measuring device operated by a wheel rolling on the track and supported from the rear buffer beam of the car.

The service tests were made on a 2½-mile route under different conditions of weather and of traffic. The energy consumption varied from 1.16 to 1.82 kw.-hr. per car-mile for the car equipped with roller bearings, and from 1.49 to 2.43 kw.-hr. for that with the plain bearings. The corresponding averages are 1.56 and 2.09 kw.-hr., a saving of 0.53 kw.-hr. or 25.4 per cent in favor of the roller bearings. Comparative pairs of individual tests, made under similar conditions, showed percentages of saving from 22.1 to 30.5.

In the tractive resistance tests the car under test was hauled by the other car through the dynamometer device, and records of pull, time and distance traversed were made. Results were obtained for the car unloaded, and also loaded with 9,000 lb. of sand bags. The percentage in favor of the roller-bearing car is remarkably uniform, averaging about 30 per cent reduction as compared with the other. From calculations of the amounts of energy applied to the trail car through the dynamometer, it appears that the difference in favor of the roller-bearing car is 31 per cent with load and 23 per cent without load, on the average.

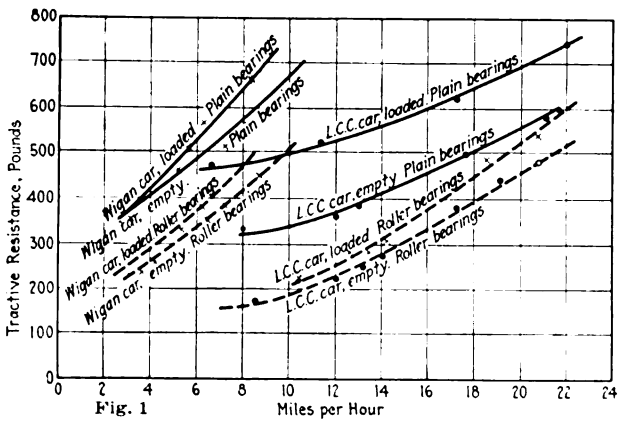

Fig. 1

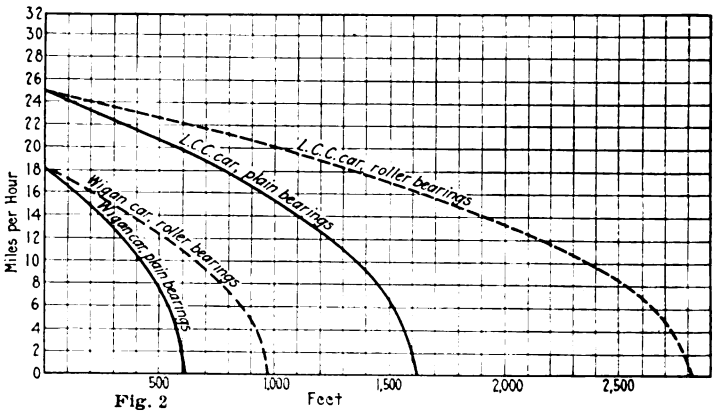

Fig. 2

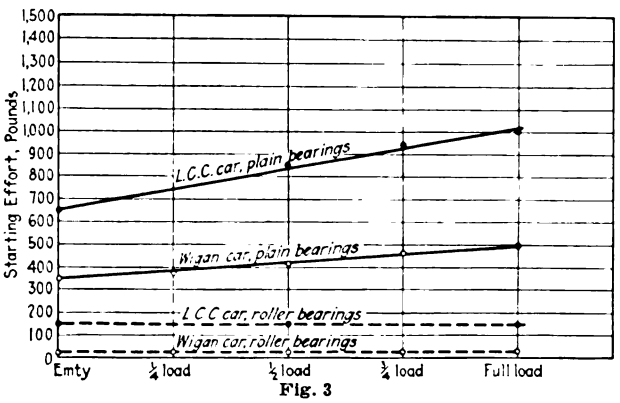

Fig. 3

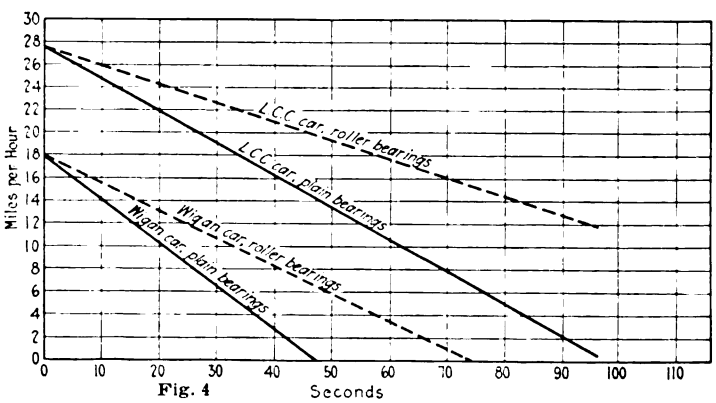

Fig. 4

Results of Tests on Cars Equipped with Plain Bearings and Roller Bearings Respectively

Fig. 1—Tractive resistance at various speeds. Fig. 2—Coasting-distance curves. Fig. 3—Starting effort at different percentages of full load. Fig. 4—Results of coasting-time tests.

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In the starting-effort tests the car under test was connected through the dynamometer and a pulley block to another car, which was securely held by its brakes. The tension of the free tackle rope was gradually increased until the car just began to move. Tests were made in each direction with the car empty and loaded with 1, 2, 3 and 4 tons (2,240 lb.) respectively. The roller-bearing car was also permitted to start down a slight gradient and the pull exerted by it was measured. The mean values of the starting friction showed a reduction in favor of the roller-bearing car of more than 94 per cent.

The retardation tests were made on a reasonably straight section of track, and measurements were made of time and distance as the cars slowed down from various speeds. It was found that the retardation increased with the initial speed, which was attributed to the oscillation of the car. While both cars oscillated at high speed, the increase in retardation at the higher speed was less for the roller-bearing car, indicating that the axle bearings employed enabled it to take the end thrust of the axle with less braking effect than occurred in the car fitted with plain bearings.

The average distance run by the roller-bearing car was found to be 57.2 per cent greater than that covered by the other car.

THE LONDON COUNTY COUNCIL TESTS

The London County Council car was one of its standard double-deck, roof-covered type, mounted on two swing-bolster trucks. The car was a new one, with a seating capacity for thirty-two persons inside and forty-six outside. The car was constructed to drawings and specifications supplied by the London County Council, the builders being the Brush Electrical Engineering Company, Ltd., and Messrs Hurst, Nelson & Company, Ltd. The electrical equipment and magnetic brakes were supplied by the English Electric Company, Ltd., and the Metropolitan-Vickers Company, Ltd. The weight of the car was 35,500 lb.

Energy measurements were made by means of a Thomson watt-hour meter, and a dynamometer similar to that used in the Wigan tests was employed. The energy-consumption tests were made on a route 15.7 miles long and the same motorman was employed throughout. To load the car fully, sand bags of a total weight of 10,920 lb., corresponding to seventy-eight 140-lb. passengers, were used. In spite of variations in conditions which favored the car fitted with plain bearings, a saving of about 30 per cent with the roller bearings was found from the half-load test, and more than 26 per cent for all of the tests.

As in the other case, tractive effort tests were made at various speeds with the result that the empty car showed a reduction in favor of the roller bearings of from 50 per cent at 8 m.p.h. to 18.8 per cent at 20 m.p.h., while the loaded car showed a reduction of from 58 per cent at 10 m.p.h. to 19 per cent at 22 m.p.h.

Starting-effort tests, made by the same method as that previously described, showed a reduction in starting effort in favor of rolling bearings varying from 77 per cent with the empty car to 85 per cent with the fully-loaded car.

The retardation tests showed a rate of 0.412 ft. per sec. per sec. for the plain bearing car and 0.238 ft. for the roller-bearing car. Coasting-distance tests were also made, the current being cut off at any particular speed up to 26 m.p.h. and the distance being measured up to the point where the speed was reduced to zero. The percentage greater distance run by the roller bearing car was 73.

The Readers' Forum

College Men in the Transportation Department

CALIFORNIA INSTITUTE OF TECHNOLOGY

PASADENA, CALIF., April 7, 1923.

To the Editors:

Your editorials in the issues of March 10 and 31 and remarks upon Mr. Trumbull's letter in the March 31 issue, concerning college men in the transportation department of electric railways, were very much appreciated.

I am at present a junior in electrical engineering at the California Institute of Technology and am very much interested in electric railway work of all kinds, especially the transportation division. Up until now I did not think that there was much thought given to placing college men in this department. The experience of myself and others with two large electric railway properties in southern California is that college men are inferior (in any department) to the men who have been with the company a long time, regardless of training or ability. It is indeed gratifying to know that the question is receiving consideration.

As you imply, the engineering graduate is not looking for "a bed of roses" but for a place where hard work and application of his training will insure him a good future. Our greatest fear is of being pushed into a rut and staying there.

I have been a subscriber to the ELECTRIC RAILWAY JOURNAL since my freshman year and find it a valuable asset. To my mind, the regular reading of a technical journal places the engineering graduate a year ahead in his profession by keeping him in touch with the latest developments and with the men who are doing the big jobs. F. DOUGLAS TELLURIGHT.

Preventing Theft of Lamps

BAMBERGER ELECTRIC RAILROAD

SALT LAKE CITY, UTAH, April 11, 1923.

To the Editors:

Referring to communication from Blankburgh, signed "Executive," appearing in ELECTRIC RAILWAY JOURNAL, page 512, March 24.

We experienced some difficulty until we had the following words, "*Stolen from B. E. R. R.,*" etched in a conspicuous place on the bottom of the globe, which has resulted in practically eliminating the loss of lamps by theft.

JULIAN M. BAMBERGER,
President and General Manager.

Weight Wrongly Stated

In the article which appeared in the March 31 issue of the ELECTRIC RAILWAY JOURNAL, describing the new cars of the Pacific Electric Railway, a statement was made that these cars weigh, completely equipped, but 27,000 lb. This should have read "the body completely equipped weighs but 27,000 lb."

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Equipment Maintenance Notes

Ovens for Baking Railway Motor Armatures

A Comparison of Heating by Steam and Electricity Is Given, Together with Construction Found Most Desirable for Satisfactory Results—Some of the Practices Necessary to Secure Best Results

BY JOHN S. DEAN
Westinghouse Electric & Manufacturing Company

THE practice of dipping railway motor armatures in a good grade of baking varnish and then baking them in an oven has been adopted by a large number of railway operators during the past few years. Their experience has been that this treatment fills up all the cracks and the pores in the insulation and greatly reduces the possibility of insulation breakdowns, which might be caused by moisture or other conducting substances getting into these openings.

Dipping armatures also acts as an effective bond to prevent vibration of any loose coils or laminations on the armature, thus materially increasing its life. Results in service show that armatures thus treated are better able to withstand the severe mechanical and electrical stresses to which they are subjected by present-day severe operating conditions.

Much of the success of this treatment depends upon the proper baking of the armatures after they have been dipped. To facilitate the baking process the following essential points should be considered in connection with the construction and operation of ovens used on railway properties, thus insuring a reliable finished product.

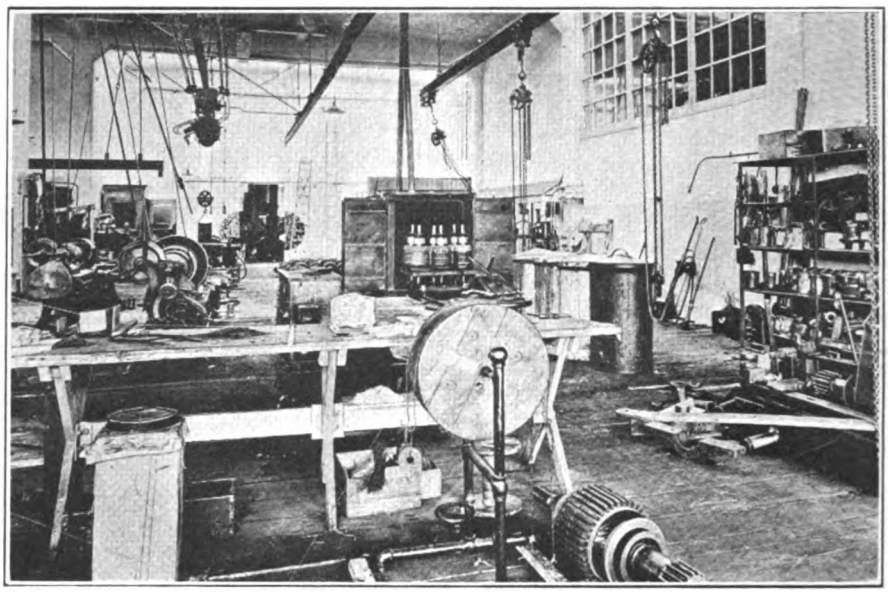
In the design of the ovens there is an advantage in the use of a number of smaller-sized ovens rather than one large oven. By this arrangement one oven can be filled with armatures to be baked without the necessity of being frequently disturbed. This layout is not only more economical but is more flexible, as increased capacity can be obtained by the construction of additional small units.

The four walls and the top and bottom of the oven should be so constructed as to guard against a waste of heat by radiation. Ovens built of sheet steel should be provided with at least 2 in. of high-grade heat-insulating material to reduce the radiation losses to a minimum.

Using a homely illustration, it is a well-known fact that clothes after being washed and hung upon a line will dry more readily on a windy day. This also applies to the baking of the armatures since the vapors from the varnish must be carried away as rapidly as they are formed and fresh air supplied for the proper oxidization of the varnish, so that it will properly set or dry.

This is accomplished by either a system of natural ventilation or by a blower outfit. Either of these systems requires suitable ventilating and recirculating air ducts, both inside and outside of the oven, to give the desired circulation of the air. It is essential to provide some means of measuring and controlling the temperature of the oven in order to secure the best results while the armatures are being baked.

Provision should be made for handling the armatures in charging and discharging the oven. This can be done by means of a large truck moving on a track, or by a number of suitable small trucks on wheels, or by an overhead trolley system. The method best adapted for this work will depend largely upon the arrangement of the inside of the oven for the receiving and storing of the armatures while they are being baked. Convenient doors that can be opened and closed readily should be provided. These doors should be fitted with a quickly operated locking device and should be carefully insulated to minimize the radiation of heat from the oven.



General View of One-Half of a Railway Repair Shop, Showing the Electric Oven for Baking Armatures and the Method of Dipping and Handling Armatures

STEAM VS. ELECTRICITY FOR HEATING

The heating elements, whether for the use of steam or electricity, should be located in the lower section of the oven near where the fresh air is admitted. Baking ovens used in connection with this treatment are usually heated by either steam or electricity, the method being determined principally by conditions existing on the various railway properties.

Where a constant supply of steam is available and convenient, the ovens are usually steam-heated, but on the other hand, if there is no steam plant on the property, the baking ovens are usually electrically heated by using old car heaters, grid resistors, or specially designed electric heating elements. Both methods of heating are being used with more or less success, depending to a great extent upon the care and attention given to

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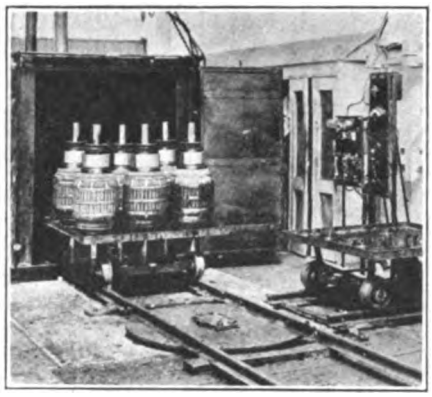
this work by the men in charge. Some of the more essential points that should be considered and used as a guide in the selection of the most suitable method of heating are as follows:

To minimize the handling of the armatures, the oven should be convenient to the armature winding room. If steam is used, the available steam supply may not permit this without extensive piping from the boilers to the oven, but there is no such difficulty with electrically heated ovens since all railway shops have convenient electric circuits that can readily be tapped for a supply of current.

In the construction of the oven, the application of steam pipes is more expensive than placing the required number of electric heating elements in the oven. Moreover, the piping from the boiler to the oven should be protected to reduce heat losses, and that is quite expensive. Another point to be considered is that some shops do not have a steam supply available, while a 500-volt trolley line is to be found in all shops as a convenient source of electric current.

Best results in baking armatures are obtained by maintaining the temperature of the oven from 95 to 105 deg. C. If the temperature is too low, the baking will be incomplete and wet armatures will result. If



Electric Armature Baking Oven, Showing Handling Trucks and Control Panel

the oven is kept too hot, the varnish will set non-uniformly throughout the armature, and only surface baking will result, which is undesirable.

Excessive temperatures are also likely to damage the fibrous insulating material and cause it to disintegrate rapidly. Thus a uniform predetermined temperature is essential and this is difficult to obtain when steam heated elements are used since the temperature is controlled manually by the workmen in charge. With the electrically heated oven, automatic regulation can be applied readily and uniform and dependable control of the temperature assured.

In extreme cold weather steam-heated ovens are subjected to low steam pressure with reduced temperature, which is objectionable. They are also affected by a shortage of coal. Electrically heated ovens, however, have a constant source of power from the trolley circuit always available when the cars are running. With steam heating the baking must be done at night only on some properties, as the required temperature of the steam-heated ovens cannot be maintained during the entire twenty-four hours.

It has always been found necessary to equip some steam-heated ovens with auxiliary electrically heated elements to secure the desired oven temperature. With a steam-heated oven, there is a possible danger from defective steam pipes allowing moisture to leak into the oven and do considerable damage to the insulation of the armatures before the trouble is discovered and repaired. In this respect electrically-heated ovens are more reliable and results are more satisfactory.

Since the temperature of a steam-heated oven is controlled by manual operation, an attendant is necessary to make adjustments frequently to insure the desired uniform temperature. Results of operation under these conditions are more or less uncertain, as they depend upon the reliability of the workmen. Ovens that are electrically heated and equipped with automatic control, however, require no attendant and very little supervision.

The actual cost of the steam re-

Now Is the Time to Plant Shop Gardens

The Men Take Pride in Keeping Their Shop Surroundings Attractive, and the Gardens Will Afford Them a Pleasant Means of Recreation

"MORNING, Bill, my daffodils are out." This was the way Jones, the shop foreman, was greeted by "Whistlin' Dick" Singer, the old reliable lathe hand in the Jinxville Electric Railway machine shop, as he punched the time clock at 6:55 one bright April morning. "Looking at the posies around my place this morning suggested to me that we might do something to brighten up the yard around this shop. Let's clean up a lot of that old junk that's piled up everywhere and spade up a few beds. If you'll get the junk away I'll stay any night for an hour or so to help get the thing a-goin'. I'll speak for the other fellows being willing to do the same thing. My son-in-law, Sam Coogan, lives in Brooklyn, and he says the railway there has grass and flower beds around its shop buildings and his friends that work there think it's a good thing. The company fixed up the beds the first time, but the men keep them up."

"Seems a bit fussy to me, Dick," replied the foreman, "it's all right to be dolled up on Sunday, but flowers and shop work don't mix, to my mind. This part of town's no place for it, Dick. How long do you suppose the kids around here would leave a flower or plant in the beds? One day, no?"

"That's one trouble with you, Bill, if you don't mind my saying it," said Dick, "you think anything but grinding out work is 'frills,' but I can't agree with you. Of course, we fellows here in the shop expect to work reasonably hard, but a little recreation as we go along does no harm. Why, I heard the other day about a shop where they put a piano in a spare room and let the men use it out of hours. Several of them could pound out the ragtime, all right."

"Cut it out, Dick" blurted out the foreman, "that soft stuff don't go around here. Flowers, piano — what next? Don't you think a sewin' society might please the young gentlemen who honor this here shop with their presence?"

"No jokin', Bill," said Dick, "our boys are no sissies, but they like the dollin' up that flowers give a place just the same. If you're too tight-fisted to have the yard cleaned up, we'll do it ourselves, if you'll put your 'O. K.' on the proposition."

"Hop to it, Dick; I can't object to getting the yard cleaned up for nothing. But, believe me, you and possibly Ole Olson will be the only ones who'll show up at yard-cleaning time. I'll bet one season will be enough for you, at that."

"You'll swallow them words, Bill; and remember this, you're losing a good chance to get next to the old man, who is mighty fond of a nice yard. What's more, if you feel like having a little exercise, bring your digging fork with you tomorrow morning and join the bunch in a little garden work after the whistle blows. Think it over, Bill."

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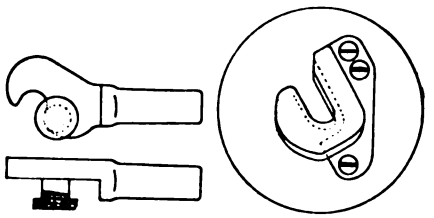
quired to heat an oven may be less than the cost for the electric current, but the consequential expenses are greater. Not only does the steam-heated oven require an attendant, but in some applications steam is obtained from boilers that are used for heating purposes only and which must be kept fired during the warmer weather to supply the necessary steam for the baking ovens.

Generally speaking, current taken from the trolley circuit is usually figured as costing very little for it is produced in such large quantities that the power cost is comparatively low.

Convenient Connector for Cable Between Cars

THE electric railway system of Nuremberg, Germany, uses electric brakes. When operating trailers it is customary to connect the electric brakes of the trailer by means of an insulated double conductor cable to the motor car. Trouble was experienced from these due to the wear of the insulation, the bending of the springs in the contact plugs and the swaying of the cable.

To overcome these troubles, Dipl.-Ing. Schwend, of the company, has introduced a special coupling and uses a 7-mm. steel cable without any insulation for the connection. During the normal braking action the potential difference between the electric brake line and ground is 30 volts. The



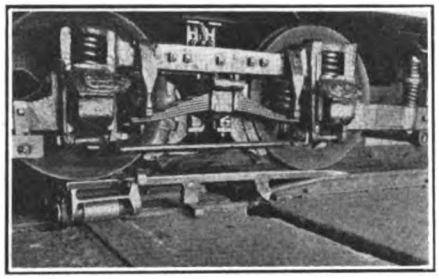
Attachments for Connecting Brake Line Cable Between Cars Used in Germany

cable is brought out from the interior wiring of the car through a metal bushing mounted upon a plate of oil-treated wood. The other end of the cable has a drop-forged special connection of a form and construction similar to that ordinarily used for air brake hose connection. The brake connection between the two cars is made by coupling the two fixtures together. In case of derailment the couplings are pulled apart readily.

Where a single car is used without a trailer the end of the cable is hooked into a blind dummy coupling mounted on a piece of oil-treated wood.

Moving Long Cars on Short Transfer Tables

SOME of the cars of the New York & Harlem Railroad have the distance between the outside wheels of the trucks greater than the length of track on the transfer table. In order to use the transfer table for shifting these cars, an extension as shown in the accompanying photograph is used. There is sufficient clearance at either end of the transfer table



Portable Extension for Transfer Table for Moving Long Cars

so that the cars can be moved with one pair of wheels off the table and still not interfere.

The extension used consists of a bar 2 in. x 2½ in. in section, which rests with one end on the rail of the transfer table while the outside end rests on a roller carriage. This bar is beveled at the end which rests on the track, so that the car wheels can be readily run onto the bar. Two supporting lugs are welded to the bar in the central portion. One of these lugs rests on the extreme end of the transfer table track and the other forms a support midway between this lug and the carriage.

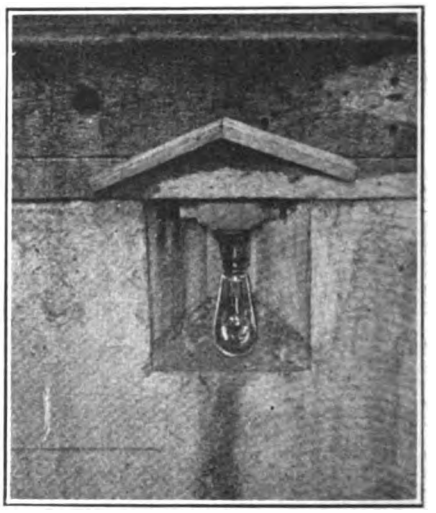
This latter lug does not reach entirely to the track as it would interfere as the transfer table is shifted. In order to form a rigid support while the truck is being run over this a wedge is inserted between the bottom of this lug and the track. The bar has dowel pins at each end, one fitting into a hole in the transfer table track, while the other fits into a corresponding hole of the carriage.

The carriage used consists of a framework with two large rollers. These rollers are 4 in. in diameter and 12 in. long. The outside ends are turned down and a babbitted sleeve is forced over the ends which serve as bearings, so that the rollers will rotate freely. These babbitted ends fit into stirrups fastened to the framework of the carriage. In order to provide for the rolling of the carriage as the transfer table is moved, a plate has been installed on the floor. Of course two carriages and two supporting bars are necessary, one for each rail, and as the transfer table is moved, with the truck in position, the two carriages roll along the iron plate. They cannot get out of position due to the truck holding them firmly.

In moving a car longer than the transfer table, the tracks are lined up and the car is run off the end of the transfer table opposite to that on which the extensions are to be installed. The extensions can then be put in place and the car is then backed up so that the forward wheel rests over the carriage, the other wheel of the truck resting on the end of the bar over the transfer table track. The wedge under the supporting lug of the bar is then removed and the transfer table can be shifted as desired.

Keeping Pit Lamps Dry

IN THE maintenance shops of the Eastern Massachusetts Street Railway at Fall River, the pits are lighted by means of lamps pointed downward in recesses molded in the concrete pit wall. To keep water from draining into the lamp recesses



Water Deflector Over Lamp Recess in Pit Wall

from the track stringer directly above, the deflector shown in the accompanying illustration has been provided. It consists of two strips of wood, 1 in. square, nailed, at an obtuse angle, above the recess.

The recess itself is made with a sloping floor so that it drains toward the pit. The recess is of such form that it tends to reflect light into the pit, and the lamp is placed well toward the front to give a wide angle of dispersion of the light.

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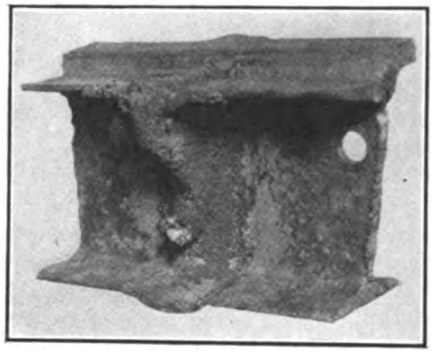
Ten-Year-Old Rail Weld

THE illustration shows a section of thermit welded rail which was cut out of the track on Carson Street, Pittsburgh, Pa., where a stretch of old rail had been welded in 1912, ten years previous. The condition of the rail surface at the weld was found



Welded Rail Joint Removed from Track in Pittsburgh After Ten Years Service

to be just as good as elsewhere, although the running surface of the rail was much worn down from the effect of the many years of traffic. If it were not for the collar of the weld on one side of the rail head, the weld at the rail surface could scarcely be distinguished from the rail itself.

An Effective Rail Bender

THE accompanying illustration shows a rail bender designed by M. C. Garlick, supervisor of tracks for the Easton (Pa.) Transit Company, which has proved a great labor saver in bending rails. Rails are bent to any desired radius by passing them between three large cast-steel rollers. Two of these are mounted on the outside end in a stationary position, and the third is fastened to a crosshead on a line midway between the two other rollers.

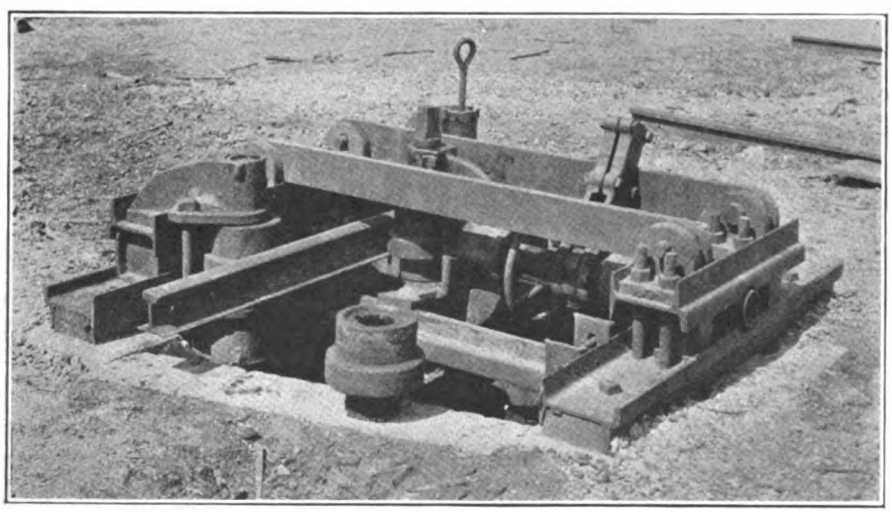
The movable roller can be shifted back and forth by a ratchet mechanism which acts on the crosshead. These rollers are of cast steel, and the circumference is made to conform to the section of rail being bent. Different rollers are used for the various sections of rail. These rollers have bearings of the same design as are standard for the Brill 21-E journal bearings used by the railway, and the central shafts about which they rotate are arranged so that they can be quickly lifted out to change rollers.

The center yoke casting, with its roller, works between two guide rails. In addition to these serving as guides, they also take the side thrust due to the bending of the rail. A large screw at the back end of the yoke provides for its movement. To bend a rail, it is placed in position on the two end rollers and the yoke casting is then moved up against the rail by a hand wheel. To give the pressure necessary for bending the rail, the ratchet mechanism at the back end is used. This ratchet is arranged to receive a long handle in a vertical position, and sufficient pressure can be obtained to bend the rail to any desired radius.

In order that the rail can be bent to the desired radius without passing it through the bender several times, the guide rails are marked for different positions of the yoke castings. These positions are first determined by experiment, but when once established the same rail section can be bent very accurately.

For feeding the rail through the bender, the center roller on the yoke casting is provided with a vertical shaft for receiving long handles. The workmen walk around the bender so as to rotate this roller, and the rail is fed through without difficulty. The company is now considering a motor drive for this so as to do away with the manual operation. In order to bring the crosshead back after the rail has been bent, the dog of the ratchet mechanism works in two directions and can be thrown over for reversing the screw as desired.

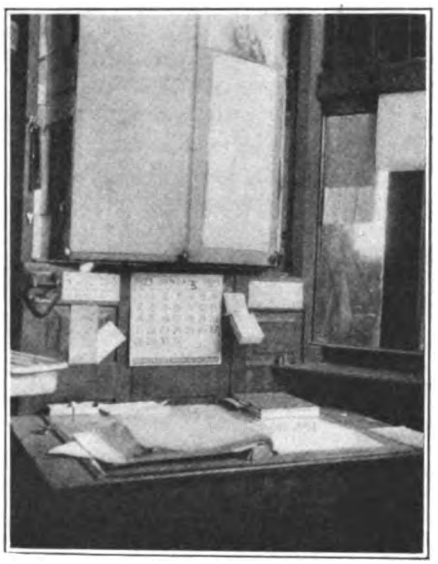
The Easton Transit Company has located this rail bender in the yard where rails are stored and has mounted it permanently on a brick and concrete foundation.



Shop-Constructed Rail Bender

A Revolving Bulletin Board Structure

IN THE shops of the Eastern Massachusetts Street Railway, at Fall River, the master mechanic uses a bulletin board arrangement like that shown in the accompanying illustration. His office is located in one corner of the overhauling shop, and the corner of the office is chamfered off so as to give a width of partition at this point of about 4 ft. His writing table is placed against this partition.



Revolving Bulletin Board Frame Used in Electric Railway Shops at Fall River

In a window in the partition there revolves a six-sided frame carrying six bulletin boards. Material can be placed on these boards in the office and the frame can then be revolved to bring the spaces carrying the posters into plain view in the shop. The master mechanic uses this bulletin board arrangement in connection with a plan for stimulating competition in maintenance work. This involves the use of a number of charts which are mounted permanently on the bulletin board frame.

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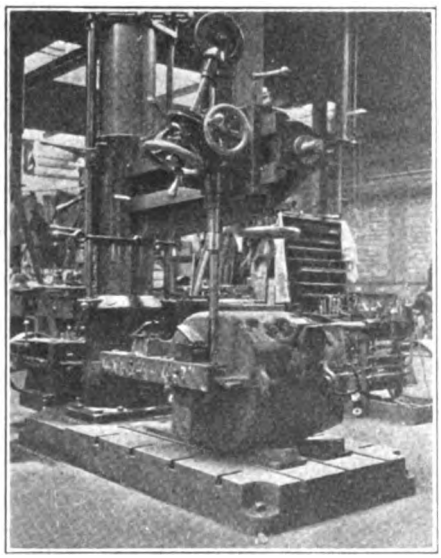
When a record is to be changed, the frame is simply swung around so that the chart can be modified from the desk, and it is swung back to show the record in the shop.

This arrangement is not only a convenience in mounting the bulletins, but it permits variety in the display of notices and posters. A narrow shelf in front of the frame on the shop side encourages the making of memoranda from the bulletins.

Reboring Holes in Motor Casings

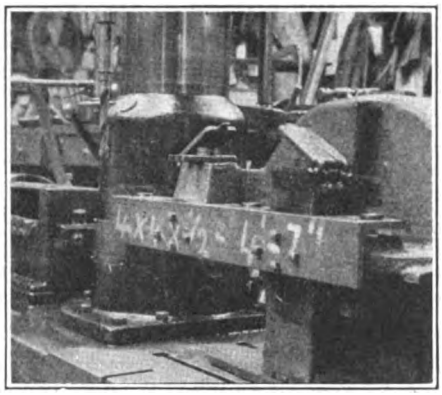
A RADIAL drill has been found by the United Electric Railways, Providence, R. I., to be the best machine for reboring holes in motor casings. There is enough of this work to keep the machine busy, and the operator has developed a high degree of skill in handling this kind of a job. A typical set-up of a motor frame on the bedplate of the machine is illustrated, while a closer view of the jig used on this particular job shows details of its construction.

The jig is made of 4-in. x 4-in. x ½-in. angle iron. It is securely



Radial Drill Set Up for Reboring Bolt Holes for Gear Case in Motor Shell

attached to the motor frame by means of curved pieces, bolted to the vertical side of the angle, which project into the armature and axle-bearing housings. By means of bolts passing upward through the grease boxes, these projecting pieces are firmly drawn against the upper surface of the holes holding the whole jig securely in position and accurately locating it in place. Steel-bushed holes in the horizontal part of the jig guide the drill.



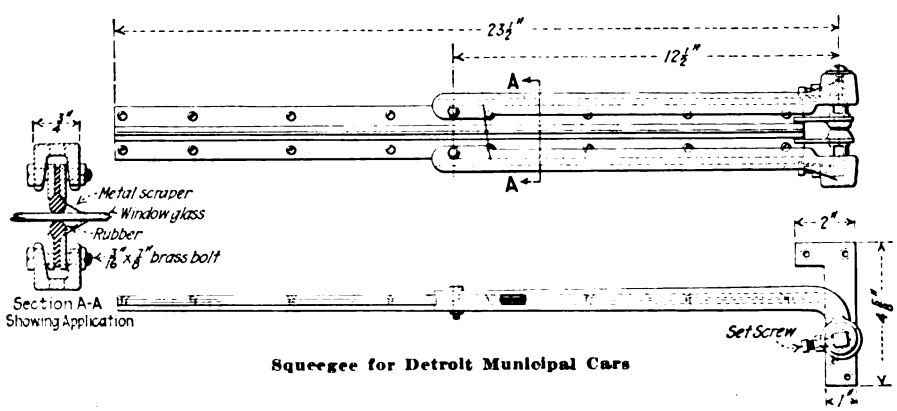
Close-Up View of Drilling Jig Attached to Motor Shell

An interesting feature of this work is that although this drill has been in operation for more than ten years it is practically new in appearance. As shown in one of the illustrations, the motor shell rests on boards and wedges, and this procedure has prevented marring of the bedplate.

Squeegee for Electric Cars

EVERY automobile worthy of the name has a squeegee for clearing the windshield of snow or moisture during stormy weather so that the driver can have a good view ahead, but very few electric cars are so equipped. It may be that because Detroit is the home of automobile manufacture the Detroit Municipal Railway has decided to equip all of its cars with this device. Its construction is shown in the accompanying diagram.

It is operated by hand and cleans both sides of the sash through which the motorman looks to see the road ahead. It consists of a steel arm 12½ in. long, which acts as a handle, a brass rubber holder, a rubber cleaner and a metal scraper, and it is attached to the upper left-hand corner of the window frame by the L-shaped bracket shown herewith. It is expected that the cost of equipping each car with this device will be about $4.50.



Squeegee for Detroit Municipal Cars

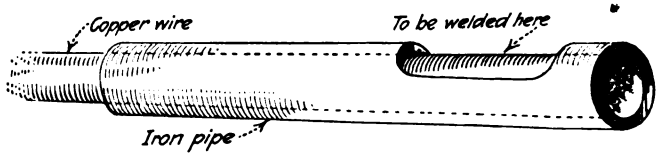
Cross Bonds with Iron Pipe Terminals

BY J. S. WILDER,
Engineer of Maintenance of Way Municipal Railway of St. Petersburg, Fla.

IN CROSS-BONDING our track we use solid copper wire with terminals of heavy black iron pipe. We take 6 in. lengths of this pipe and grind a spot part way through near one end, making the width of the depression same as that of the emery wheel with which grinding is done.

After cutting off a suitable length of solid copper wire for the bonds, we slip one of the pieces of pipe over each end of the wire, completely filling the pipe with the wire. We then hammer the pipe against the wire near where the ground-out spot is located, and weld the pipe and wire together at this spot. For welding we use an oxyacetylene torch and wire, such as are furnished for use in installing gas weld bonds.

We weld these bonds to the base of



Iron Pipe Construction for Terminals of Wire Used in Cross-Bonding

the rail, either by the electric or gas weld process, which can be done without danger of injuring the copper. A wet cloth laid over the copper wire will serve to draw the heat. After the bond is installed, the pipe and weld are given a coat of tar paint to retard rusting. These cross bonds can be made up in advance at odd times at very little expense. Possibly we could get better results if we used cast terminals instead of iron pipe.

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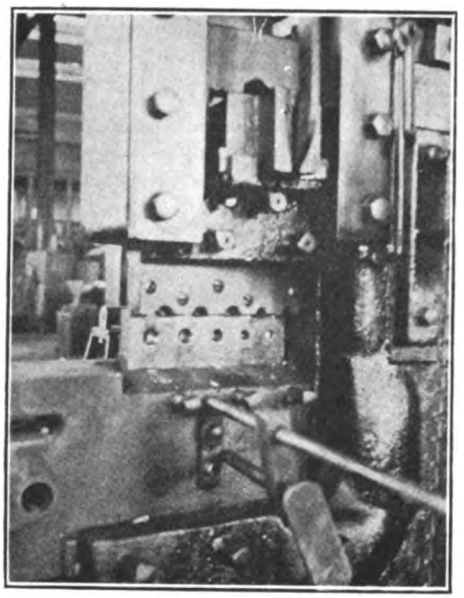
Corrections on Blueprints

IN REVISING blueprints the United Railways & Electric Company, Baltimore, Md., uses what are known as "Bourgeois" French water colors, obtained from Eugene Dietzgen Company, New York City. The colors are thinned with water and kept in small bottles, tightly corked. The colors are used like drawing ink. Unfortunately, the colors can be washed off, but as a rule this is not a defect.

Novel Use for Old Punch Press

INCLUDED in the equipment of the blacksmith shop of the United Electric Railways, Providence, R. I., is a combination shear and punch. There was no demand for the punch



Beaudry Combination Shear and Punch Fitted Up with Shears for Cutting Off Round Rods of Several Sizes

part of this machine, so it was changed over to cut off round stock in sizes ½ in., ⅝ in., ¾ in., ⅞ in., and 1 in.

On the bed of the press is mounted a block of machine steel, bored with a row of holes, each fitted with a hardened tool steel bushing to form a die. Each die accommodates loosely one size of rod. This forms the stationary blade of the shear. The moving blade is mounted on the crosshead and consists of a hardened steel plate notched out on its lower edge with notches of size appropriate to the diameter of rod to be sheared off.

By means of this shear a rod can be cut off instantly, with an end which is practically square and without deformation of the cross-section of the rod at the end. This eliminates the objection to shearing off rods in an ordinary shear, or with plain shears in a punch press. The use of the machine largely eliminates the necessity for sawing off rods.

This machine takes very little power when running light. It is kept running a good deal of the time, so that the men can cut off rods with no loss of time.

Lining Up Equalizing Bars

TO FACILITATE the proper lining up of equalizing bars and raising them into position a tool has been devised in the shops of the Metropolitan West Side Elevated Railway which not only performs this task with ease but also with safety. Following two very serious accidents in which the truck man was injured on the foot due to the equalizing bar falling, the foreman in charge of truck work designed the equalizing bar lifting tool illustrated in the accompanying photograph.

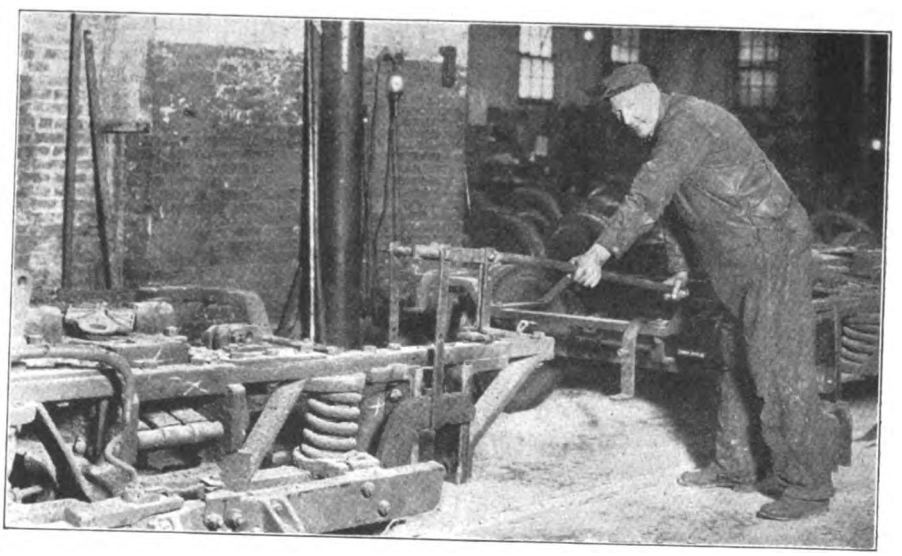
The construction is very simple. A 1-in. round wrought-iron bar acts as a lever, while two straps, 1 in. x ½ in., bent up at the ends form the lifting hooks. The fulcrum is so designed that it can be held in position by a couple of bolt-heads on the truck frame. Holes have been provided in the lifting hooks so that a pin may be inserted after the equalizing bars have been lifted to the desired height. One operator can then insert the spacing casting and spacing bolts into the two equalizing bars. An "X" has been drawn on the inside equalizing bar in the picture so that it may be more easily identified.

Although safety was the real reason for the introduction of this tool, the labor-saving feature of this device should not be overlooked. Previous to its installation three men were required to align and lift the equalizing bars into position. With this new device one man can do the work in less time.

Dipping Compound Kept from Armature Shafts

THE Easton (Pa.) division of the Lehigh Valley Transit Company dips and bakes all of its armatures and field coils, using an effective device designed by C. A. Doud, master mechanic. The dipping tank is located in the armature room, and in order to save floor space the tank is installed underneath an opening in the floor. By means of trapdoors this space can be kept closed when not in use. Armatures are dipped with the commutator end up, and in order to keep the compound off the armature shaft, the slings for supporting armatures are provided with a pipe receptacle at the bottom, which has the lower end closed. In supporting the armature in the sling the shaft rests in this pipe and the shaft is effectively protected, which eliminates cleaning the compound from the shaft as would otherwise be necessary.

The armature shown in the illustration is a Westinghouse type 306, and the sling for handling this type of armature has a 7-in. x 1-in. plate at the bottom, and a 3-in. pipe is welded to this plate as a protection for the armature shaft. This sling is also used for shorter railway armatures, but in this case a longer link is used at the top, which fits farther down on the side guides and thus supports the top of the armature shaft.



Device for Raising and Lining Up Equalizing Bars

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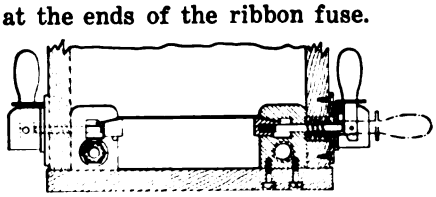
Sling with Pipe Protection Keeps Dipping Compound from Armature Shafts

The sling shown in the illustration on the cover of the door is for handling compressor armatures. An overhead traveling hoist is used for handling the armatures and for lowering them into and raising them from the dipping tank.

Improved Fuse Box Construction

THE accompanying illustration shows an improved type of construction for contact shoe fuse boxes using copper ribbon fuses. This has been worked out by Harvey L. Bullock, general foreman of the North White Plains electric shop of the New York Central Railroad, and has been installed on a number of multiple-unit cars and locomotives of that system. Additional cars are being equipped as rapidly as possible. The improvements consist in the method of operating the wedge for holding the ribbon fuse in position so as to provide for a rapid renewal and also to insure a positive contact at the ends of the ribbon fuse.



Improved Clamping Mechanism Provides for Rapid Renewal of Ribbon Fuses

The terminal block and wedges are of the standard design furnished by manufacturers. Each terminal wedge is provided with a stem which extends outward through an opening in the fuse box. The outer end of the stem has a bearing in a bracket attached to a plate on the outer face of the box. A coil spring surrounds the stem and is set in an opening in the fuse box with one end against the terminal block and the other against a washer on the stem, held in place by a cotter pin. The pressure of this spring thus holds the wedge in its clamping position in the terminal block.

When fuses blow in service, it is necessary that they be replaced as quickly as possible to prevent extended delay. This design provides for quick release of each terminal wedge by a hand lever fulcrumed on a bracket at the end of the fuse box and having the end shaped so as to move the wedge pin.

In its normal position the lever hangs downward and the wedges are held in their clamping position through the pressure of the spring. To release the terminal wedge, the operator swings the lever upward into a position indicated by the dotted line in the illustration. The beveled end of the lever pushes the stem inward with the terminal wedge and thus the ribbon fuse is released. As soon as the fuse has been inserted, the levers are knocked down and the fuse is held firmly in position.

New Equipment Available

Snow Broom Attachment for Truck Mounting

THE Fox Rotary Snow Broom Company, Newark, N. J., has placed a new rotary snow broom attachment for mounting on any standard chassis on the market. The frame is made of standard structural steel shapes and blue annealed steel plates. All parts pertaining to the attachment are mounted on this frame, which can be attached to the chassis by means of U bolts and can be installed or removed quickly.

Rotary Snow Broom Mounted on Standard Chassis

A 70-hp. motor is mounted in the rear of the frame, and power is transmitted from this to the double broom in front by means of a transmission shaft and two high-speed silent chain drives. A set of beveled gears is used in front to change the angle of drive due to the 45 deg. mounting of the broom. The chain drive runs in an oil-tight case and the beveled gears are enclosed and run in oil.

The broom shaft is made of 2½-in. cold rolled steel and is suspended at both ends and in the center between brooms. Four broom seats are mounted on the shaft, to which the broom halves are clamped. The end and center bearings are of the sleeve type made of bronze. The end bearings are designed for waste and oil lubrication and are suspended by cast-steel arms mounted on heavy pins fastened to the steel frame and concentric with the short transmission shaft between the broom chain drive and the beveled gears. The chain case acts as a suspension for the center bearings.

The arms and chain case are suspended at the broom end by means of a rocker shaft, levers, connecting links and a balanced weight for up and down adjustment of the broom. Should the brooms strike any heavy obstruction they will rise automatically as the balanced weight is free to move up or down as the case demands. The brooms are 34 in. in diameter, spaced 10 in. apart and will clear a road about 9 ft. wide. They are made in halves and are clamped to the broom seats on the shaft. The bristles are of ¼-in. rattan and will give about 100 hours of continuous service.

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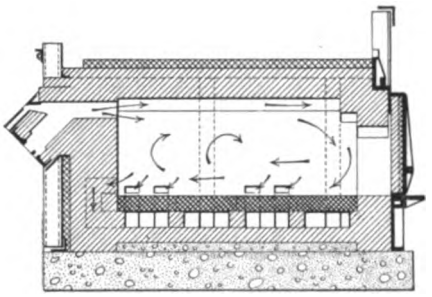
New Style Furnace Proves Successful

A HEAT-TREATING furnace of a type somewhat different from those in common use has been designed by the Mahr Manufacturing Company, Minneapolis, Minn., and has been giving very satisfactory results, it is said. The more even distribution of heat throughout the interior of the heating chamber, which has been secured in this furnace, makes it particularly well adapted for some kinds of electric railway work. It has been successfully used by the Transit Supply Company in Minneapolis, which is the purchasing organization for the Twin City Railway system, for the tempering of car springs.

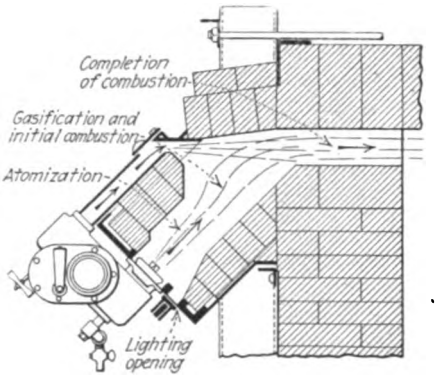
In this furnace the heat is applied directly and evenly to the material. As shown in an accompanying illustration the gases enter at the top of the heating chamber, travel along the roof, down the opposite side, across the bottom, out through apertures at the base of the side walls, and then through passages under the floor. The path of these gases is distinctly different from that in the ordinary furnace where they first strike the under side of the floor, travel along under that, up outside the walls, thence into the heating chamber and up the flue.



Sectional View of New Furnace

The floor and floor supports of the Mahr furnace are not subjected to the destructive action of the direct flame, and replacement of the floor is necessary only when it has been worn out on top by the handling of the stock. The design of the heating chamber insures a uniform distribution of heat from a single burner, thereby reducing the operator's labor to a minimum. A high degree of efficiency in operation is said to be insured by the path of the gases through and under the chamber.

Another novel feature of this furnace is the design of the burner. Either oil or gas can be used with low pressure air at about 8 to 12 ounces per square inch. The air, however, does not enter the burner through a circular opening immediately surrounding the stream of oil, as is usually the case, but is carried through a separate passage to a point slightly beyond, where it mixes with the atomized oil and the combustion takes place. The illustration shows the general design of the burner. This entry of the air by a separate passage permits the quantity to be exactly controlled, and any desired temperature in the heating chamber can easily be maintained.



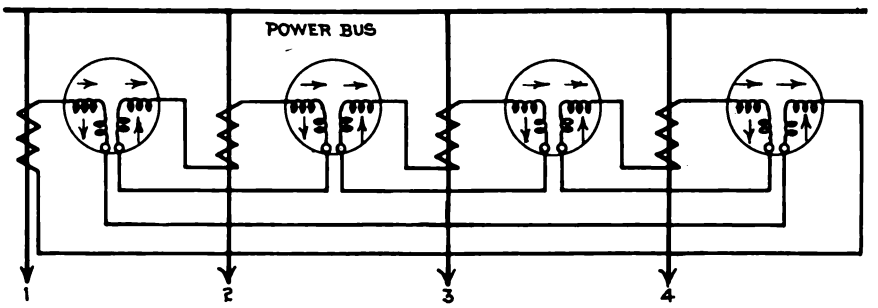
Cross-Section of Mahr Burner

Selective Differential Relay for Parallel-Line Protection

FOR use on two or more transmission lines which are in parallel between generating stations or substations, the Westinghouse Electric & Manufacturing Company has brought out a current relay which gives balanced protection to such lines. This relay, known as type CD, works on the induction principle and operates on current alone. It has two overload elements acting upon a common disk through a common magnetic circuit. Each element is connected separately to its own current transformer in corresponding phases of the two balanced lines. The two elements are electrically opposed, and under conditions of balanced line loads the fluxes in the magnetic circuit of the relay are equal and opposite, giving a resultant zero torque on the relay disk. Under these conditions the disk which carries the moving contact is held in a mid-position by the controlling springs.

Under the proper condition of current unbalance, the disk can rotate 80 deg. in either direction from zero and make contact on either side. Thus the moving contact acts as a single-pole, double-throw switch in the trip circuits of the circuit breakers of the two unbalanced lines, and will trip out the circuit breaker on the line carrying the heavier load.

When one of the lines is open, the differential relay is then automatically converted into an overload relay with a tripping current setting of twice the differential setting, and with the disk tending to rotate in such a direction as to trip out the loaded line.



Application of the Type-CD Relay to Four Parallel Feeders

Time Saved by All-in-One Steel Figure Dies

STEEL figures and letters are used quite extensively in electric railway shops for marking various metal parts. An ingenious arrangement of the steel figures by incorporating them all on one circular piece has just beeen brought out by Marburg Brothers, Inc., New York, N. Y. The figures are cut around one-half of the circumference of a steel disk, the other half being marked so that the blow of stamping can be applied at the most desirable point.

Among the advantages claimed for this arrangement is the saving in time which is usually taken in hunting for the correct figures. The "All-in-One" arrangement is more convenient to handle, and as there is more space for holding there is less danger of smashed fingers. By having the lettering on the side nearest the operator there is no danger of the figures getting upside down, and the individual figures cannot be lost or disarranged.

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Steel Plate Roller Bearing Trolley

WITH the objective of producing a strong flexible trolley for severe service conditions, the Yale & Towne Manufacturing Company, Stamford, Conn., has just brought out the "Yale" steel plate trolley. The accompanying illustrations show the details of construction.

The wheels are mounted on roller bearings attached to the side plates, which in turn are connected by a single equalizing pin which supports the shackle plate. Spreader castings are riveted to each plate, and these give a very large bearing surface for the equalizing pins. They are also shaped so as to protect the trolley and act as a bumper which engages the track stop on the lower flange at the end of the I-beam track. The strength of this construction is such that a full load may be safely carried on either plate.

In order to provide an exceptionally strong construction for withstanding shocks and strains, a reserve of seven times the rated capacity is provided. A 1-ton trolley will run on a minimum 21-in. radius curve, extreme flexibility thus being assured. Roller bearings are heat treated, hardened and ground. The grease chamber is so designed as to prevent dust from reaching the bearings.

The axles are set parallel to the I-beam flange. These are pressed into the wheel hubs and supported by the inner bearing plate, so that they are subjected to practically no bending strain. The wheels have chilled-iron treads which conform to the shape of the I-beam flange. The equalizing pin is of cold-rolled steel. It supports either the shackle, eye or clevis, and for use at locations where headroom is limited the chain block can be hooked directly over the equalizing pin.

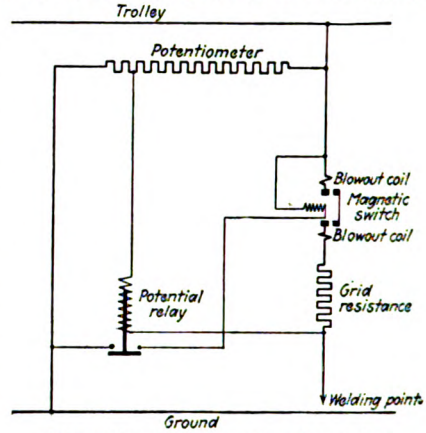
New D.C. Welder Breaks Arc Automatically

THE chief feature of a new d.c. welding apparatus recently put on the market is the use of a potentiometer, a relay and a magnetic switch to break the arc automatically at a fixed maximum length. Moreover, this device is so designed that the full 550 volts are carried by the apparatus only when it is actually in use.

The potentiometer is placed directly from trolley to ground. At a point 50 volts from the end of the potentiometer a tap goes to the potential relay, the other side of which is connected to the welding point. The relay is set to pick up at 50 volts and to drop at 25 volts. When the welding electrode is touched to the ground, therefore, a 50-volt current passes through the relay and it immediately picks up. This action of the relay closes a single-pole double-break magnetic switch which energizes the main welding circuit.

When the electrode is pulled away from the ground there is a voltage drop which at once affects the relay circuit. As soon as the voltage of this circuit falls below 25 volts, which occurs when the arc exceeds $\frac{3}{8}$ in. in length, the relay drops out, thereby releasing the magnetic switch and opening the main circuit.

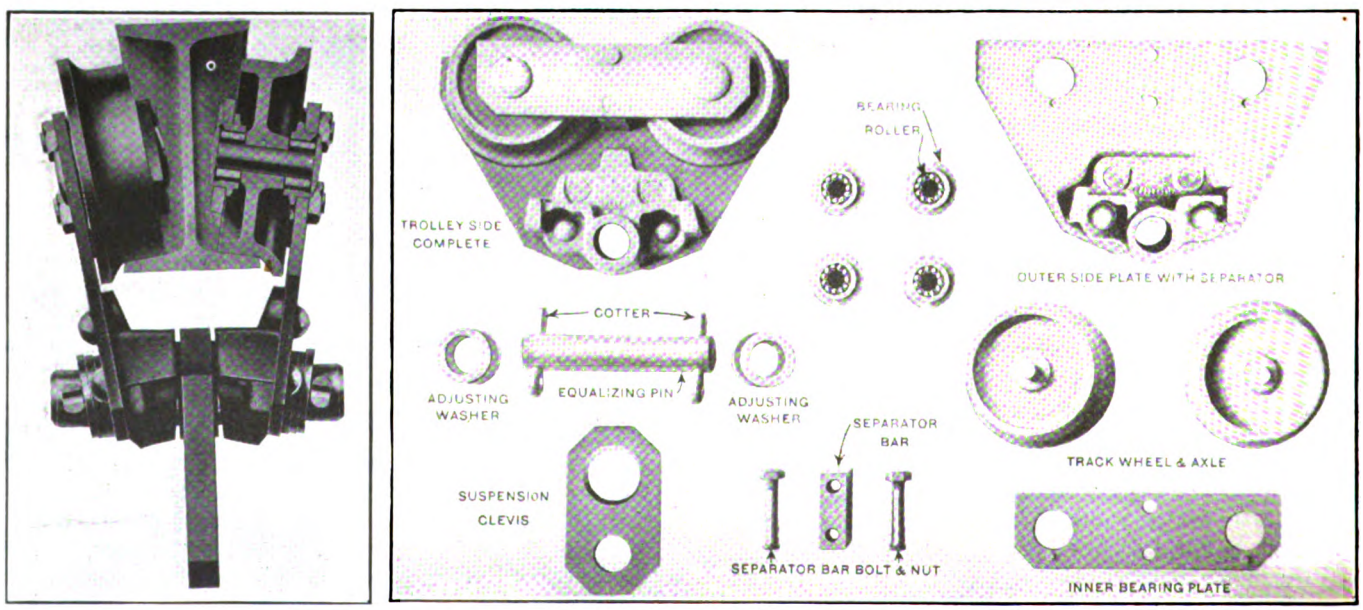
Two advantages that are particularly important in such work as track welding are claimed for this apparatus. In the first place the automatic breaking of the arc at a maximum length of a fraction of an inch eliminates the long flash which strains the eyes of the operator and often burns a hole in the work. In the second place increased safety results from the fact that all of the apparatus between the magnetic switch and the ground is dead except



Relay Prevents Drawing Long Arc

when welding is actually in progress. The resistance grids and other parts which a person might carelessly brush against carry full voltage only when the magnetic switch is closed.

The machine is made by the Electric Arc Cutting & Welding Company, located at Newark, N. J., is constructed under its own patent and is compact in construction and light in weight. The relay and magnetic switch are fastened on a piece of slate 15x18 in., and the potentiometer is placed in back. The whole apparatus stands 21 in. high and weighs 70 lb.



At Left, Sectional View Showing Installation of Trolley on I-Beam. At Right, Details of Plain Steel Plate Trolleys

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Association News & Discussions

Questions for Consideration of Chamber of Commerce

A NUMBER of questions have been forwarded to the Chamber of Commerce of the United States for consideration at the forthcoming eleventh annual meeting to be held in New York City, May 7 to 11. Among them are resolutions of the American Electric Railway Association and the American Gas Association regarding tax exemption of securities. The former submits the following:

Whereas our present policy of federal taxation has undergone a radical change from indirect to a system of direct taxation which relies chiefly upon levying a high rate of income tax upon those of large incomes, thereby causing a constantly increasing volume of capital to be diverted into the non-taxable securities of the federal, state and minor subdivisions of government, and

Whereas this diversion of capital has proved a serious handicap to productive enterprise by reason of the fact that, while exempting large incomes from the payment of taxes they would otherwise be obliged to pay, and placing an unfair burden of taxation upon those who cannot benefit by such exemption, it gives an unfair competitive advantage in the money markets to the exempted securities, and

Whereas the earnings of electric railways are limited by public regulation and consequently have been and still are insufficient to attract necessary new capital in competition with tax-exempt securities so that they are now being forced to furnish inadequate and unsatisfactory service, which situation will undoubtedly grow worse rather than better if present tax conditions continue, and

Whereas this situation can be corrected and the public properly served only by removing the competition from tax-exempt securities or by making further and in many cases material increases in the rates charged by such utilities for their services; now, therefore, be it

Resolved, By the American Electric Railway Association that it recommends that necessary corrective legislation be provided to remove the present inequitable burden of taxation and to make all income from whatever source and in whatever form bear its just proportion of the cost of government and remove the discrimination now prevailing between securities of the federal, state and minor subdivisions of government and those of private enterprise.

The American Gas Association also submits a resolution supporting the present method of utility regulation by state bodies, as follows:

Whereas the commercial and industrial life of the nation unquestionably depends largely upon efficient, adequate service by the public utility companies supplying light, heat, power, transportation and telephone service, and

Whereas the investment in these enterprises now aggregates more than fifteen billion dollars, and represents the savings of more than a million investors throughout the nation, thus reflecting their confidence in the system of just and impartial state regulation, and

Whereas the welfare of our industries also depends upon the ability of the utilities to attract continuously new capital at reasonable rates to supply the ever-increasing demands for additional service and extended facilities, these companies, in turn, being dependent upon the rates and charges for service which are determined and fixed by order of state commissions, and

Whereas municipal legislators, boards of aldermen, or officials created and designated by them and responsible to them, under the influence of local conditions or political interests, cannot be impartial, disinterested or qualified arbiters of intricate questions of rates, and

Whereas such bodies cannot maintain the necessary trained personnel required properly to advise tribunals in the exercise of quasi-judicial powers over important public services and vast investments, involving large technical and financial as well as business problems; now, therefore, be it

Resolved, That the Chamber of Commerce of the United States of America affirm its confidence in the principles of state regulation of public utilities and takes the position that any proposal to undermine or destroy such regulation, by delegating the state's regulatory powers to boards of aldermen, common councils, or other municipal bodies in the cities, represents a reactionary and retrogressive step, radically opposed to the best interests of the public.

Design of Passenger Stations for Electrified Railways

A LECTURE on the modernization of passenger railway stations, for graduates and students, was delivered before the Institute of Transport in London on Feb. 20. The authors were F. Bushrod and J. F. S. Tyler. As a part of their subject they discussed the influence of electrification of steam lines on passenger station design and operation. Among the points which they made were the following:

Conversion of lines from steam to electric traction, followed by the introduction of a rapid service at regular and frequent intervals, in substitution for comparatively slow and infrequent steam trains, involves consideration of station design from a new aspect. With the growth of passenger traffic, particularly in suburban areas, there came about a gradual lengthening of platforms to accommodate long steam trains. Under electric traction, with shorter and more numerous trains, these long platforms are unsuitable. Even with carefully placed and easily understood stopping marks, passengers have a tendency to spread themselves along the whole length of the platform during the intervals between trains. Time is thus lost waiting for passengers to make their way to the point where the train stops.

The location of platform entrances and their protection require closer attention than was given under the more leisurely steam working. The placing of entrances at extreme ends of platforms brings about uneven loading of trains, which is very noticeable when there are two or three consecutive stations having the entrance at the same end. The best position for the opening onto the platform is a point about the middle of its length.

Owing to the risk involved in passengers attempting to enter rapidly accelerating electric trains, it is essential that entrances should be protected by easily closed barriers, placed as near the platform as possible.

The introduction of an electric train service, with trains every few minutes, obviates the necessity for providing such ample waiting room accommodation as was formerly the custom. Platform covering should, however, be ample, otherwise there is a tendency for the passengers, on a wet day, to congregate under the shelter afforded, and all will attempt to crush into one or two coaches.

The timing of electric trains permits of only brief stoppages at stations, and it is therefore essential that everything possible be done to expedite passenger transfer and handling of baggage. Careful attention is needed to the following details of station design:

1. Ample platform width free from columns, lamp posts and similar obstructions.

2. Platforms of footboard height and having good surface for movements of trucks, etc.

3. Provision of separate entrances and exits at stations where traffic is heavy.

4. Provision of adequate ticket office facilities.

5. Clear and distinct platform and train indicators, direction boards, station name boards, etc.

6. Adequate lighting of platforms and illumination of station name boards.

Where power is taken from conductor rails, the latter must be cut at points where timber crossings are provided for the passage of baggage trucks, etc.

Such crossings are a source of risk where there is a frequent and rapidly accelerating train service, and station design should provide for their elimination, so that, wherever possible, traffic to or from one platform to another can be dealt with without obliging passengers and employees to cross the rails on the level.

Program for the Chamber of Commerce Meeting

ANNOUNCEMENT has been made of the topics which are to be considered at the Chamber of Commerce meeting, under the general headings "Transportation in All of Its Phases in the United States," and "Europe and Europe's Affairs." The list includes (1) communications, (2) distribution, (3) finance, (4) foreign commerce, (5) industrial problems, (6) immigration, (7) insurance, (8) International Chamber of Commerce, (9) merchant marine, (10) natural resources, (11) railroads and (12) transportation.

Transportation includes (1) the farmer's interest in transportation, (2) governmental relations to transportation, (3) readjustment of relative freight-rate schedules, (4) developing a national system of rail, water and highway transportation, involving co-ordination of our transportation systems, co-ordination of railroads, waterways and highways, and co-operation

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between the motor and the railroad.

On Friday, May 11, national councillors, delegates and substitutes, officers, directors and members of the Chamber of Commerce of the United States and their families will be the guests of the New York general reception committee, A. C. Bedford, chairman, and of the ladies' entertainment committee of New York, Mrs. William Fellowes Morgan, chairman, on a visit to West Point via the steamer *Washington Irving*. At West Point a special program of drills and exercises by over 1,300 cadets has been arranged by Brigadier General Frederick W. Sladen, superintendent United States Military Academy, especially for the occasion under authority of the Secretary of War.

Southwestern Association

THE program committee of the Southwestern Public Service Association (formerly the Southwestern Electrical & Gas Association), which will hold its annual convention in Fort Worth, Texas, May 15 to 17, has prepared the following tentative program for the meeting:

Tuesday, May 15—General session with addresses by the following: Col. Oscar H. Fogg, American Gas Association, on a subject connected with the gas industry; Hon. Carl D. Jackson, National Electric Light Association, on a subject connected with utility operations; Hartwell Jalonick, on the organization of a committee for business development.

Wednesday afternoon, May 16—A Public Relations session addressed by: Labert St. Clair, American Electric Railway Association, on "Advertising Utility Service"; H. C. Abell, National Electric Light Association, on "Public Utility Information Bureaus"; Luke C. Bradley, district manager Stone & Webster, on "Selling Utility Services Through the Employees"; George McQuaid, director Texas Public Service Information Bureau, on the work of the bureau.

Wednesday morning and Thursday morning, May 16 and 17—Papers and discussions in the street and interurban railway, gas and electric light and power sections.

Summer Convention of A. I. E. E.

SWAMPSCOTT, MASS., will this year be the scene of the annual summer convention of the American Institute of Electrical Engineers, to be held June 25 to 29. The headquarters will be at the New Ocean House.

The keynote of the convention will be advances in equipment and plant design. Among the subjects to be covered will be modern developments in rectifiers; researches conducted upon the nature of insulation failures; artificial transmission lines; electric plant for commercial radio; transmission and distribution; a new type of lightning arrester; lamp quality; street lighting; and a whole session upon the important subject of station economics as affected by the proposed use of 1,000-lb. steam pressure at the New Weymouth station of the Edison Electric Illuminating Company of Boston, and by new methods of conducting away heat losses in generating machinery.

Electric welding will be considered, and other papers promised, which may be included in the schedule, bear upon heat balance and plant economy, duplication of electrical equipment, instrument specifications, and electrical instruments. There will be at least one paper on engineering education.

In the main the afternoons will be devoted to the social and recreational sides of the convention. Provision will be made for inspection trips to plants in the Boston district on each day.

American Association News

Power Generation

THE Engineering Association committee on power generation met in Chicago on April 10. The following members were present: C. A. Greenidge, chairman; W. E. Bryan, F. C. Hanker, G. H. Kelsay, E. H. Scofield, sponsor, and R. L. Weber.

Regarding automatic substations, Mr. Bryan stated that a questionnaire should be sent out to the operating companies with a view to reaching standards for automatic substations. He explained the means of ventilation of some new substation buildings which are being installed in St. Louis. Forced ventilation is used, the air entering through a duct directly underneath the rotor, hence through the transformers and the grids, finally leaving the building through the roof ventilator. Ventilation, he suggested, could be controlled either thermostatically or by means of a time-clock control.

Mr. Scofield suggested the following classification of subjects to be studied or investigated in a questionnaire: Multiple or single feeders from bus; extent to which automatic control is applied; character of supervision; ventilation, forced or natural; power supply, either individual or common; buildings, with or without basement. Discussion brought out, as the order of importance in the design of a substation, the following elements: (1) Selection of the equipment, including the necessary alternating and direct current accessories; (2) decision as to system to be used and provision of adequate space for it; (3) design of the building.

In connection with the subject of reporting failures Mr. Bryan stated that on his property the interruptions to service are listed under two headings: (1) fixing the cause of the trouble; (2) seriousness of the interruption as measured by the load affected.

As to recent progress in power generation, the committee concluded that, inasmuch as the N. E. L. A. and the mechanical and electrical as well as the Edison associations are studying this subject, the committee should make only a general statement of the most recent developments and the latest designs. Mr. Greenidge has secured information as to condensers from various manufacturers and material regarding the best superheater practice.

The next discussion was on the definition of the output of a generating plant. A definition will be submitted for approval, through the proper channels.

H. A. Kidder was delegated to investigate the changes in the specifications for boiler tubes as made by the A.S.T.M. so as to harmonize the association's specifications with them.

For the information of the committee the report of a sectional committee of the A.E.S.C. on terminal markings was submitted as was also that of the electrical apparatus committee of the N.E.L.A. on transformer standards.

Copies of the latter will be sent to all members of the committee, who will be asked to report regarding it.

It was suggested that copies of the N.E.L.A. prime movers committee report should be sent to all members of the Engineering Association.

The meeting adjourned, to meet in June in Cleveland.

Buildings and Structures

PROGRESS reports were made by the four sub-committees of the Engineering Association committee on buildings and structures at the meeting held in Louisville, Ky., on April 16. Besides the chairman, N. E. Drexler, Hampton, Va., there were present the following: B. R. Brown, James Link, J. R. McKay and S. J. Steiner.

The topics taken up and the way in which they were handled are epitomized below:

Electric railway terminals. Plans of a number of passenger, freight and combination terminals were gone over and discussed. On account of the wide scope of this subject it was decided to treat it in a general way and include plans and descriptions of a number of existing terminals, which in the judgment of the committee are well laid out.

Waiting stations. Mr. McKay submitted plans of a number of waiting stations now in use in various parts of the country. This report was approved as containing good data for the final report.

Small bridges, trestles and culverts. After general discussion it was decided to obtain further information on trestles and concrete culvert pipe and to revise the drawings in last year's report.

Revision of existing standards. The chairman presented proposed revisions of Sections Bm-1c and Bm-2c of the Manual. These will be checked and included in final report.

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The News of the Industry

Transit Commission Reports

Detroit Body Says Comprehensive System Can Be Provided There Only Under City Ownership

Municipal ownership of Detroit's proposed rapid transit system is the only means of providing a comprehensive passenger distribution system there. This is the opinion set forth in a report by the Rapid Transit Commission, appointed by former Mayor James Couzens to study Detroit's needs. The commission is composed of Col. Sidney D. Waldon, chairman; Col. H. W. Alden; Andrew H. Green; Clarence W. Hubbell, former city engineer and Willard Pope, civil engineer. Daniel L. Turner, New York, is consulting engineer and Major T. J. Hallihan, New York, is advisory engineer.

In the designing of a complete city-owned system, the importance of city planning and regulation by zoning of the heights and uses of buildings must be considered, according to the report submitted by the commission's chairman. The recommendation that Detroit proceed to lay out a large system of streets and avenues is taken as evidence that the survey which the commission is making is not confined to the study of subway and elevated lines.

Aims To Relieve Traffic Congestion

The commission's studies include plans for transportation by private vehicles, buses, surface cars, and rapid transit trains to all sections of the city. The undertaking was to draw plans for a comprehensive rapid transit system capable of meeting the requirements of a population spread over what is referred to as Detroit's metropolitan area. The task as the commission sees it is to facilitate collection and distribution of the bulk of the car-riding public in and between the residential, industrial and business districts with the greatest saving of time and the maximum of convenience to patrons. The system must be the backbone of Detroit's transportation on rails. It must anticipate industrial and business developments and facilitate uniform growth. Above all it is to relieve traffic congestion.

It is pointed out that concentration of population, induced by transportation induces other transportation to tap the same profitable field, and in turn adds to the concentration. All forms of transit when operated wholly for profit, according to the report, act upon this general principle and private ownership of public transportation will always tend toward concentration of population.

The commission's engineers find that the creation of many more centers of concentration will be necessary. Three million inhabitants mean filling all of the vacant spaces in the present city of Detroit and much space that is outside the city. It is recommended that Detroit at once lay plans for mass transportation by rail and automobile. The city is considered as standing at a critical stage in its development.

The engineers state that Detroit is substantially a two and one-half story city spread out over many miles, but it is believed that wide arteries of traffic can still be laid out through relatively inexpensive property, and these can be gradually developed to the plans at a minimum of expense to the city.

It is expected that the comprehensive plan which the commission is developing for Detroit and the metropolitan area will be ready to submit to the voters at the election in November.

Strike Ends—Memphis Men Get Four Cents Increase

The car strike of the employees of the Memphis (Tenn.) Street Railway terminated on April 18 after one day's duration. The walkout was the result of a wage dispute, the men demanding a flat increase of 7 cents an hour. The scale had been 38 cents an hour for the first year, 43 cents for the second and 48 cents for the third. Following a series of conferences the men returned to work on a scale of 42 cents, 47 cents and 52 cents, according to length of service. This represented an increase of 4 cents an hour. No disorder accompanied service suspension.

Complains of Tariff Discrimination

The Salt Lake & Utah Railroad has filed compaint with the Interestate Commerce Commission, asking that the line be made a party to a tariff under which coal from Utah Railway points is shipped to Nevada and California. The complaint alleges that the Utah Railway, which terminates at Provo, refused to grant the Salt Lake & Utah Railroad (Orem Line) permission to enter into the haul of coal from mines in the Castlegate district. Charge is made of an agreement between the Denver & Rio Grande Western and Los Angeles & Salt Lake Railroad by which these companies are to haul the coal to Salt Lake and Ogden for routing to Nevada and California points.

The Orem line asks for equal chance at a routing with the Utah Railway and proposes the routing from the coal fields be the Utah Railway to Provo; Salt Lake & Utah Railroad to Salt Lake; Bamberger Electric to Ogden, and Southern Pacific to points west.

Commission Attacked

Governor Donahey of Ohio Wants Commission to Act in the Interests of People—Resignations Asked

Governor A. Victor Donahey of Ohio, in his pre-election campaign, assured Ohio voters that he would "make the Ohio Public Utilities Commission function in the interests of the people and be fair to both the people and the utilities, or else abolish the commission."

In his first step in this direction, Governor Donahey has demanded the resignation of George T. Poor and Frank B. Maullar, two of the members of the commission. The terms of office of these men do not expire until after Mr. Donahey's term of office is over.

The third member of the commission, whose term has already expired, is C. C. Marshall, who is of the same political faith as the Governor, but Mr. Donahey has already named a new man, Walter Hopkins, Cincinnati, as Mr. Marshall's successor. So far, however, the State Senate of Ohio has refused the necessary confirmation to permit Mr. Hopkins to qualify.

It is reported that if Mr. Poor and Mr. Maullar refuse the Governor's demand to resign he will attempt to oust them.

In a recent message to the General Assembly of Ohio, Governor Donahey said in part:

> In my opinion there has been something radically wrong with the manner in which the Public Utilities Commission of Ohio has functioned for several years. Whether the fault lies in the law, the method of administration, the policies of the commission, or its personnel, evils incident to the foreign ownership and control of some of our utilities, or whether the difficulty is a combination of all these factors, I do not profess to know. I am convinced, however, that a crisis with reference to this question of public utility regulation is at hand which can only be solved by unselfish effort upon the part of all concerned to remedy such defects as may exist in the present law or its administration in order that these great facilities may be further expanded more efficiently to meet the needs of our people and at the same time assure the vast number of customers efficient service at reasonable rates.
>
> The records show a vast number of important cases decided without the issuance by the commission of any opinion reviewing the facts involved and stating the reasons for the decision. Surely in cases of this kind the patrons concerned and the general public are entitled to opinions giving reasons actuating the particular decisions and reviews of the facts upon which the decisions are based.
>
> I recommend that it be made mandatory upon the Public Utilities Commission of Ohio in all contested cases to issue in such cases opinions setting forth the reasons prompting the decisions arrived at and a review from the record of the facts upon which such decisions are based.
>
> In my opinion it would greatly clarify the situation if, in all cases where such action is feasible, hearings be held in the community in which the cause of action arises.
>
> Another phase of regulation which is daily growing of more concern to our people is the matter of valuation for rate-making purposes. I am convinced that for a number of years the staff of engineers and accountants in the employ of the commission has been woefully incompetent and inadequate properly to do justice to the pub-

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lic's interest. It is my hope that this staff may be so reformed as to inspire a feeling of confidence in our people that in all valuation matters the state is using the best engineering and accounting talent available to insure a square deal—nothing more and nothing less—to both the public served and the utility rendering service.

If further appropriations are found necessary to accomplish these ends they should be freely granted. As it has been administered in recent years, the regulation of Ohio public utilities has paralyzed municipal control and reduced many of our cities to a condition of helpless rage or deadly indifference.

Birmingham Jim Crow Law Enforcement Postponed

Enforcement of the recently adopted Jim Crow ordinance to require separate cars or compartments with separate entrances for white and negro passengers has been postponed for thirty days by the City Commission of Birmingham, Ala., pending the outcome of conferences now being held with representatives of the Birmingham Railway, Light & Power Company in an effort to settle all differences between the city and company. The time limit for enforcing the ordinance was extended to May 15 by a unanimous vote of the commission at an adjourned meeting held on April 12. Conferences are scheduled to be resumed in a few days.

Three conferences have been held. All have been behind closed doors. No detailed announcement has been made of the matters gone into or of the progress of the discussions. No statements have been forthcoming from Lee C. Bradley, receiver, or from J. S. Pevear, president and co-receiver of the Birmingham Railway, Light & Power Company. Commissioner William L. Harrison has acted as spokesman following the conferences already held. He has announced that the conferences are being held in an effort to arrive at a general settlement of all issues between the city and company, including the jitneys, Jim Crow ordinance, street paving wanted by the city, certain rights-of-way wanted by the city from the company, installation of street lights and other matters.

Paving Question Up in Pittsburgh

Agreeing to co-operate as far as possible with the city in its general street repaving program this year, W. D. George and S. L. Tone, two of the three receivers of the Pittsburgh (Pa.) Railways, said at a conference with City Council it was doubtful whether the company would be financially able to complete the entire schedule. The receivers promised to confer with Public Works Director Charles A. Finley and submit a list of streets which the company will agree to improve between its tracks. Desirability of getting an early start on the schedule was pointed out by several members of Council.

The receivers have expressed a desire to abandon one of the tracks on East Carson Street, from Thirty-first Street to the city line, also one track on Sixteenth Street, between Liberty Avenue and the south approach to the new Sixteenth Street Bridge, and one track on East Street, North Side. To relieve traffic congestion on Sixteenth Street after the new bridge is opened, it was suggested both tracks there be abandoned and a new loop track be placed on Fifteenth Street. The receivers said they would have legislation prepared at once, authorizing this change.

Bill to Assess Property for Transit Improvements Introduced in Pennsylvania

Senator Edward W. Patton, of Philadelphia, on April 9 introduced a bill in the Senate of Pennsylvania proposing an amendment to the Constitution which would permit the enactment of laws authorizing assessments against properties particularly benefited by the construction of public improvements or utilities by the city of Philadelphia. It is provided that the money realized from such assessments shall be appropriated toward the cost of such improvements or the retirements of bonds issued for their construction.

The effect of such an amendment would be to permit the passage of laws assessing properties particularly benefited by transit improvements undertaken by the city. The resolution was sent to the committee on municipal affairs, of which Senator Samuel W. Salus is chairman.

The bill is somewhat along the lines of the suggestions contained in the "Rapid Transit Handbook," issued in May, 1922, by the Philadelphia Rapid Transit Company. It will be recalled that T. E. Mitten, president of the company, then advocated the assessment idea, saying that failure to assess some portion of the costs of added transit upon property owners who are specially benefited, exhausted the city's borrowing capacity, and thus prevented property owners from getting other improvements to which they might be properly entitled. The other conclusions contained in the "Rapid Transit Handbook" follow:

Higher fares discourage increased riding and interfere with the extension of home building areas, thus nullifying the main justification for use of municipal funds in aid of added transit.

Inability to collect sufficient revenue in fares to meet costs of operation, and in addition pay the interest on city investment, makes necessary the use of some other means to avoid overburdening city credit.

There being no inducement for further investment of private capital, municipal funds, or those secured through assessment of benefited property, must be depended upon for future transit development.

Subway and elevated lines relieve street congestion to advantage of general vehicular and pedestrian traffic. This, with increased values of public or other property, not subjected to special assessment for added transit, would justify general taxes bearing a share of the costs of rapid transit development.

Liberal treatment of earlier investment is justified because of the risks taken by original pioneers in developing transit; but a continuation of the present plan of building subways benefiting private property, which takes no risk whatever, is without any such justification.

A commission of public spirited citizens, representing the real estate and commercial interests, could, in co-operation with the city and the company, together best plan for added transit.

The Philadelphia Rapid Transit Company is repeating these conclusions just now in "Service Talks."

Chicago "L" Extension Under Way

Work on the contemplated extension to the Douglas Park branch of the Metropolitan West Side Elevated Railway of Chicago has been temporarily restrained by an injunction obtained by the Chicago & West Towns Railway. The contention is that the Elevated did not apply for a certificate of necessity and convenience for this extension. The West Towns Railway was required to obtain such a certificate before making extensions to its properties, and inasmuch as the new Elevated line extends into the former's territory it is felt that such a certificate should be obtained by the Elevated Railroad. No trackwork, such as rails and ties, is to be laid until after a hearing.

When completed the extension will add about three-quarters of a mile to the Douglas Park branch. Two new stations will be added, one at Ridgeland Avenue, Berwyn, the other at the terminal, Oak Park Avenue. Inasmuch as the Elevated owns the right-of-way, no destruction of buildings or confiscation of property is necessary. The track will be laid on the surface. The total cost will be about $60,000.

Key Route Receives New Turbo-Electric Ferryboat

The San Francisco & Oakland Terminal Railroad, Oakland, Calif., has received the first of the two new ferryboats which have been constructed to order in Los Angeles Harbor. The *Hayward* was brought up the Pacific Coast in tow of a seagoing tug, arriving at San Francisco on April 2, having made the 400-mile sea trip in two days. The new boat has turbo-electric drive. It is 240 ft. long and displaces a boat of 1,375 tons. The capacity of the new boat is 3,000. The second boat, the *San Leandro*, was expected at San Francisco within a month after its sister ship.

Conference Called on New York Utility Legislation

From the attitude of the Republican Assembly of New York, as indicated by a statement issued on the night of April 19 by Speaker Machold calling for a conference of Senate and Assembly leaders with Governor Smith on transit matters, it seems almost certain the New York State Legislature will not adjourn May 4 without having enacted a home rule transit law for New York City. While the Speaker would refer municipal ownership and operation of transit facilities to a referendum of the voters of New York City, it is not thought that particular feature will stand in the way of a compromise bill, provided regulation of service and capitalization are permitted to remain under stable state supervision. To do otherwise, the Speaker declared, would abrogate the principle of public utility regulation established by Governor Hughes sixteen years ago.

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Rapid Transit Extension Planned for Interurban

The Ohio State Senate has passed the Lipp bill, giving City Councils power to fix rates of fare on elevated railroads in excess of 5 cents. Residents of the western section of Cincinnati thus appear to be assured rapid transit service from Anderson's Ferry into the heart of the city within a few months. The measure is intended primarily to give the Cincinnati, Lawrenceburg & Aurora Electric Street Railroad the right to extend its tracks into the city.

Residents of Delhi, Sayler Park, Anderson's Ferry and Fernbank already have prepared to build the extension and the West End Terminal Railway has been incorporated by H. Lee Early, Morgan Wamsley, Milton Sayler, and others to finance the project. It is estimated that the improvement will cost approximately $750,000.

Stanley Shaffer, counsel for the receivers of the Cincinnati, Lawrenceburg & Aurora Electric Street Railroad, said that the railway or the new corporation would apply to the City Council for a franchise as soon as the measure becomes a law. The rate of fare will be decided by agreement between the Council and the company. The desire is to make the cash fare 10 cents with tickets at the rate of 8 cents.

The Union Gas & Electric Company is prepared to supply power for the new line. The time for the trip from the center of the city to Anderson's ferry, the present Cincinnati terminal of the Cincinnati, Lawrenceburg & Aurora Electric Street Railroad, which now takes forty-five minutes by surface cars, will be reduced to fifteen minutes by the elevated service.

L. G. Van Ness, general manager of the Cincinnati, Lawrenceburg & Aurora Electric Street Railroad, said that the extension will be built by the West End Terminal Railway and leased to his company. Work on the extension will be started within the next sixty days.

Kansas Electrification Not Decided

Nothing definite has as yet been done regarding the carrying out of new electrification work in Kansas under the terms of legislation passed at the recent session of the Legislature. This legislation makes possible the lending of aid by municipalities toward the carrying out of such work.

One of the companies about which there has been talk in connection with the electrification rumors is the Arkansas Valley Interurban Railway. It is understood that more than a year ago officers of this company conferred with officers of the Union Pacific and the Missouri Pacific Railroad with a view to leasing branch lines of these companies, with the end in mind of electrifying the two branch lines from Newton to Salina, thus giving a through electric line from Wichita to Salina.

As the railroad map of Kansas shows the Union Pacific has a branch line from Salina south to McPherson, a distance of 34 miles, while the Missouri Pacific has a branch line from McPherson southeast to Newton, a distance of about 30 miles. The Arkansas Valley Interurban operates from Wichita to Newton. On their face the factors seem favorable for carrying out the work of tieing up these lines for electric operation, but many elements enter into the consideration of the matter, among them the increasing menace of the motor truck and the motor bus as possible active competitors for business. It is even believed in some quarters that the decision to go ahead with some of this work would long since have been made had it not been for this feeling of uncertainty as to the proportion of business which the railways could retain under competitive and, so far as the railways are concerned, restrictive operating conditions.

Conference on Rewriting of Purchase Contract for Seattle Railway

By unanimous vote, the members of the City Council of Seattle, Wash., have agreed to confer with the Stone & Webster bondholders, in an effort to obtain a rewriting of the purchase contract by which the city agreed to pay $15,000,000 for the lines now included in the system of the municipal railway. A resolution passed by the Council paves the way for obtaining, if possible, from the bondholders an extension of the time limit for retiring the municipal railway bonds, and authorizes the city officials to negotiate with Stone & Webster officials with that end in view.

Copies of the resolution have been mailed to A. W. Leonard, president of the Puget Sound Power & Light Company, Seattle representative of Stone & Webster, and to the Equitable Trust Company, New York, trustee, to whom the interest is remitted by the city treasurer. Mr. Leonard has agreed to take the matter up with his company officials. Councilman C. B. Fitzgerald, who introduced the resolution, said that its object was to ascertain the attitude of the bondholders on a proposal to double the time limit on the remaining $13,334,000 of bonds, which would mean an extension of sixteen years, or a limit of thirty-two years from date.

Complete figures on receipts of the Seattle Municipal Railway for March, under the 5-cent fare, which went into effect on March 1, bear out the trend indicated at the beginning of the 5-cent fare period and an actual average loss daily for the thirty-one days is shown to be $4,475, or $138,725 for the month. In a letter to the City Council last November, Superintendent of Public Utilities G. F. Russell, stated that he anticipated an increase of 13 per cent in passengers under the 5-cent fare, but the actual increase during March amounted to only 8 per cent.

Through action of the City Council in appropriating $50,000 from the operating fund to the depreciation fund by ordinance, another warrant crisis looms in the finances of the railway system for May. At present, the passenger revenues of the system are barely sufficient to take care of maintenance and operation, and the ordinance appropriating $50,000 to repay money borrowed from the depreciation fund late in January, when the department faced a warrant crisis, will make the operating fund short. By May 25, next pay day, the operating fund will be short and warrants will be necessary for part of the money due in salaries or supplies, unless the city revenues show marked increase.

The appropriation of $50,000 is to take care of contracts signed for the improvements to Westlake Avenue along Lake Union and a strip of Union Street.

In the meantime, the Council has requested by ordinance, a complete report on the finances of the street railway system, with a detailed survey of the entire situation. Municipal railway officials are compiling the report which will be submitted in the near future, and which is expected to include recommendations from both the utilities and railway department heads that the 5-cent fare be discontinued.

Fifty-one Years an Employee

What is probably the longest record of continuous service with a traction company in the Middle West has been made by A. W. Lentz. He has served with the Indiana Service Corporation, Fort Wayne, Ind., and its predecessors for a period of fifty-one years and five months. This fact came out recently on the occasion of Mr. Lentz's eightieth birthday anniversary. During Mr. Lentz's connection with the company the ownership of the property changed several times and he served in many different capacities. At the present time he is a timekeeper in the south carhouse of the corporation.

In acknowledgment of the faithful service of Mr. Lentz, Samuel W. Greenland, general manager of the company, sent him the following letter:

My dear Tony:

I note that tomorrow you will have reached another milestone in your life. I desire to congratulate you and wish you continuation of health and happiness, with the hope that you may have many more birthdays.

It is certainly very pleasing to note that you are the oldest employee in the service of this company and its predecessors. Continuous service for fifty-one years and five months is certainly a fine record, especially when account is taken of the high-grade service you have rendered.

For this company and the former companies with which you have been associated I want to thank you for the loyal manner in which you have served these fifty-one years.

Surface Lines Extend One-Man Car Operation—Effective Monday, April 16, the Chicago Surface Lines' equipped eight routes with one-man cars. This brings the number of routes so operated up to twelve and a total of forty-seven one-man cars in operation. Of the twelve routes, six are equipped with single-truck cars, while the remaining six are equipped with double-truck cars of the type which can be operated by either one man or two men.

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Los Angeles Campaign Intense

Mayor and President of Utility Board Oppose Majority Proposal to Force Large Program on Companies

Mayor Cryer of Los Angeles, Calif., claims that Commissioners of Public Utilities Bogardus and Kennedy, who form a majority on the board, were without authority in rejecting as "unsatisfactory as a whole" the offers of the Pacific Electric Railway and Los Angeles Railway companies for a $6,000,000 improvement program of track extensions and motor bus service. The mayor states that the companies should be given a chance to make good; that he has always found it wise policy to accept such offers for much needed improvements in street car service, then later barter for further improvements.

President Leeds of the Board of Public Utilities was not a party to the communication to the street railway companies, as he does not agree to all of the demands made by the majority of the board. He appeared before the City Council and requested it to instruct the Board of Public Utilities to accept the improvement program offered by the companies. It is claimed the majority members of the board exceeded the law in addressing the companies by letter without the approval of the City Council and Mayor.

CITY COUNCIL CAN FORCE ACCEPTANCE OF PROGRAM

The city charter gives the City Council power to compel the board to accept the companies' proposals. Regardless of differences within the city government, formal applications to the City Council and the board are being prepared by the railways for permission to carry out their proposed $6,000,000 program of rail extensions and motor bus "feeder" lines.

The Board of Public Utilities, however, can of its own motion issue the rail lines motor bus permits. The program of improvements of the Los Angeles Railway and the Pacific Electric Railway for motor bus lines and rail extensions was reported in ELECTRIC RAILWAY JOURNAL, April 14, 1923.

The majority members of the board claim that if they accept any part of the offer of the rail lines independent motor bus companies will be permitted to operate their lines. Commissioner Bogardus states that no motor bus permits will be given the Pacific Electric by the board, but that several permits will be given the Los Angeles Railway, and that the majority will approve the rail extensions proposed by the Los Angeles Railway. Permits will also be given the People's Motorbus Company and the Gulick Glendale bus system.

The City Council has appropriated $1,500 to defray the expense of Commissioner Bogardus and Chief Engineer Lorentz of the board to visit various Eastern cities where motor buses are in operation to study the situation.

W. G. McAdoo, counsel for the People's Motorbus Company, is actively campaigning for the issues in favor of his company that appear on the May first ballot. He nightly is addressing various associations where there is agitation for the motor bus.

The Traffic Betterment Association, an organization of prominent business and professional men, believes that additional motor buses would add to the badly congested streets of the city, and states that the People's Motorbus Company is now seeking to amend the ordinance against jitney buses approved by the voters in 1917, so as to permit them again to clog up the streets with unnecessary traffic.

The Los Angeles Chamber of Commerce has made a public statement that it is opposed to the McAdoo bus system being admitted to the city street, recommending that the street car companies be given time to make good on their offer to make improvements.

News Notes

Strike Over.—A settlement has been practically reached between former employees and the management of the Steubenville, East Liverpool & Beaver Valley Traction Company, East Liverpool, Ohio, which will terminate a strike which lasted nearly 350 days.

Bill Against One-Man Cars in Wisconsin.—A bill has been prepared for introduction into the State Legislature at Madison, Wis., calling for the complete abolishment of one-man cars in Wisconsin and compelling railways to have a motorman and a conductor on every car.

Urges Trolleys for Motorists.—H. B. Weatherwax, vice-president of the United Traction Company, Albany, N. Y., has urged on motorists the slogan of "the trolley car for business, the automobile for pleasure." This, he believes is the solution of the traffic congestion problem which will help make for successful operation of the railway lines.

Confer on Wages.—Conferences are being held between the management and employees of the East St. Louis & Suburban Railway, East St. Louis, Ill., looking toward a new wage agreement. The present agreement terminates on May 1. It calls for a scale of 51 cents an hour, which is a reduction of 19 cents from the scale in effect during 1922.

Utility Department Created at Houston.—A Department of Public Utilities has been created within the city government of Houston, Tex., and a supervisor of public utilities is to be appointed who will have supervisory powers over the various utilities operating in the city. Under the agreement each of the large utility companies operating in Houston will contribute $5,000 to a fund to be used in financing the operation of the new department.

Foreign News

The council of the Tramways & Light Railways Association have instituted a standing research committee with power to appoint sub-committees consisting of technical men, whether members of the association or not, and to delegate inquiries to these sub-committees. Questions regarding rolling stock have been referred to the standing research committee with instructions to co-operate with the Municipal Tramways Association. A joint committee of representatives of two associations has accordingly been formed.

The chairman of the London United Tramways Corporation, Sir William Ackworth, in addressing the recent annual meeting of the shareholders, stated that the result of experiments with a one-man car had been quite satisfactory, and before long that type of car would be in use on the less profitable routes. A few one-man cars are in use in other parts of Britain.

At a recent meeting of the London County Council the chairman of the highways committee stated that during the twelve months ended Jan. 31 last 410 persons were knocked down by vehicles passing London County Council tramcars engaged in setting down or taking up passengers. This is an argument for the proposal to have legislation to deal with the matter. Glasgow already has powers to compel vehicles to refrain from passing on the near side of cars at stopping places.

London County Council has accepted a tender by the North Eastern Steel Corporation for the supply of 4,900 tons of tramway rails and fastenings at £58,351. The lowest tender, £41,919, was for rails made in Germany. Preference was given to the British-made rails.

Speaking in the House of Commons in February, Sir M. Barlow, Minister of Labor, mentioned that the London underground railway companies were making application under the trade facilities act for a government guarantee on an additional proposed capital of £8,000,000. This was contingent on the companies getting a Parliamentary bill passed, which they were now promoting, to authorize extensions of their undertakings. (These proposed extensions have already been dealt with in these pages.)

The ingenious London Underground Electric Railway people have been treating the public to a few interesting statistics. The latest point made is that in twenty-four hours, from midnight to midnight, the underground lines performed work of 5,500,000 ton-miles, including weight of trains and passengers. It is blandly added that this is equivalent to moving an underground car a distance greater than from the earth to the moon and back, or to moving 220 tons (a train of ten cars loaded with passengers) around the world.

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Financial and Corporate

Strike Reduces Earnings

Virginia Railway & Power Company Has $217,159 Less Net in 1922 than in 1921

The gross operating earnings of the Virginia Railway & Power Company, Richmond, Va., of $9,513,095 decreased over the previous year $660,239, or 6.49 per cent, while the operating expenses decreased $442,502, or 6.26 per cent. The gross income from all sources amounted to $3,123,970, a decrease of $217,159 as compared with 1921.

The expenditures for maintenance of way and equipment amounted to $782,326, or 17.62 per cent of the gross railway earnings as against $1,060,593, or 19.5 per cent for the previous year.

In addition to the regular charges for maintenance of way and equipment an amount of $1,422,500 for the year was included in operating expenses and credited to the depreciation and renewal reserve, being 5½ per cent on the depreciable property in the light and power department, and 3 per cent of the depreciable property in the railway department, and which is in lieu of the 6 per cent of gross earnings annually set aside before the readjustment of the property account as of Jan. 1, 1922, under the Stone & Webster inventory and appraisal. The balance to the credit of the depreciation and renewal reserve on Dec. 31, 1922, was $4,115,952.

The reserve for injuries and damages on Dec. 31, 1922, was $170,427 against $176,667 on Dec. 31, 1921.

The expenditures during the fiscal year ended Dec. 31, 1922, for additions, extensions and betterments to property and charged to capital account, amounted to $1,252,414, of which $497,766 was for the railway department.

During the year a dividend of 6 per cent declared in 1921 on the preferred stock, and payable in preferred stock, was paid by the issuance of 4,686 shares of preferred stock and scrip certificates.

During the year the company funded a considerable part of its capital expenditures through the sale of a large block of its treasury bonds to a syndicate of bankers, and the full dividend of 6 per cent on the preferred stock was declared out of earnings for 1922, payable in cash, 3 per cent on Jan. 20, 1923, and 3 per cent on July 20, 1923.

Explaining the reduction in gross earnings, Thomas S. Wheelwright, president, states:

> Beginning Jan. 16, there was a strike of railway employees throughout the system which resulted in a temporary interruption in the street railway service, but upon its restoration the company established the policy of the open shop and this has resulted in a marked improvement, not only in the morale of the men, but in the service furnished to the public.
>
> Material progress has been made during the year in getting the railway lines of the system on an economically sound basis. While the applications for revised franchises are still pending before the several local Councils, the Supreme Court of the State has recently declared the jurisdiction and control of rates of public utilities to be vested in the State Corporation Commission. Under the principle established, it is the opinion of counsel that the rates for all service rendered by this company are subject to the jurisdiction of the commission, with the possible exception of transportation rates in Richmond under certain franchises now in process of adjustment. The commission has for several years exercised its control as to rates for light and power.
>
> In Petersburg permits have been granted for the operation of rail-less cars to the Walnut Hill section, a popular and growing suburb of that community, replacing tracks over a large portion of the route. The cities of Norfolk and Portsmouth are also giving favorable consideration to the operation of rail-less transporation and it is believed that arrangements will soon be made for the operation of one or more rail-less lines in each of these cities.

With the addition of seventy Birney safety cars during the year the company has 200 safety cars now in operation throughout the system.

The company built 11,365 ft. of new track in Richmond and 3,907 ft. in Norfolk, while in Richmond 9,156 ft. of track was abandoned. Track was rebuilt in various parts of the system totaling 40,641 ft.

VIRGINIA RAILWAY & POWER CO.
COMPARATIVE COMBINED INCOME ACCOUNT

	Year Ended Dec. 31, 1922	Year Ended Dec. 31, 1921
Gross Earnings:		
Railways	$4,438,823	$5,439,623
Electric light and power	5,074,272	4,733,710
Total gross earnings	$9,513,095	$10,173,334
Operating Expenses:		
Railways	$3,793,079	$4,560,917
Electric light and power	2,832,080	2,506,744
Total operating expenses	$6,625,159	$7,067,662
Net from operation	$2,887,936	$3,105,672
Total other income	$236,034	$235,457
Gross income	$3,123,970	$3,341,129
Taxes and Licenses:		
Railways	$305,550	$374,640
Electric light and power	179,240	167,871
Federal income	183,798	155,600
Total taxes and licenses	$668,588	$698,112
Gross income over operating espenses, taxes and licenses	$2,455,381	$2,643,017
Interest on bonds	$1,163,804	$1,163,052
Sinking fund payments	$205,613	$202,500
Rental paid Norfolk Railway & Light Co.	$99,000	$99,000
Miscellaneous interest	51,083	95,894
Fixed charges, rentals and interest	$1,519,501	$1,560,447
Surplus	$935,880	$1,082,570
Amortization of discount, etc., on bonds sold and miscellaneous net charges to surplus	$38,812	$92,471
Surplus for the year over all charges	$897,067	$990,098

St. John Property to Be Rehabilitated

The *Financial Post* of Toronto, Can., in commenting on the sale of the New Brunswick Power Company to the Federal Light & Traction Company, New York, N. Y., says that several million dollars will be spent in rehabilitating the St. John property and developing an extensive water power site.

According to the *Post* the sale involved the purchase of the $2,000,000 common stock of the New Brunswick Power Company at $15 a share which amounted to about $300,000.

The New Brunswick Power Company operates the light and power, distribution system, gas and electric railway in St. John and vicinity. The company has outstanding $1,869,000 of 5 per cent bonds due 1937, $1,000,000 of 7 per cent cumulative first preferred and $350,000 of 7 per cent non-cumulative preferred. The bonds and preferred stock are largely held in New England.

1922 Record Year for Traffic

The total gross earnings of all the companies constituting the system operated by the Columbia Gas & Electric Company, Charleston, W. Va., for the year 1922 amounted to $35,322,087. Gross earnings of railways and other operations outside of electric and gas operations were $2,248,429, against $2,170,258 for the year ended Dec. 31, 1921.

The company operates the Cincinnati, Newport & Covington Railway, which does the entire electric railway business in Covington, Newport and adjacent municipalities in northern Kentucky. The railway during 1922 carried a larger number of passengers than ever before in its history and through economic operation shows an increase in net earnings greater than in gross.

The report made to the stockholders says that it is gratifying to note the improved results and prospects of this branch of the company's activities.

RAILWAY STATISTICS FOR YEAR ENDING DEC. 31, 1922
VIRGINIA RAILWAY & POWER COMPANY

	Richmond Dec. 31, 1922	Norfolk Dec. 31, 1922	Total* Dec. 31, 1922
Revenue passengers	35,486,265	27,662,319	71,950,905
Revenue transfers			
Transfer and free passengers	11,606,879	4,491,473	17,102,151
Total passengers	47,093,144	32,153,792	89,053,056
Percentage of revenue passengers using transfers	31.92	15.07	22.86
Average fare per passenger including transfers and free	$0.0443	$0.0512	$0.049
Car-mileage	7,355,063	5,465,310	15,409,697
Car-hours	930,386	630,806	1,847,825
Average passengers per day	129,023	88,092	243,981
Total revenue per car-mile	$.2865	$.3065	$.2881
Total revenue per car-hour	$2.265	$.2655	$2.402
Operating expenses per car-mile	$.2414	$.2562	$.2462
Operating expenses per car-hour	$1.909	$2.219	$2.053

* Includes Portsmouth, Petersburg and Interurban divisions.

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Sale of Securities by Ads Is Cheapest Way

During the last four years and eight months the Milwaukee Electric Railway & Light Company and its affiliated corporation, Wisconsin Gas & Electric Company, advertising exclusively in Wisconsin newspapers and backing up their advertising with a small force of field salesmen, have sold $12,400,000 of short-term notes and preferred shares to more than 25,000 Wisconsin men and women, of whom more than 20,000 are residents of Milwaukee city and suburbs.

All of these securities were sold at par for cash. Total selling cost, for the $12,400,000, was a shade over 3½ per cent of par. It is believed this establishes a record for the United States in obtaining, at so low a cost, any comparable amount of new capital to finance public utility growth. Costs at this time are higher, averaging 4½ per cent of par, due to increases in advertising rates and other items of expense.

Sales at the counter and by mail are attributed solely to advertising. A certain percentage of sales made by field salesmen is credited to the advertising. Experiments ever periods of several weeks have proved that field sales shrink approximately 40 per cent when newspaper advertising is stopped. Over the whole term of four years and eight months counter and mail sales have accounted for more than $6,500,000 of the $12,400,000 total.

D. E. Callender, general manager of Wisconsin Gas & Electric Company, is the head of the securities department of the two companies. His company is believed to be the only large utility in the country which has financed its growth solely, during the last five years, by selling its new securities directly to its customers and other residents of its service territory. Each year the Milwaukee Electric Railway & Light Company finances a larger portion of its new capital needs in this way. Mr. Callender believes that by Dec. 31, 1923, the two companies will have more than 30,000 Wisconsin investors.

Service Will Be Resumed in Bridgeton

Resumption of electric railway service in Bridgeton, N. J., is assured through the financing of a new company to restore the service abandoned by the Bridgeton & Millville Traction Company nearly a year ago. Some time ago a citizens' committee, led by members of the Bridgeton Chamber of Commerce, started work to finance a loan for the Cumberland Traction Company, which took over the line from Bridgeton to Millville. The Cumberland Company agreed to run the line if the bonds to the amount of $60,000 could be sold. The committee has sold within $3,700 and agreed to underwrite the balance so the road could be started again. At a mass meeting of the residents of Bridgeton a preference was expressed for the electric railroad over the motor buses. The J. G. Brill Company showed its faith in Bridgeton by starting several months ago to build cars subject to countermand of the order, and these cars will soon be ready. Clayton M. McPherson, manager of the new company, has had 6,000 ties cut in the woods near Back Neck and expects soon to be laying the ties on North Laurel Street, Bridgeton.

Memphis Street Railway Receivership Lifted

On April 11 the Memphis (Tenn.) Street Railway for the first time in several years, was operated free from the control of the Federal Court. The receivership ended Tuesday at midnight. Frank Elgin and T. H. Tutwiler had been receivers. Under their jurisdiction many improvements were made to the property, some lines were re-routed, transfer points were changed and in a general way service was benefited.

Judge Ross of the Federal Court on Tuesday afternoon signed an order relieving the two receivers. The application for their removal was filed by Lovick P. Miles, of Wright, Miles, Waring & Walker.

The railway went into the hands of receivers, Jan. 20, 1919, on the application of the American Cities Companies. The petition of Mr. Miles recited that all past due and unpaid obligations of the local company have been met and paid, and that there were no outstanding obligations of any nature.

The Memphis Street Railway will operate under the same officers who served prior to the receivership. T. H. Tutwiler, who served as receiver, has been re-elected president; E. W. Ford, who has been superintendent, vice-president; L. Lemay, secretary and treasurer.

Mr. Tutwiler is also president of the Memphis Power & Light Company. This latter concern has purchased the power plant of the railway for $1,568,000.

The directors of the railway are: H. C. Abel, E. B. Odom, C. E. Grosbeck, T. H. Tutwiler, E. W. Ford, W. W. Mallory, C. W. Butler, F. S. Elgin, A. L. Parker and J. M. Walker. One vacancy remains on the board.

The directors of the Memphis Power & Light Company are R. Leedy Matthews, H. C. Abel, C. J. Haase, F. B. Odum, C. E. Grosbeck, F. N. Fisher, J. R. Flippin, J. P. Norfleet, J. F. Raimer, Henry Wetter and T. H. Tutwiler. Mr. Matthews is a new member of the board. The light and power company plans to spend $4,500,000 on its new plant within the next two years.

The State Public Utilities Commission on April 8 approved the sale of the railway's power plant to the electric company. By permission of the state commission the railway for some time has been charging a passenger rate of 7 cents.

Indianapolis Street Railway Has Good Year

The Indianapolis (Ind.) Street Railway has filed with the Public Service Commission of Indiana its report for 1922. The statement shows gross income of $1,078,301, or $241,605 more than 1921. The report indicates a nice improvement in the company's business. Two dividends of $75,000 each were paid on preferred stock in 1922 on account of back dividends due from 1921. The company officials, headed by Robert I. Todd, president, say the business thus far this year is 5 per cent better than 1922. The total revenue for 1922 was $5,541,445, or $309,581, more than in 1921. The total revenue from passenger fares was $5,000,556, from rent of track and equipment for interurbans $215,329, for rent of other property $248,021. Total operating expenses were $4,057,361 or $94,917 greater than in 1921.

The operating ratio was 73.16 per cent.

The report shows out of the gross income of $1,078,301, payment of the following:

Rent for leased cars	$ 10,000
Interest on funded debt	633,198
Interest on unfunded debt	4,144
Miscellaneous debits	4,853
Total	$652,196

With the foregoing total deducted from the gross income there remained an income balance of $426,104.

While the number of revenue passengers on city cars in 1922 was about 5,000,000 greater than in 1921, 400,000 fewer persons came into Indianapolis by interurban in 1922 than in 1921.

This is attributed to the increase in buses operating between Indianapolis and outlying cities and towns. The number of transfers on city cars did not increase in 1922 over 1921 in the proportion the number of revenue passengers as a whole increased.

The following figures compare the two years as to number of passengers:

	1922	1921
Revenue passengers city company	92,078,151	87,086,415
Transfers	19,393,675	19,321,777
Passengers interurban cars	6,431,051	6,854,038

The preferred stock is $5,000,000 at 6 per cent. This makes the dividends $300,000 a year. They are payable quarterly. Dividends were suspended for March, 1921, and none was paid until September, 1922. The preferred stock dividends are cumulative and the two $75,000 dividends paid in 1922 applied on amounts due in 1921. On March 1, 1923, another $75,000 dividend was paid. This was in settlement of the amount due stockholders on Sept. 1, 1921. At the present time six quarterly dividends are unpaid.

When the Indianapolis Traction & Terminal Company was the operating corporation it paid $300,000 annually as a lease rental to the Indianapolis Street Railway. This sum was in turn

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distributed as a 6 per cent dividend on the $5,000,000 of common stock. When the old Indianapolis Street Railway and the Indianapolis Traction & Terminal Company were consolidated, the $5,000,000 of common of the former was exchanged for $5,000,000 preferred.

In the order of the Public Service Commission in 1919, authorizing the consolidation, the commission directed that sinking fund payments be suspended until 1923 and that the amounts that would have been paid into sinking funds be expended for betterments and improvements. These payments amount to about $130,000 a year.

The rate of fare in 1922 was 5 cents with 2 cents additional for a transfer. For a short time in 1921 the fare was 6 cents, with 1 cent additional for a transfer. Some of the improvement in the financial condition of the company is attributed to the removal of unfair jitney competition under the regulatory ordinance passed by the City Council in 1921.

City's Valuation of Philadelphia Rapid Transit Is $119,887,000

A revised statement of the valuation of the Philadelphia (Pa.) Rapid Transit Company by the city was recently presented by Robert M. Feustel to Commissioner Clement which shows an increase of $3,383,710 over the figures in a former report. The new list places the city's estimate of the cost of reproduction of the property now, based on prices prevailing in the first quarter of 1922, at $119,887,752. The original report set the figure at $116,504,042.

In explaining the matter to Commissioner Clement, Mr. Feustel testified that he had not changed the basis on which he estimated the figures originally.

The figures in the original report were compiled at minimum. The estimated original cost of existing property after deducting depreciation was increased $1,155,221, making it $90,179,742. The other changes varied from 11/25 of 1 per cent to 2¼ per cent.

The $3,383,710 increase was figured at 3 per cent.

No Special Purchase Fund Required

The suit of the Puget Sound Power & Light Company against the city of Seattle, to compel the city to set aside gross earnings of the Seattle (Wash.) Municipal Railway to pay interest and sinking fund on $15,000,000 bonds of the railway held by the company, will not be decided by the United States Supreme Court, which on April 16 denied a petition for a writ of certiorari.

The Federal District Court had held that the city must set aside gross earnings for these payments before paying operation and maintenance expenses. The Circuit Court of Appeals reversed this ruling on the ground that a state statute provides adequate remedy if proper payments are not made. The action of the Supreme Court permits the Circuit Court's decision to stand.

In its petition, the company, which sold the railway properties to the city, alleged that a special fund for the bonds was not being set aside by the city before paying operation and maintenance charges, and the question of whether the municipal railway was charging sufficient fare to insure payment was injected into the suit.

Railway Securities at Auction

Electric railway securities sold at auction by A. H. Muller & Sons, New York, on April 19 were as follows:

105 shares Buffalo & Lake Erie Traction Company common, 100 shares Buffalo & Lake Erie Traction Company, preferred, $2 lot.

$2,000 Cleveland, Elyria & Western Railway first mortgage 5s of 1920, extended at 7 per cent to 1923, certificates of deposit, 65 per cent.

$10 Cities Service Company scrip for preferred stock, $5 lot.

5 shares Cities Service Company preference B stock, $12¾ per share.

Deficit Reported for February.—Although there was a gross surplus of $916 in the earnings of the Tacoma (Wash.) Municipal tideflats line during February, the payment of interest on bonds and loans from the Emergency Fleet Corporation and payment of gross earnings tax caused a deficit of $2,572, according to the city controller's report. There were 199,742 passengers carried.

Balance Shows Decrease.—For the year ended Feb. 28, 1923, the Reading Transit & Light Company, Reading, Pa., reports a net income of $246,527, against $263,462 for the year ended Feb. 28, 1922. After providing for dividends on the preferred stock the balance for the period ended February, 1923, was $129,412, against $146,347 for the year ended February, 1922.

Earnings Satisfactory.—The report of the San Francisco-Oakland Terminal Railways Company for 1922 shows a net operating income after taxes, operating expenses and depreciation of $1,437,188. Gross operating revenues amounted to $6,922,348 and operating expenses including depreciation to $5,202,236. Net earnings from operation were $1,720,112.

Bonds Pledged for Loans Held Valid.—In an opinion filed in the United States District Court at New York Judge Mayer holds to be valid $7,079,000 of 4 per cent Brooklyn Rapid Transit refunding mortgage bonds pledged with various banks and trust companies prior to receivership. The loans, most of which were made in 1917, cover a period from 1914 to 1919.

Traffic Heavy in Shortest Month.—The Municipal Railway of St. Petersburg, Fla., carried approximately 515,000 passengers during February, the greatest number ever handled on the local lines within the shortest month. The figures represented an increase of 24 per cent over the corresponding month of 1922. Because of the tourist patronage greater records for March are expected.

Equipment Certificates Being Offered.—Clark, Dodge & Company, New York, N. Y.. are offering at 100 and accrued interest equipment trust 6 per cent gold certificates, maturing on March 15, 1925 to 1928. The yield is 6 per cent. These certificates are issued under the Philadelphia plan and are to be secured by 100 new completely equipped steel passenger cars at approximately 75 per cent of cost.

Net Income and Traffic Increase.—For the three months ended March 31, 1923, the Philadelphia (Pa.) Rapid Transit Company reports a net income of $644,175 against $614,831 for the same period ended March 31, 1922. Passengers carried totaled 222,850,564 against 202,286,650 for the period from January-March, 1922. The passenger revenue for the first three months of 1922 amounted to $9,972,001 and for this year $10,758,622.

Operation to Suspend.—Officials of the West Chester, Kennett & Wilmington Electric Railway, operating between Kennett Square, Pa., and Wilmington, Del., recently announced that operation would be suspended because it was a losing proposition. It is said that plans are being formed by persons interested in the continuation of the line between Brandywine Springs and Kennett Square to have the road taken over by another railroad company and operated as a branch. The discontinuance will not affect the road between West Chester and Kennett Square, which is operated by the West Chester Street Railway.

Offers Preferred Stock.—Bonbright & Company, New York, N. Y., are offering $6,000,000 of the 7 per cent cumulative preferred stock of the Public Service Electric Power Company. The price is $98.75 a share and accrued dividends to yield about 7.10 per cent. The proceeds from the sale of this preferred stock, together with that from the sale of $14,000,000 first mortgage gold bonds and 300,000 shares of no par value common stock, already underwritten, will provide funds equal to the estimated cost of the new power plant, and any excess cost will be paid by the lessee. The new company will supply power to the Public Service Railway, both companies being included in the system of the Public Service Corporation of New Jersey.

Seeks Abandonment of Railway.—Claiming that it has been losing money for the past ten years and specifying the exact loss during 1922 as $24,000, the Trinidad Electric Transmission, Railway & Gas Company, has asked the Colorado Public Utilities Commission for permission to abandon all local and interurban railway service. It has been several months since any street cars were operated in the city of Trinidad. When the railway quit, the Trinidad Motor Bus Company started three twenty-passenger buses and has kept them in operation. Certain city lines were abandoned in March, 1922, in accordance with a decision of the commission and since that time hourly service on the interurban lines is all that Trinidad has had.

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Traffic and Transportation

Saginaw Moves for Settlement

New Mayor Says Transportation Problem Is Most Important Before City

With the appointment of Frank A. Picard as city attorney, friends of street car-bus transportation in Saginaw, Mich., are looking forward to an early solution of the difficulties confronting Saginaw since bankruptcy proceedings in August, 1921, caused a suspension of electric railway service.

Naming the city attorney is the first step of the new City Council toward public conferences between the grantee, Otto Schupp, and whomever he may select to meet with the Council and prepare a franchise to be submitted to the people.

This action is in line with the inaugural message of Mayor Albert W. Tausend. Mayor Tausend and Councilman William J. Wolf were elected on street car platforms and the Mayor at the first meeting of the present Council said in regard to transportation:

Suggests Conferences to Modify Franchise

Of all the problems fronting us, two seem most important—water and transportation—and of these transportation seems to offer a more immediate solution because it has been much in the public mind of late, and because there seems to be but a few adjustments to be made to produce a franchise that would be acceptable.

I have in mind the thought that there are three parties to the question, the people, whose rights must be protected, and whose wishes must be carried out when expressed; the Council which acts as agents for the people; and the grantee, who must be looked to to accept the franchise and carry out its provisions.

A franchise can properly come from one of two sources, either from the Council acting for and on behalf of the people, or for the grantee who is to carry out the contract.

I would suggest therefore that the Council with the city attorney summon the grantee and such representatives as he may desire into public conferences with the Council for the purpose of endeavoring to bring about such modifications in a franchise as will be fair to the people, fair to the grantee, assure its adoption, and bring a speedy return of adaquate transportation facilities to our community.

Within a few days the Council will discuss the situation and will then name one of its members to interview the grantee and arrange for the conferences at which time the franchise will be framed along the lines which have been outlined.

Outlook Appears to Be Improved

Mayor Tausend's election as chief executive has had a reassuring effect upon the public mind and many believe the small number of the electors who have been able to defeat the will of the majority because of the 60 per cent vote required for the adoption of a franchise will be won over to the affirmative side of the question and the difficulties over transportation will be brought to an end.

An attempt was made to submit a municipal ownership plan to the electors, but it failed to get by the Council. Commissioner George Phoenix, who opposes every franchise so far offered, fathered this ordinance, but it was never read, his measure failing to attract a majority vote even for consideration of his proposal.

Because of this and the attitude of the other members it seems to those who favor the return of electric railway service that a satisfactory solution will be worked out and approved.

The new Mayor has also served notice on the chronic "no" faction in the city that Council members have been elected to perform certain duties and that no outside interference such as was countenanced by the last Council will be permitted in any way under the new order of things.

Council Seeks Fifteen-Year Grant

Members of the City Council and Otto Schupp, grantee under the recent franchise defeated by a few votes, conferred on April 18 relative to modifications with a view of again submitting a street car-bus franchise at an early date.

The Council favors a fifteen-year grant, with the rate of fare fixed to run the full period to avoid referring the fare question to the public utilities commission or writing the upset value in the contract. If the bond owners protective committee is unable to meet the terms, this does not mean the end of negotiations.

Mr. Schupp expects to be in New York during the week commencing April 22 to confer with the interests who are preparing to finance the project. It is expected that as a result of his visit to New York a conference will be held in Saginaw upon his return.

Great Reduction Noted in Accident Costs in Philadelphia

J. J. K. Caskie in the April 16 issue of *Service Talks*, the official publication of the Philadelphia (Pa.) Rapid Transit Company, gives some statistics on accident prevention under Mitten Management. In 1911 there were 517,697,478 passengers carried on the lines of the Philadelphia Rapid Transit Company. Nearly 6 per cent of the earnings of the company for that year was spent in paying accident costs, and 4,824 negligence suits were pending in the courts. In 1922 848,883,512 passengers were carried while only 3.05 per cent of the earnings was spent for accidents and only 1,313 suits remained unsettled in the courts. This reduction is significant in view of Mr. Caskie's statement that in 1911 there were only 40,000 automobiles licensed in the state and now there are more than 800,000.

Safety Work Progressing in Nashville

The Nashville Railway & Light Company, Nashville, Tenn., has been conducting a safety campaign which the company reports is progressing splendidly. The number of accidents is much smaller this year than last year. A bonus has been arranged for distribution to employees at the end of the campaign. A number of safety pamphlets have been given out to the schools of the city, and short talks and readings have been made before the pupils regarding safety measures.

The Nashville Automobile Club has co-operated and, as a result, new traffic laws have been put into effect on the main thoroughfares of the city, to reduce accidents and, at the same time, speed up traffic. A number of car stops have been eliminated safety zones have been placed around stations, and one-way streets and right turns for vehicles have been designated.

Since these regulations have been put into effect there has been a considerable reduction in the number of accidents. The work which the Nashville Railway & Light Company is doing is part of a campaign which is to be carried on throughout the State of Tennessee.

Seattle & Rainier Valley's Difficulties Reviewed at Hearing

Toward the close of the hearing before the Department of Public Works, upon a petition of residents of the Rainier Valley district for a reduction in the 8½-cents fare charged by the Seattle & Rainier Valley Railway, Frank R. Spinning, supervisor of the department, stated that the testimony showed that the company was not only unable to pay its taxes, but that it was indebted to its owners. Further, that it was the function of the State Department of Public Works to see that public utilities were able at least to make a reasonable return upon their investments.

The residents of the district complained that with the rest of the city enjoying a 5-cent fare under municipal operation, the higher rate was working against the development of the valley district, and driving people away. The company submitted testimony intended to show that it could not operate under a reduced fare, maintain its tracks and equipment as required by law, and pay its way. Figures were introduced to show that even with a 15 per cent increase in traffic, under a 5-cent fare, the company would face a yearly deficit of approximately $150,000. Testimony was given that the company had never paid dividends, and had only paid interest upon certain of its bonds.

Officials of the company declared that if permitted to maintain the present fare for another two years, they would be financially able to make needed improvements and betterments, clear away outstanding debts, and be in better shape to meet rate reductions.

It will probably be several weeks before a decision is rendered.

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More Improvements for New York Elevated

In addition to the extensive increases of the train services on the elevated railroad lines, the Interborough Rapid Transit Company, New York, N. Y., has announced other features of the contemplated program of improvement. Previous statements have had to do with added service. The new statement relates to features which will make the service more attractive. It was made by the company on April 16.

The company has arranged to expend a very considerable sum for painting a substantial part of the elevated structures and redecorating a large number of stations, and to begin a program of vestibuling of the trains and repainting of cars, inside and out. The elevated colors, hereafter, will be orange and black. The major color for the outside of the cars is the golden rod shade of orange used by the Chesapeake & Ohio, the St. Paul and other steam railroads. Lettering will be done in black. The woodwork in the lower part of the interiors will be finished in mahogany tones, and the ceilings will be white. This will make the cars not only brighter, but will materially improve the lighting. The painting of the stations has begun with the Thirty-eighth Street station, on Sixth Avenue. The station colors will be in harmony with those of the cars.

The company has arranged to issue a small pamphlet showing the frequency of service and running time of elevated trains between many points to and from which travel is greatest. Contrary to a somewhat general impression, the company points out as a fact that in a very large proportion of cases the elevated offers a service that is not only just as rapid but more frequent than can be found by any other route, to say nothing of less crowding, more comfort and an all open-air ride. The scheduled speed on the elevated is 25 m.p.h. for express trains and 15 m.p.h. for local trains. The company has adopted for the elevated the slogan: "Ride on the Open-Air Elevated."

School Children Hear "Safety First" Arguments

W. Lester O'Brien, superintendent of the Shore Line Electric Railway and the Groton & Stonington Traction Company, operating in Norwich, Conn., recently pleaded with the high school pupils of Stonington to help make "safety first" something more than just a slogan. He told about the efforts being made by railroad, railway, manufacturing companies and cities throughout the country to reduce the number of accidents which carries away a terrible toll in lives every year.

Besides giving the children some human interest stories he gave them several "don'ts" to bear in mind, emphasizing the fact that with reasonable care and good judgment on their parts the possibility of an accident was greatly reduced.

Through Bus Service to Be Started.—The Eastern Wisconsin Electric Company, Sheboygan, Wis., expects to establish through motor bus passenger service between Fond du Lac and Neenah via Oshkosh within the next six weeks.

Evansville Has No Jitneys.—The city ordinance at Evansville, Ind., passed less than a year ago providing that jitneys could not take on or unload passengers on streets where there were electric railway lines, has been rigidly enforced. As a result jitneys have practically gone out of business.

Seeks Permission for Fare Increase.—Application has again been filed by the Madison (Wis.) Railways for permission to make a substantial increase in its fares on its lines in Madison, presumably from its present cash fare of 6 cents to 7 cents or 8 cents. The subject of paving charges will figure prominently when the hearing takes place.

Hearing Scheduled for Bus Charter.—A hearing will be held on May 7 before the Pennsylvania Public Service Commission on the matter of granting a charter for the Logan Valley Bus Company, a subsidiary of the Altoona & Logan Valley Electric Railway, Altoona, Pa. It is the plan of the railway to operate two buses into the Pleasant Valley district, south of Altoona.

Wants to Operate Larger Buses.—The Philadelphia (Pa.) Rapid Transit Company wants the law changed as to size and maximum weight of trucks so that it can run larger buses on Roosevelt Boulevard than now possible under the Pennsylvania ruling. The plans of the company to enter the bus business through a subsidiary have been referred to previously in the ELECTRIC RAILWAY JOURNAL.

Bus Ordinance Passed.—Fremont, Ohio, city officials were in Sandusky on March 30, in conference with Lake Shore Electric Railway officials, seeking a signed agreement that the company will pay a share of the cost of the East State Street paving. The company had intimated that it would pay its share of the paving if the Council would pass a bus license ordinance. The ordinance was passed March 29.

Berkeley Joins in Half Fare Fight.—Berkeley, Calif., has joined in the fight started by Oakland to obtain half fares for school children in those cities on the lines of the San Francisco-Oakland Terminal Railways. City Attorney Gray of Oakland charged undue discrimination on the part of the railway company. He declared that while half fares were in effect in Richmond and Alameda the other cities could not obtain a similar privilege.

Council Suggests Conference on Ticket Sale.—The aldermanic committee appointed to devise means of bringing about a lower rate of fare on the lines on the New York State Railways in Rochester, N. Y., has passed a resolution authorizing negotiations to put certain changes in effect. The plan includes the suggested use of a pass and the sale of sixteen full fare tickets for $1 or in one-half multiples. The Common Council has authorized Commissioner Barnes to negotiate with officials of the New York State Railways on these changes.

Bus Line for Section in Moline.—A bus line operated by either gasoline or electricity is to be established by the Tri-City Railway to provide transportation for residents in the southeast section of Moline, Ill. The bus plan is a counter proposition advanced by Mr. T C. Roderick, Illinois manager of the traction company, in meeting demands for the extension of the Fourth Avenue line. To make this extension, Mr. Roderick said, would entail an expenditure of approximately $18,000, which is more than half the net earnings of the company last year.

Car Routes Renamed with Historic Significance.—Within the last few weeks several of the routes of the Memphis (Tenn.) Street Railway have been renamed. New signs have been put on the cars showing not only the street or route, but also numbers on ends and sides to indicate the final destination of cars. The Jackson Mound car, for instance, is now called after the changed name of the park where it terminates De Soto Park, which of course is after Hernado De Soto discoverer of the Mississippi River and the first white man to land on the Chickasaw Bluffs.

Identification Card System Awaits Approval.—The City Council of Davenport, Iowa, has taken no action on the petition presented by 2,500 signers for the introduction of the identification card system by the Tri-City Railway & Light Company. The matter is now before the transportation committee. In accordance with the city ordinance, it well be necessary to notify the company in writing thirty days before the system is to be put into effect. The measure as introduced provides for a 5-cent fare for holders of a monthly identification card and allows others to buy four tokens for 35 cents. The flat rate of fare will be 10 cents.

Excursions Being Planned.—The Indiana Service Corporation, Fort Wayne, Ind., will run an unusually large number of excursions this summer, according to an announcement made by J. A. Greenland, general passenger and freight agent of the company. Instead of the usual four excursions a summer to Niagara Falls, the company will run an excursion on Tuesday of each week, starting June 5, with the last one on Sept. 11. The trip will be made to Toledo by traction and from there to Buffalo by boat. The cost of the trip this year with a fifteen-day stopover will be $12.25 round trip fron. Fort Wayne. A traction trip to Toronto can be added by excursionists at an additional cost of $3.28 for the round trip. Week-end excursions will also be run to Toledo and Lakeview, Ohio. Other excursions will be run to Detroit with a boat trip from Toledo to Detroit.

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Personal Items

New Vice-Presidents in New Jersey

John L. O'Toole and Dudley Farrand Advanced—Reallocation of Duties Approved—New General Solicitor

John L. O'Toole and Dudley Farrand have been elected vice-presidents of the Public Service Corporation of New Jersey. The election of Messrs O'Toole and Farrand was announced along with other important changes in the staff of officers of the Public Service Corporation of New Jersey, Newark, and twelve of its subsidiaries, including the Public Service Gas, Electric, Railway and Production companies, made on April 18 at the annual meeting of the directors of the organizations.

Thomas N. McCarter was re-elected president of the corporation and subsidiaries for the twenty-first consecutive term. The board of directors was cut from eighteen to fifteen members. Two vice-presidents resigned and two new ones were named. There was a reorganization of departments, which meant a reallocation of duties for the four vice-presidents that now share equal distinction on the staff of the Public Service companies. A new general solicitor was named.

The vice-presidents who resigned are Randell Morgan of Philadelphia and Colonel Anthony R. Kuser of Bernardsville, both of whom have been in an official capacity with the Public Service family for fifteen years or more. They will continue as members of the board of directors of the corporation and as members of the executive committee. As noted previously the new vice-presidents are John L. O'Toole and Dudley Farrand.

Under the reorganization plan, the vice-presidents and the titles they assumed are: Percy S. Young, vice-president in charge of finance; Edmund W. Wakelee, vice-president in charge of law; Dudley Farrand, vice-president in charge of industrial relations; John L. O'Toole, vice-president in charge of public relations. Mr. Wakelee, who has been general solicitor as well as a vice-president, has relinquished the first title to George H. Blake, who has been assistant general solicitor.

The board of directors was cut so as not to make it necessary to fill three vacancies that have existed since the three members either died or resigned. Another resignation, that of Samuel T. Bodine of Philadelphia, was accepted. Mr. Bodine is president of the United Gas Improvement Company of Philadelphia. He explained that pressure of business made him give up his directorship. Former Circuit Court Judge William H. Speer of Jersey City, general attorney for the corporation, was elected to succeed Mr. Bodine.

The new officers were elected to their positions with the corporation first and at later meetings of the directors of the subsidiaries the same scheme was carried out. All of the men who have been advanced have been in the service of the company for many years. Mr. Speer, the new director, joined the staff in September. Mr. Blake, the new general solicitor, is a comparatively young man, but has been with the corporation some time, having represented it in Hudson County for many years before assuming the work of assistant solicitor in 1921.

Under the reallocation of duties, Mr. Wakelee will relinquish some of his work as vice-president in charge of public relations to Mr. O'Toole, who will now have that title. Mr. Wakelee will devote his entire time to the law. Mr. Young, as heretofore, will be chief financial officer of the corporation.

The scope of the work of Mr. Farrand as vice-president in charge of industrial relations is wide and is not easily definable at this time. He will keep in close touch with the employees of the various subsidiaries and will deal with operating problems. Mr. O'Toole's work will be along the same lines as it has been, together with additional duties to be taken over from Mr. Wakelee.

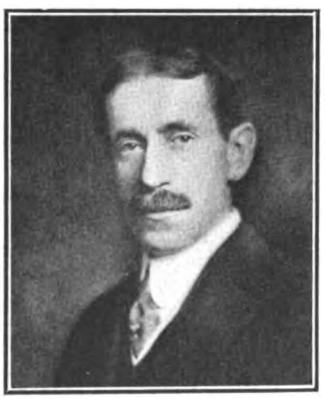
Messrs. Farrand and O'Toole have previously been known as assistants to the president.

Mr. O'Toole went with the Public Service on Jan. 4, 1909, after having been in newspaper work in Newark for seventeen years. He first was with the *Newark Times* in 1892. The following year he joined the staff of the *Evening News*. For nine years prior to resigning to go with the Public Service as publicity agent, he was city editor of the *News*. In 1917 his title was changed from publicity agent to assistant to the president.

Mr. Farrand has been with the predecessors of the Public Service Electric Company and with the corporation continuously since 1887. He was first elected a director and assistant treasurer of the old Newark Electric Light & Power Company. In 1895 he became assistant general manager of the People's Light & Power Company and in 1898 its general manager. The following year he became general manager of the United Electric Company of New Jersey and in 1903 was made general manager of the electric department of the Public Service Corporation. That was at the time of the reorganization of the corporation. In 1910, Mr. Farrand was made general manager of the Public Service Electric Company and five years later was made its vice-president and general manager. He became an assistant to the president along with Mr. O'Toole in 1917. Mr. Farrand was president of the National Electric Light Association in 1907 and the following year was appointed by President Roosevelt as technical adviser representing the electric interests to the National Conservation Commission. He is a fellow of the American Institute of Electrical Engineers and a member of the American Society of Mechanical Engineers.

Mr. Wakelee joined the Public Service organization in 1913, as associate general solicitor, after having been actively engaged in Republican politics. His home is in Bergen County. He had served in the House of Assembly three terms, being Republican leader in 1900, and then he went to the Senate for three terms, being floor leader and later president of the Senate. In 1904 he was act-

J. L. O'Toole



Dudley Farrand

E. W. Wakelee

P. S. Young

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ing Governor for a short period. In 1917 he was made a director and vice-president of the Public Service and in 1921, upon the death of L. D. Howard Gilmour, was made general solicitor.

Mr. Young has been engaged in the gas business in one capacity or another for thirty-three years in this country. He was a native of England. From 1890 to 1898 he was with the Omaha Gas Company. In 1898 he went with the United Gas Improvement Company of Philadelphia and in 1899 with the Hudson County Gas Company as secretary and treasurer. When that company became part of the Public Service Gas Company Mr. Young was made controller of the amalgamated concern. He became treasurer in 1914 and in 1916 was made vice-president of the Public Service Gas, Electric and Railway companies. The following year he became a director in the corporation and vice-president.

One feature of the reorganization is that the four vice-presidents were advanced together in 1917, the first two named being made assistants to the president at that time, and the latter two vice-presidents.

Mr. Danforth Heads Power Company

Richard E. Danforth, vice-president and general manager of the Public Service Railway, Newark, N. J., has been elected president of the Public Service Electric Power Company. Mr. Danforth's election as head of the new electric company does not in any way affect his connection with the railway. The Public Service Electric Power Company will forthwith construct a modern steam electric power plant near Newark, N. J., with an initial installed capacity of 200,000 hp. The company has arranged to acquire sufficient land to care for an ultimate capacity of 400,000 hp. The output will be distributed to the larger cities and the most important industrial centers of northern New Jersey by the Public Service Electric Company. Other officers of the Public Service Electric Power Company are: Henry D. Whitcomb, vice-president; William H. Feller, secretary; Frederick A. Neis, treasurer.

Mr. Taylor Made General Manager at Atlanta

The Georgia Railway & Power Company, Atlanta, Ga., announces the appointment of W. H. Taylor, vice-president, as general manager of the business of the company. He will be designated as vice-president and general manager and will have general supervision over various departments of the company, assisting H. M. Atkinson, chairman of the board, and P. S. Arkwright, president. Mr. Taylor was for seven years president of the Omaha Gas Company of Omaha, Neb. Previous to joining the Georgia Railway & Power Company he was connected with the United Gas Improvement Company in Philadelphia.

Mr. Hood Honored

Vice-President and General Manager of Massachusetts Northeastern Lines Heads New England Club

Ralph D. Hood, president of the New England Street Railway Club for the year 1923-1924, is a native of Massachusetts. He was educated in the public school and at Phillips-Andover Academy and is an engineer by profession. He served as rodman in the Haverhill City Engineer's office in 1891. Next he became transit man for the Haverhill & Amesbury Street Railway, serving that company in 1892 and 1893. He was engineer for the Haverhill, Georgetown & Danvers Street Railway in 1894-1895 and then in turn served in a similar capacity with the Exeter Street Railway, 1897; Exeter, Hampton & Amesbury, 1899-1900; Massachusetts Construction Company and Lowell System, 1900-1903; Manchester & Haverhill Street Railway, 1904. In 1905 he was office engineer for the El Paso &

R. D. Hood

Durango Railroad and in 1906 engineer of the Rockingham racetrack. He was with the Manchester & Derry Street Railway in 1907 and the Dover, Somersworth & Rochester Street Railway and allied companies from 1908 to 1911. On Jan. 1, 1911, Mr. Hood became superintendent of highways for the city of Haverhill and on Jan. 1, 1912, was elected a member of the Municipal Council of Haverhill and served as head of Department of Streets in 1913. He became engineer of maintenance of way of the Massachusetts Northeastern Street Railway and allied companies in 1914, continuing as such to 1917, when he was made vice-president and general manager of these companies.

In addition to his public service in 1911-1913, he has been chairman of the Haverhill Board of Survey from 1917 to date. He saw military service as an officer in the National and State Guards from 1904 to 1919, being promoted successively from Second Lieutenant to Major.

Socially, he is a past president of the Haverhill Rotary Club, a member of the Boston Society of Civil Engineers, American Electric Railway Association, junior warden of the Trinity Church, Haverhill, Mass., and a member of the Massachusetts Consistory.

J. C. Hurd has succeeded R. L. Hughes as superintendent of the Ashtabula & Lake Shore Railway, Ashtabula, Ohio.

A. L. Rider has succeeded T. Nolan as chief engineer of the Toledo, Ottawa Beach & Northern Railway, Toledo, Ohio.

O. A. Taylor has succeeded E. N. Smith as auditor of the Cleveland, Alliance & Mahoning Valley Railroad, at Ravenna, Ohio.

A. Baltzer has replaced J. Carnegie as master mechanic of the Windsor, Essex & Lake Shore Rapid Railway, Kingsville, Ont.

William H. Stamm has been made chief engineer of the Webster, Monessen, Belle Vernon & Fayette City Street Railway, Charleroi, Pa.

Lewis A. McArthur, general manager of the Pacific Power & Light Company, Astoria, Ore., has in addition, taken on the duties of vice-president.

E. E. Doe has succeeded L. E. Kromstrome as claim and general freight and passenger agent of the Levis County Railway, Levis, Que.

J. M. Beauchamp has replaced D. B. Carson as vice-president of the Community Traction Company, Toledo, Ohio. Mr. Beauchamp is located in New York.

W. T. Leander has succeeded W. H. P. Weston as secretary and treasurer of the Lake Superior District Power Company, Ashland, Wis. Mr. Leander is in the Chicago office.

M. W. Kirkwood, general manager of the Lake Erie & Northern Railway, Galt, Ont., has taken on the duties of purchasing agent in addition to those of general manager.

J. P. Moore has been added as one of the commissioners of the London & Port Stanley Railway, London, Ont. The other commissioners are Philip Pocock and F. E. Harley.

Ross Lessig has been made an engineer at the power station of the Wilkes-Barre & Hazleton Railway, Hazleton, Pa. Working in the same capacity with Mr. Lessig is Harry W. Kuhns and Lew Welliver.

C. F. M. Niles has succeeded L. S. Sneath as president of the Tiffin & Fostoria Railway successor to the Tiffin, Fostoria & Eastern Electric Railway. Mr. Niles is located at Toledo, Ohio. He was formerly treasurer of the company.

D. M. Shafer, auditor of the Abilene (Tex.) Traction Company, has also taken on the duties of secretary and treasurer. E. A. Short has succeeded T. S. Jordan as purchasing agent, and N. C. Browning has succeeded C. J. Neese as master mechanic.

R. A. Bruce has succeeded F. J. L. Doyle as assistant secretary and assistant treasurer of the West Virginia Utilities Company, and as auditor and assistant treasurer of the Wheeling Public Service Company, both in Wheeling, W. Va.

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M. D. Baer, for several years soliciting freight agent for the Bamberger Electric Railway, Salt Lake City, Utah, has been appointed general freight and passenger agent for that company. Mr. Baer has been with the company in the traffic department since June, 1918.

Matthew C. Brush, well known to electric railway men as the former head of the Boston (Mass.) Elevated Railway, has resigned as president of the G. Amsink Company, but will continue as chairman of the board. He will be succeeded as president by Harry A. Arthur. The Amsink Company is a subsidiary of the American International Corporation.

Dr. Edward P. Hyde, who organized the Nela Research Laboratories in 1908, and who for the past few years has occupied the position of director of research of the National Lamp Works of the General Electric Company, has tendered his resignation to take effect on June 30 of this year. Dr. Hyde, has decided to take a prolonged rest abroad.

Calvert Townley, assistant to president of the Westinghouse Electric & Manufacturing Company, has been reelected a vice-president of the American Engineering Council and has been appointed a member of its finance and public affairs committees. He has also been made a delegate of the American Electric Railway Association to the annual meeting of the United States Chamber of Commerce.

Yanata Yanaaka, managing director of the Osaka Railways, Japan, is on a visit to the United States in connection with the affairs of his company. The electric railways under Mr. Yanaaka's direction consist of about 50 miles of interurban lines. His company is, however, now interested in the electrification of the steam railroads to tie its system into an electrical network. He says that the development of railway electrification is progressing very satisfactorily in Japan. Mr. Yanaaka recently inspected the works of the Westinghouse Electric & Manufacturing Company at East Pittsburgh, studying especially the manufacture of electric railway equipment.

Park W. T. Loy, who for several years has been in charge of the claim work and the marketing of the securities of the Potomac Public Service Company, Hagerstown, Md., has been made head of a recently created general welfare department. In this capacity he will be engaged in the handling of the welfare and relief work over the entire property of the company, which will include health and promotion of employees, accident prevention, first aid instructions, proper relations with employees and certain public relations. His duties will be closely allied with the work of the general manager's office in Wheeling. There, he will be the general manager's personal and general representative in many problems which will come up for discussion. R. Paul Smith, general manager, in announcing the formation of this department, said that the rapid expansion of the Potomac Public Service Company and its subsidiaries, was the reason that led the management to decide upon the creation of a general welfare department.

Obituary

Thomas E. Crossman

Thomas E. Crossman, who served the American Electric Railway Association and its predecessors as official stenographer for forty years, died suddenly on April 4 in the Congress Hotel, Chicago, where he had gone to report the meeting of the American Railway Engineering Association. Mr. Crossman was one of the foremost convention reporters in America. He was a street railway man in the days of the old horse car and the early days of the electric railway and through that connection and his affiliation with the railway association had a very wide acquaintance among electric railway men. He was almost equally well known to steam railroad men through his long association with the work of reporting the proceedings of the American Railway Engineering Association and other steam railroad bodies and also with the operating officials of the electric light and power companies through thirty-three years of reporting the sessions of the National Electric Light Association.

Underwood & Underwood Photo

T. E. Crossman

Mr. Crossman was an indefatigable worker. His profession, however, made extraordinary demands upon his physical and mental powers. Tom Crossman thought about himself last when he thought about himself at all, and so it was that he virtually died doing the work that so many varied interests had come to intrust to his care, knowing that the record which he made would be complete and that the rough edges of extemporaneous speech would all be smoothed down as only the adept at reporting knows how to do it.

As has been indicated previously, Mr. Crossman began his business career with the Atlantic Avenue Railroad, of which company W. J. Richardson, the first secretary of the American Electric Railway Association, was the secretary. Through this connection he undertook the work of reporting the first regular meeting of the association in 1883 at the Fifth Avenue Hotel, New York, and continued to report the later meetings.

At the meeting of the American Electric Railway Association in Chicago last October Chairman George H. Harries, who presided at the sessions on Past-Presidents' Day, called Mr. Crossman before the members and presented to him, in behalf of the association, a gold watch fob stamped with the emblem of the association. In expressing his thanks for the gift Mr. Crossman said that the work of reporting the conventions had never been a grind to him, but was fascinating to him. The truth of the matter really was that the fascination of the work dulled him to the sense of fatigue which necessarily is part of such strenuous endeavors. If this were not true Mr. Crossman would have been more greatly concerned for his own welfare and it is not likely that he would literally have died in harness. A shrewd observer of men writing in the department "Conventionalities" in the daily edition of the ELECTRIC RAILWAY JOURNAL at Chicago last fall paid Mr. Crossman a well-deserved compliment by saying at the time that "Mr. Crossman knows more about this business than do many railway men." Mr. Crossman was sixty years of age.

Arthur B. Burtis, president and general manager of the Mamolith Carbon Paint Company, Cincinnati, manufacturers of railway paints, died recently at his home in that city. Mr. Burtis, who was seventy-five years old, went to Cincinnati from Oaks Corner, N. Y., about twenty-five years ago, to engage in the paint business. Later he became president of the Mamolith company.

Jesse Rankin Wharton, manager of the Butte (Ia.) Electric Railway since 1892, died on March 19, at the age of sixty-six. He was also a director in the company. Mr. Wharton was prominently connected with all activities in Butte, being known as the Grand Old Man of Butte. In his management of the railway he had tried to bring about the greatest amount of efficiency and service.

W. S. MacFarland, assistant treasurer of the Lackawanna & Wyoming Valley Railroad, Scranton, Pa., died very suddenly in his office in Scranton, on April 14. He was born in 1870 in New York City and before entering the railroad field was connected with several industrial concerns. In 1918 he joined the forces of Ford, Bacon & Davis in New York and remained there for three years doing auditing and other accounting work. Mr. MacFarland next served in turn with the Empire State Railroad and the Central New York Southern Railroad, at Ithaca, N. Y., both of which are under the management direction of Ford, Bacon & Davis. He remained at Ithaca a very short time, and since leaving there has been associated with the Lackawanna & Wyoming Valley Railroad at Scranton.

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Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Air Brake Representatives Promoted

The Westinghouse Air Brake Company has announced a number of new appointments and promotions in the personnel of its organization.

V. Villette, mechanical expert, Pacific district, Westinghouse Air Brake Company, has been promoted to representative, Westinghouse Air Brake Company and Westinghouse Traction Brake Company, same district.

A. C. Layton, a locomotive engineer on the Los Angeles Division of the Southern Pacific, succeeds Mr. Villette as mechanical expert.

Raymond Boiselle, mechanical expert, Westinghouse Traction Brake Company, St. Louis, has been transferred to Wilmerding as representative, Westinghouse Air Brake Company and Westinghouse Traction Brake Company, Pittsburgh district.

F. C. Young, industrial representative, Pittsburgh district, has been promoted to representative, Westinghouse Air Brake Company and Westinghouse Traction Brake Company, same district.

S. B. Schrontz, chief clerk, Pittsburgh district office, has been appointed industrial representative, Pittsburgh district, assisting Mr. Young.

E. H. Weaver, industrial representative, Pittsburgh district, has been transferred to the Chicago office as inspector for the Westinghouse Air Brake Company.

New Turbine for Pennsylvania Railroad Electrification

The Pennsylvania Railroad has recently purchased from the Westinghouse Electric & Manufacturing Company a 20,000-kva. turbine generator, complete with condensers, auxiliaries and switching equipment. This unit will be installed in the Long Island City power plant, which supplies power to the Pennsylvania tunnel and terminal electrification at New York City. This is the fourth Westinghouse unit of this capacity that the railroad has purchased for this power house. When the new unit has been installed, the station will contain four 20,000-kva. turbines and one of the original 8,000 kva. units. It is the intention of the railroad eventually to replace the last named with another 20,000-kva. machine, making the final capacity of the station 100,000 kva.

Each of the four 20,000-kva. installations consist of one high-pressure condensing steam turbine generator, producing 11,000-volt power at 25 cycles. This rating is with three-phase operation, the corresponding single-phase capacity being 13,000 kva. There is also one 32,000-sq.ft. surface condenser, one direct-turbine-driven Le Blanc air pump, one motor-driven condensate pump, one turbine-and-gear-driven circulating water pump and the necessary switch equipment.

Westinghouse to Sell Additional Common Stock

The Westinghouse Electric & Manufacturing Company will offer $14,962,530 additional common stock at 53 to preferred and common stockholders of record April 16, in ratio of 20 per cent of holdings. The net profits of the company available for dividends, for the fiscal year ended March 31 (March estimated), will amount to about $12,000,000; while dividends on the shares, including new issue of stock, at rate now being paid, 8 per cent per annum, will be $7,182,000.

The directors of the company believe there will be a still further enlargement in demand for the company's products, due to public attention now being directed toward hydro-electric developments, steam railroad electrification, industrial electric manufacturing processes, further development of activities in the radio field, and a widening use of electricity for other purposes. The board of directors has no present plans for substantial enlargement of plants, but it has deemed it advisable to increase working capital by making this offering of additional common stock. It is explained that if expectations as to continuance of prosperous business conditions should not be realized, the additional issue of stock will place the company in a favorable position to redeem its 7 per cent bonds, due 1931, which become callable as a whole on or after May 1, 1926. The Westinghouse Company has $121,000,000 common stock of $50 par authorized, of which $70,813,950 is outstanding. There is $3,998,700 of 7 per cent cumulative preferred stock outstanding of $4,000,000 authorized.

Net Income Increases

The report of the International General Electric Company, Inc., for the year ended Dec. 31, 1922, shows net income of $2,265,477, after expenses, interest and taxes, equivalent, after preferred dividends, to $15.65 a share earned on $10,000,000 common stock. This compares with $1,973,072, or $12.73 a share, in 1921. The surplus in 1922 after preferred dividends amounted to $1,565,477 against $1,273,073 in 1921.

American Company Gets Part of Glasgow Contract

At a meeting of the Glasgow Town Council on March 29 there was much discussion on a proposal by the tramways committee that an order for about £4,000 worth of special trackwork should be divided among four firms that had submitted tenders. One of the four was the United States Steel Products Company and its tender was the lowest. The other tenders were from British firms. One town councillor moved that the contract should be awarded to the three British firms. He based his suggestion on the assertion that in the works of the American company the employees were not allowed to be members of a trade union. In purchasing steel from America, Britain was not only getting steel but the blood of the working class. On behalf of the tramways committee it was explained that it would have accepted the lowest offer (the American), but on the ground of unemployment in Britain the members of the committee thought it would be hard on British labor to send the order to America. The committee, however, could not afford to cut out the American offer altogether because it had had large quantities of steel rails from American mills, when British prices had been prohibitive.

Another amendment was moved to accept the lowest offer on the ground that if Britain ceased importing goods its shipping industry would be ruined. Mr. McWhirr, chairman of the tramways committee, said he was satisfied that the workers of the American company were employed under conditions that compared very favorably with those of the workers similarly engaged in Britain. A great part of the Glasgow tramway system was equipped with rails supplied by the United States Steel Products Company and there was conclusive evidence of the value of the work turned out.

The proposal to accept the American tender for all the work received only eighteen votes and was dropped. On a vote between the acceptance of the three British offers and the committee's proposal dividing the work between the four firms the latter was carried by forty votes to thirty-two.

Metal, Coal and Material Prices

Metals—New York	April 17, 1923
Copper, electrolytic, cents per lb	16.875
Copper wire base, cents per lb	19.625
Lead, cents per lb	8.20
Zinc, cents per lb	7.60
Tin, Straits, cents per lb	45.25
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	6.30
Somerset mine run, Boston, net tons	3.375
Pittsburgh mine run, Pittsburgh, net tons	2.00
Franklin, Ill., screenings, Chicago, net tons	1.95
Central, Ill., screenings, Chicago, net tons	1.575
Kansas screenings, Kansas City, net tons	2.625
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft	7.75
Weatherproof wire base, N. Y., cents per lb.	19.50
Cement, Chicago net prices, without bags	$2.20
Linseed oil (5-bbl. lots), N. Y., per gal	$1.195
White lead, (100-lb. keg), N.Y., cents per lb.	13.375
Turpentine, (bbl. lots), N.Y., per gal	$1.56

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Rolling Stock

Eastern Wisconsin Electric Company, Sheboygan, Wis., expects to purchase five new sedan buses which it is planned to have in operation before June 1.

Warren-Jamestown Street Railway, Warren, Pa., has placed an order with the Kuhlman Car Company for four interurban cars of the latest and most approved design to be delivered in Warren in about four months. The length of the cars will be 45 ft. over all. They will have a seating capacity for approximately fifty passengers.

Ohio Valley Electric Railway, Huntington, W. Va., has purchased forty new steel cars at an estimated cost of $500,000. The cars are being built by the J. G. Brill Company, Philadelphia. They were designed especially for Huntington and are larger, lighter and considerably more comfortable than those now in service. The new equipment is expected to be put in operation some time in August. The cars measure 40 ft. in length over all and will seat forty-eight persons. They are of all steel construction and entirely modern in design, made double end as the present cars but arranged for either one-man or two-man operation. The cars complete will weigh about 17 tons, as against 25 to 30 tons, the weight of the largest car now in service. They are to be equipped with four 35-hp. motors and air brakes.

San Diego (Calif.) Electric Railway has ordered from the American Car Company of St. Louis, fifty cars to be delivered in September. They will cost $18,500 each, or a total investment in new equipment of nearly $1,000,000. These cars are of the latest type, convertible for either one-man or two-man operation. They are double-truck motor cars, with straight sides, round ends and arched roofs. Top sash stationary, except four on each side to be pivoted. Seating capacity when operated with one man fifty-five, with two men, fifty-four. Length over all, 47.5 ft. Length over dashes, 46.2 ft. Width over all, 8.6½ ft. The doors at the ends, opening out, will be a new departure in San Diego, as heretofore all the company's large cars have been of the center entrance type, only the small Birney safety cars having the end entrance and exit. The new cars will be equipped with the National Pneumatic Company's electric pneumatic safety interlocking door control. The control is operated by push buttons, with switches for one and two man operation. They are also to be equipped with Tomlinson automatic couplers. These cars will also be placed in the general service on the city lines.

Track and Roadway

San Francisco - Oakland Terminal Railways, Oakland, Calif., has started the reconstruction of tracks for about a mile along Grove Street in Berkeley from Berkeley way to the Alameda. The cost will approximate $100,000.

Hydro-Electric Power Commission, Ontario, Canada will spend $150,000 on rebuilding radial roadbed on Lake Shore Road, New Toronto, Can.

Madison (Wis.) Railways has announced the 1923 budget for expenditures. It includes an authorized expenditure of $40,000 to be used for track and line improvement purposes, as well as for additional construction work and other needed improvements.

Cleveland, Ohio.—Traction Commissioner Holcomb recently submitted to the traction committee in behalf of the Cleveland Railway a proposed program of improvements to cost $869,807. The plans call for removal of worn-out tracks, double tracking and repaving in all sections of Cleveland.

New York State Railways, Utica, N. Y., will spend $150,000 in improvements in Utica. The James Street line will be extended to St. Vincent Street, new tracks will be laid in Genesee and Bleecker Streets and a loop will be built at the entrance to the Yahnundasis Golf Club.

Seattle, Wash.—Repairs to Rainier Avenue costing more than $8,000 are said to have been necessitated by the city street department, owing to the seepage of water between the rails of the Seattle & Rainier Valley Railway. The company's right-of-way, with the exception of Dearborn Street, has never been paved, owing to the financial condition of the company.

Power Houses, Shops and Buildings

Louisville (Ky.) Railway has closed deals whereby it has secured all the property on Second Street, excepting one lot, in the area in which interurban stations will be erected. The company will probably bring condemnation proceedings to get the one building, which is 95 x 95 feet, at the corner of Second and Liberty Streets.

Wisconsin Public Service Company, Green Bay, Wis., during this summer will start work on the development of another large hydro-electric power plant at Caldron Falls site. The plant will cost approximately $750,000 and will be located on the Peshtigo River. The company has just recently completed its Johnson's Falls hydraulic development, which cost approximately $700,000 to erect.

Public Service Corporation of New Jersey expects to start construction soon on a $20,000,000 superpower station. The new station, which will add 200,000 hp. to the system's capacity, will be built on the Kearny Meadows. The power furnished by the addition will be used for industrial and domestic needs of northern New Jersey. Mr. McCarter, president of the Public Service Corporation, has stated that arrangements for financing the enterprise have been completed.

New Incorporation

San Antonio, Medina Lake & Western Railway, San Antonio, Tex., has been incorporated. Its object is to build an electric line from San Antonio to San Angelo. The estimated cost is $190,000. The project will comprise 190 miles of road through new territory.

Trade Notes

Nichols-Lintern Company, Cleveland, Ohio, reports that the demand for N-L car equipment has been very good. Since Jan. 1 orders for N-L indicating signals, sanders and ventilators have been exceptional. A continuance of the demand is expected for several months.

American Insulated Wire & Cable Company, Chicago, is now manufacturing magnet wire, having begun operations on April 1. Its products are sold under the trade name A-1 Magnet Wire and consist of the following: plain enameled; single cotton covered; double cotton covered; single cotton enameled; double cotton enameled; single silk covered; double silk covered; single silk enameled; and double silk enameled.

Combustion Engineering Corporation, Ltd., and the **Uehling Instrument Company** have recently entered into an agreement whereby Uehling interests in the Dominion of Canada and Newfoundland will be handled exclusively by the Combustion Engineering Corporation, Ltd., with principal offices located in Toronto, Montreal, Winnipeg and Vancouver. The Uehling line includes such fuel economy equipment as CO_2 recorders, SO_2 recorders, draft recorders, combined barometer and vacuum recorders, absolute pressure indicators, etc.

New Advertising Literature

Hisey-Wolf Machine Company, Cincinnati, Ohio, has issued a revised bulletin on portable electric drills and reamers. A reproduction of a sectional drawing shows the construction clearly. Several sizes of drills and reamers are listed, as well as two sizes of drilling stand, or drill press, in which the Hisey drill is incorporated. The bulletin is No. 106; it supersedes Nos. 105-155.

Link Belt Company, Chicago and Philadelphia, has recently issued a comprehensive and instructive book, "Electric Hoists and Overhead Cranes." It is not only profusely illustrated with photographs of actual installations showing some of the most recent Link-Belt electric hoist applications, but with line and wash drawings, the subject of proper installation and efficient operation is fully covered. Going further than the usual "catalog," Book No. 480, as it is known, tells, in print and picture, of the practices and methods employed by users in widely divergent fields.

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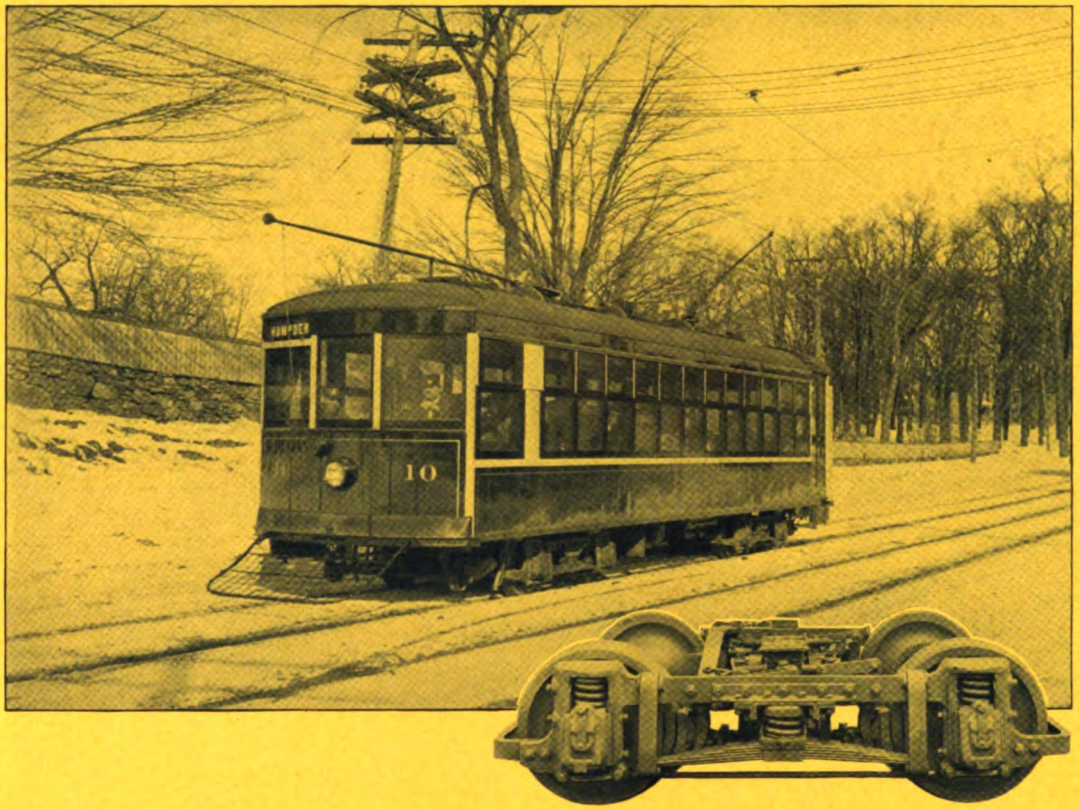

Double-Truck Safety Car

Mounted on Brill Low-Level Trucks No. 77-E

In this double-truck type Safety Car are combined the advantages of light weight and a carrying capacity equal to the requirements of practically any service. It weighs approximately 28,000 lb. complete, and has a seating capacity of 54.

Also, Brill 77-E trucks equipped with 26-in. diameter wheels not only carry the car body very low but operate in a steady and most comfortable manner.

Complete information will be furnished upon request.

THE J. G. BRILL COMPANY
PHILADELPHIA, PA.

AMERICAN CAR CO. ST. LOUIS MO. — G.C. KUHLMAN CAR CO. CLEVELAND OHIO — WASON MANF'G CO. SPRINGFIELD MASS.

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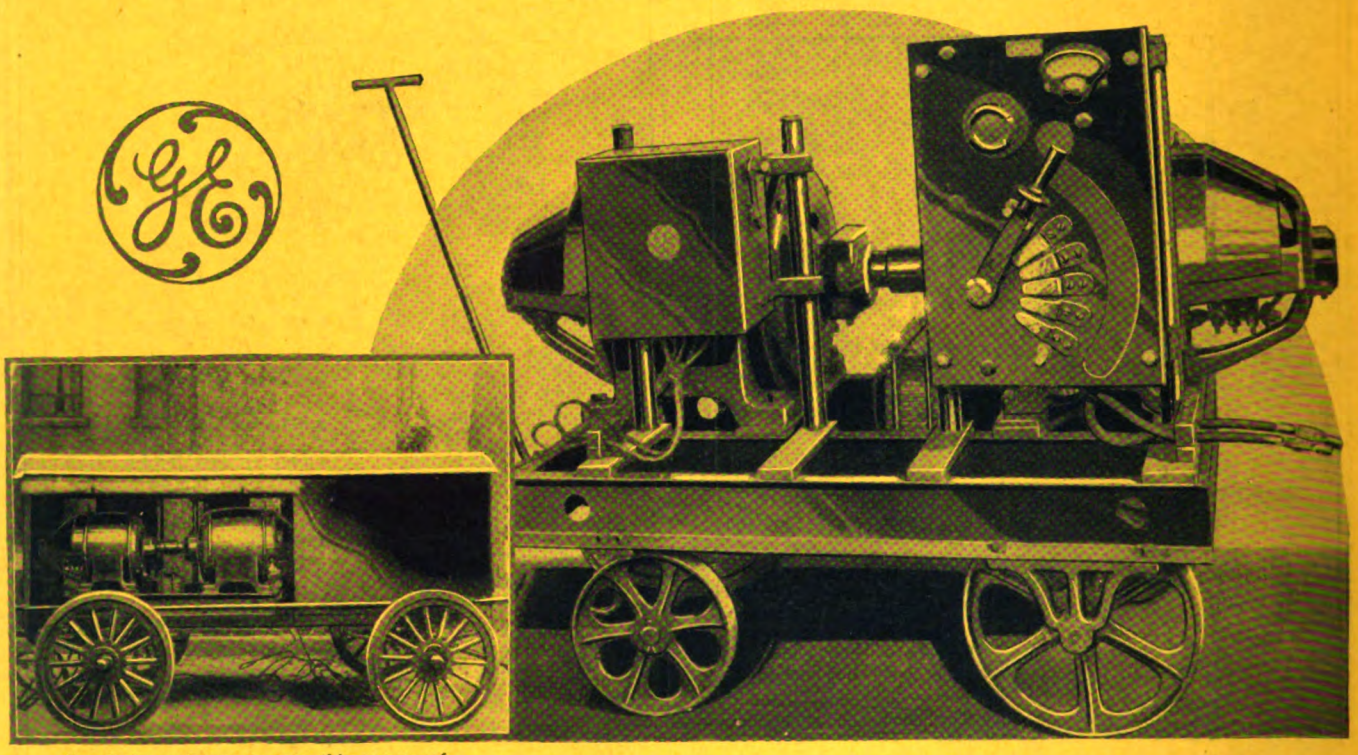
Here's the Arc Welder for You



One Railway Company uses this means of mounting "WD-9" for track work.

"WD-9" does great shop and track work!

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Philadelphia Rapid Transit
American Rys. Co., Philadelphia
Washington Ry. & Elec. Co.
Northern Ohio Pr. & Lt. Co.
Columbus Rwy. Lt. & Power Co.
Chicago Surface Lines
Milwaukee Elec. Ry. & Lt. Co.
Des Moines City Railway Co.
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San Francisco—Oakland Terminal

"WD-9" was specially designed to run at constant speed where the supply circuit varies even as much as 400 volts minimum or 650 volts maximum. It gives the operator constant conditions in the arc—and that means good welding. It is a compact, well-built set—easy to use and economical to operate.

Here are some of the things "WD-9" will do right for you if you team it up with a welding operator who knows his business. It repairs truck frames—brake hangers—journal boxes—gear cases—resistors—drawheads and underframing—flanges on worn car wheels—worn journals on armature shafts—broken and worn motor frames. It readily repairs railway tracks—and is used for rail bonding.

Get acquainted with "WD-9" at any of the G-E Sales Offices which are in all large cities.

GENERAL ELECTRIC

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McGraw-Hill Company, Inc. April 28, 1923 Twenty Cents Per Copy

ELECTRIC RAILWAY JOURNAL

SAMSON SPOT
TROLLEY CORD
Ideal for one-man cars

Trade Mark Reg. U. S. Pat. Off.

Waterproofed, smooth and durable. Gives the greatest wear, and does not jam or break unexpectedly. The colored spots are our trade-mark.

Samson Bell and Register Cord

Extra quality stock, firmly braided and smoothly finished to withstand constant abrasion and jerking.

SAMSON CORDAGE WORKS
Boston, Mass.

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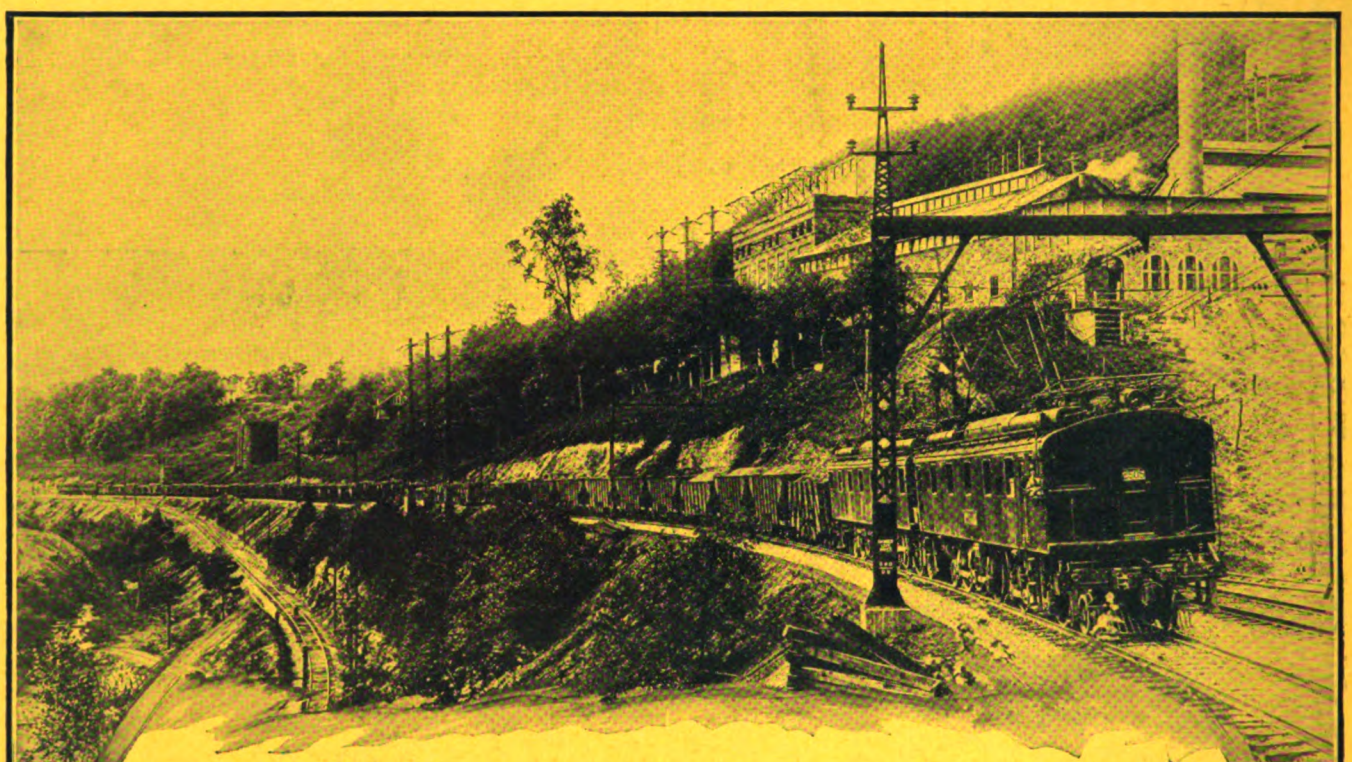

Another Successful Alternating-Current Installation

Winding over and through the mountains of West Virginia, hauling approximately two million tons a month, the electric locomotives of the Norfolk & Western have more than met expectations.

As a proof of the successful operation of this alternating-current electrification, the Norfolk & Western Railway is extending its electrified zone a distance of thirty route miles.

This extension will assure a more rapid and efficient handling of the 3250-ton trains through this coal-mining region which includes the 2% Elkhorn grade over which these trains operate at a speed of 14 miles per hour.

Were steam locomotives used to handle the present tonnages the number required would be at least three times the number of electrics now employed.

MEMBER AERA AMERICAN ELECTRIC RAILWAY ASSOCIATION

THE BALDWIN LOCOMOTIVE WORKS · PHILADELPHIA · PA

WESTINGHOUSE ELEC. & MFG. CO. · EAST PITTSBURGH, PA.

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ELECTRIC RAILWAY JOURNAL

Consolidation of Street Railway Journal and Electric Railway Review
Published by McGraw-Hill Company, Inc.
HENRY W. BLAKE and HARRY L. BROWN, *Editors*

Volume 61 New York, Saturday, April 28, 1923 *Number* 17

Significance of the Boiler-Room Changes at Providence

THE United Electric Railways, Providence, R. I., has shown its confidence in pulverized coal by equipping one section of its boiler house with equipment for burning fuel in this form. All bridges behind have not been burned, because a number of the stoker-fired boilers remain, and it will be possible to burn oil under the new boilers in place of coal if necessary. However, the pulverizing apparatus is being installed in the confident belief that it will prove economical and convenient. The plant is of peculiar interest in the electric railway field because it is of moderate size, it is provided with facilities for trying out different kinds of fuel, and it was built long enough after the Lakeside plant in Milwaukee to permit experience with that plant to be utilized.

The railway company would have preferred to postpone announcement of the details of this plant until after it had been in operation for a time. However, a partial description of the preliminary design was published in at least one of the foreign engineering papers, and it seemed desirable, therefore, to print in the ELECTRIC RAILWAY JOURNAL a fairly complete statement of the present status of the work. This has been prepared in collaboration with the railway company and the manufacturers and appears elsewhere in this issue. It will be followed in due course by another article on the operation of the plant.

Coming U. S. Chamber Meeting of Special Interest to Interurbans

THE predominant theme of the eleventh annual meeting of the Chamber of Commerce of the United States in New York, May 7 to 10, is transportation—transportation in its national aspects. This meeting might be characterized for its intent as the Federal Electric Railways Commission proceedings of the steam roads, for its main accomplishment will be to bring to public attention a great deal of information about the true aspects of the transportation situation. Many of its phases will be discussed, including the matter of rates and their relation to manufacturing costs and to distribution, transportation obstructions to distribution, store door deliveries and collections, railway financing, co-ordination of trunk line, highway, electric railway and water-way transportation systems, etc.

The chamber is making a study "comprehensive of the whole problem from every point of view, hoping to aid in the ultimate formulation of a national transportation policy." This study has been intrusted to the Transportation Conference, whose work will continue considerably beyond the May meeting. P. H. Gadsden is a member of the conference, and steps are being taken to present complete and enlightening data about the electric railways.

There is an unusual opportunity here for the electric railway industry to bring about a general appreciation of the magnitude of its services, where they fit into the general scheme, and what they could accomplish in relieving the steam roads if utilized in an intelligent plan that comprehended their full abilities.

This is particularly an opportunity for the electric interurban lines. They did not derive much benefit from the Federal commission proceedings as there were primarily devoted to the street railways. But in the present case they will have their inning.

Electric railway men will therefore find special interest in this eleventh annual meeting of the chamber, and they should plan to attend its sessions and take active part in the discussions. In other words, they should make the electric railways felt in these councils embodying all transportation agencies.

One Hundred Years of Transportation

SO FEEBLE were the means of transportation, comparatively, prior to the advent of the railroad that transportation may fairly be said to have had its beginning with the chartering of the Delaware & Hudson Canal Company, which celebrated the hundredth anniversary of its founding with fitting occasion on April 23 in New York. This is the first centenary of a railroad company.

As the name indicates, the company incorporated by special act of the New York Legislature on April 23, 1823, had the purpose first in view of promoting and building a canal. This project was quickly followed, however, by a grant from the Pennsylvania Legislature on April 5, 1826, authorizing construction of a railroad from the head of the canal at Honesdale to the anthracite coal mines at Carbondale. And then the "Stourbridge Lion," bought in England by the Delaware & Hudson, made its first trip on Aug. 8, 1829. It was the first steam locomotive to run on a railroad in America.

The American public might well stop to ponder the marvelous accomplishments of the century concluded by this significant anniversary. The tremendous importance of anthracite coal, previously unavailable but brought to our civilization by the Delaware & Hudson, merely typifies the part of the railroads in the unparalleled development of the life and commerce of the United States.

Somehow the accomplishments wrought by the railroads must be dramatized so that the public will comprehend what it owes them. If there could be put into the 1923 mind a composite picture of the strides

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made since 1823, for which transportation is peculiarly responsible, there would be a quick reversal of public attitude to the eager, friendly interest in the railways that prevailed during the first fifty years of transportation. The present desire, so commonly expressed, to tighten the ban of regulation is the product largely of ignorance, and of misrepresentation by those who would capitalize that ignorance for selfish political gain.

In view of present agitation it is not to be wondered at that Leonore F. Loree, eighth president of the D. & H., in his centenary celebration address, attacked the system which he says has vested legislative powers in commissions. They exercise these powers in making special rules applicable only to the particular proceedings pending, as contrasted with the general, basic rules of conduct laid down by the true legislature. "Railroading is no longer a business; it has become a calamity," he declared.

But the remedy is clear. It is only that we must find the means and the talent to counteract this ignorance with understanding, and prevent misrepresentation by securing honest public officials. In this movement electric railways are as vitally interested as the trunk lines, and there should be a joining of hands in this matter of public relations. Mr. Loree sounded the keynote of progress by concluding his address with an appeal to take up this work with the courage and confidence shown by the railroad pioneers in overcoming the physical obstacles which beset them.

The Right Kind of Accounting Conduces to Better Control of Expenditures

NATURALLY the first duty of the electric railway accountant has been to meet the needs of the general officers of the company. Now that this duty is reasonably well accomplished in present-day accounting, attention is being turned toward departmental requirements. This is evidenced by the work of joint committees in the electric railway associations, such as those on claims accounting and engineering accounting.

Take, for example, the matter of engineering accounting. The engineering department expends large sums for construction and maintenance, which it can do with best economy only when it has full data. The information compiled primarily for the executive department has not been in sufficient detail for this purpose, hence the engineering departments have usually had to shift for themselves very largely in determining costs. It is now becoming recognized that the accounting department contains the experts on cost statistics who should assume the duty of furnishing all such data required. This means more work for the accountant, but increased prestige. It involves close co-operation with the engineering department, to determine what information is needed, and in what form. Obviously, judgment must be used in making demands upon the accounting department, for the subdivision of costs can be carried too far; that is, farther than is necessary in accomplishing the purpose of impelling control of expenditures. However, the information should be in sufficient detail to permit prompt compliance with requests for special information, even if these are not likely to occur more than two or three times a year, for segregation of costs by types of construction, for example, can be made cheaply as a routine matter, whereas special researches to meet occasional demands not anticipated in the routine are expensive and often very unsatisfactory.

What has been said of the engineering department applies also to other departments. In fact, there is practically no limit to the possibilities for usefulness on the part of the accounting department, if its head has the vision to appreciate the needs of the other departments.

A Great Opportunity in New Orleans

THE local transportation situation in New Orleans has been a good example of what street railroading ought not to be. Physically and financially this system stands out as one of those instances where history reflects the kind of promotion and management that have been the cause of so much public distrust and trouble for present-day managements.

The system is a consolidation of eight early railway companies, some of whose lines were built for competitive purposes; and worse, some purely as promoters' schemes where there was no justification for the construction. This resulted in a ridiculous duplication of track to the extent that in the uptown section of the city there are seventeen parallel tracks in fifteen blocks. Unfortunately, with the consolidation of companies which naturally came along, the miscellaneous trackage was never really assimilated into a practical monopoly system. Two track gages were permitted to remain and operation of all the lines was continued with consequent financial burden and inability to build extensions into growing sections where they were needed.

But this faulty layout of trackage and failure to correct is not all. A series of some seven receiverships and eleven reorganizations, with unscrupulous financial manipulations in almost every instance, have not only thoroughly disgusted the New Orleans people with the utility interests, but this distrust and antagonism have been intensified by the fact that the local people have usually been left holding the bag.

So it is not going to be easy for the new interests and new management that recently took hold to develop a good condition of public relations. But there is a splendid opportunity to make an efficient and soundly profitable property of the New Orleans railway and other utilities. The recent purchase was presumably made at a price well within the actual physical value, which should make possible the rehabilitation necessary without a capital burden exceeding the earning powers of the property. The new control and management are free from the disrepute attached to the company's history. Furthermore, the report just completed by John A. Beeler, while made for the city and containing recommendations that at first thought seem drastic, probably would, if carried out in major part, put the company in a position greatly to improve the measure with which it can fulfill the local transportation requirements. In fact, the plan of track rearrangements, covered in this issue, is one which the company might well have undertaken at its own instance. But it would provide much better service for the people as well as better economy for the company, hence its interest to the city authorities.

The time is now ripe for both company and public to make a new start, to work together in providing this great Southern seaport with the kind of transportation that it ought to have in order to keep pace with its opportunity to grow, and thus to eliminate one more of the sore spots of the traction industry.

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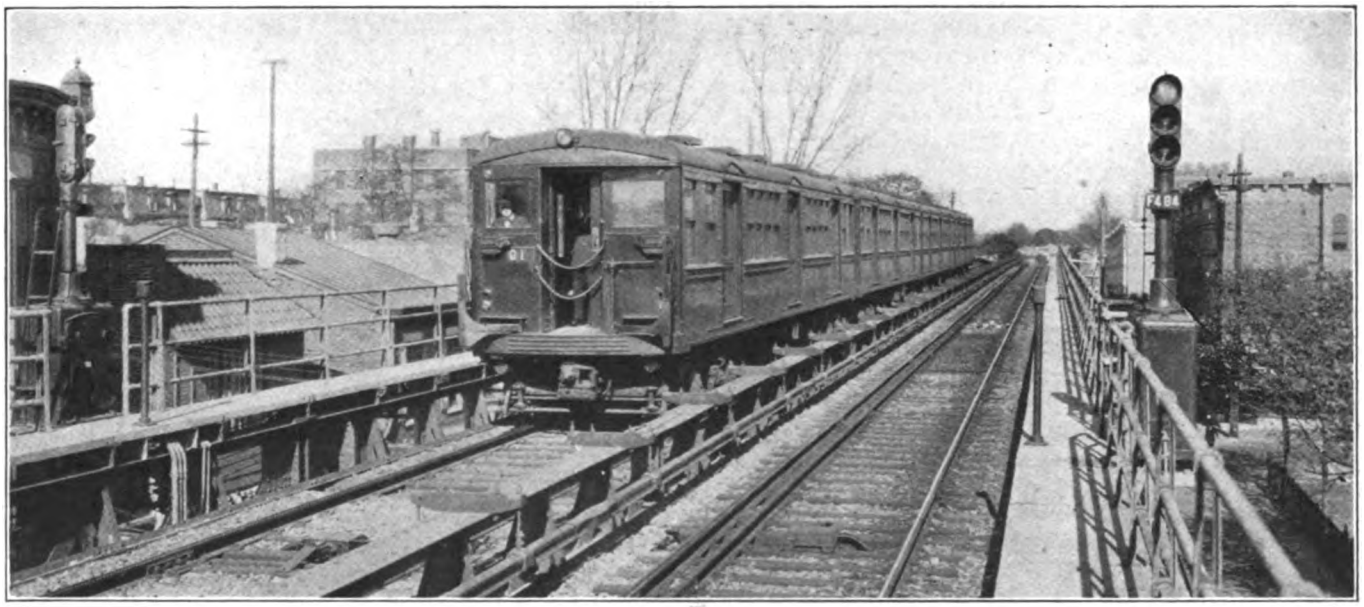

Color Light Signals and Automatic Train Stops with Key Release on Frankford Elevated

Signaling on the Frankford Elevated—I

The Special Problems Met and How They Were Solved on This Most Recently Completed Elevated Line—This First of Two Articles Deals Particularly with the Signals, Trips, Electric Circuits and Air Lines

By J. N. Dodd

Consulting Engineer, New York City. Recently with the Department of City Transit, Philadelphia, Pa.

THE Frankford Elevated Railway* in Philadelphia is equipped with a complete automatic block-signal system. Some of the main features of the installation may perhaps be most clearly presented in tabular form. They comprise:

Junction interlocking.
Yard entrance and terminal interlocking.
Emergency crossover interlocking.
Semi-automatic control of interlocking signals.
Permissive signaling.
Three-position automatic block signaling.
Automatic stops.
Overlap control of signals.
Electro-pneumatic operation of stops and switches.
Traffic locking between towers.
Approach locking.
Time-release locking.
Sectional-route locking.
Speed control of signals.
Color-light-type signals.
Single-rail track circuits.
A.c. control entirely (no batteries).
Continuous-bus feed for all low-tension apparatus.
Loop system of high-tension mains.
Lever light indicators.
Illuminated track models.

The signals are of the color light type, with a lens opening 5 in. in diameter. According to specifications they were to have a range of 1,000 ft. in bright sunlight. Actually the range is about 50 per cent in excess of this. Signals at station entrances and "dwarfs" are two-position and display red for "stop" and yellow for "proceed." All others are three-position and show red for "stop," yellow for "proceed with caution as the next signal is red," and green for "proceed." The lamps are 36-watt, 30-volt, and have two filaments in multiple. If either filament burns out the remaining one will give an indication, but the reduction in light warns the maintainer of trouble.

The light unit is a cast-iron box, mounted on a pipe post erected on top of the relay case. The case is carried on a special platform placed just outside of the bench walk running along each side of the structure for its entire length. To one side of the relay case is fastened a ladder to permit access to the light unit.

Trips Are Normally Depressed

On the track level near each signal is a stop or trip which serves to enforce the danger indication. When raised this is in position to engage with a valve in the brake pipe mounted on the car truck, thus setting the brakes on any car which passes. It is in the raised position only when the red signal is displayed. In general there are two types of circuits controlling trips which are normally in the depressed position. With one type the trip rises directly back of a train and does not fall until the signal changes to yellow. The train is thus protected by two raised trips back of it. The type of control adopted for most of the trips on the Frankford Line differs from this in that the raising of the trip is delayed until the train has left the block at the entrance to which the trip is located. As

*For details of the track and elevated structure of this railway, see ELECTRIC RAILWAY JOURNAL, Nov. 25, 1922, page 841.

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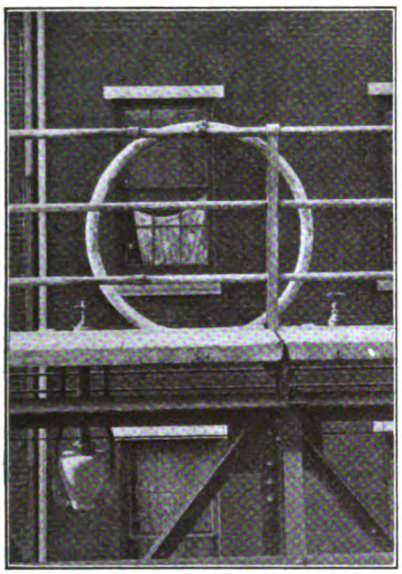
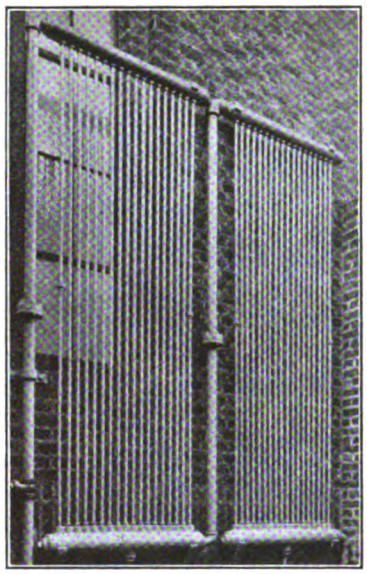




At Left, Expansion Loop and Drainage Reservoir in Air Pipe Lines.
At Right, Condenser for Removing Moisture from Air Pipe Lines

with the type of control previously described, the trip falls when the signal changes to yellow. The train is thus protected by one raised trip located a full block length back. The presence of a train on the section immediately beyond the trip holds the trip down. This type of circuit was adopted to permit the operation of trains in the reverse direction without the necessity of installing an additional relay at each signal to be operated by the traffic levers in the signal towers.

Relays for this purpose are objectionable on account of their cost, but mainly because they and the control circuits used for clearing stops would come into play only in emergency cases in which it is desired to reverse the direction of traffic. It would be difficult to test out such circuits during the normal operation of the system, as they would be very long and the relays could not be energized without interfering with the normal operation of the trips. If the trips should be disconnected from the relays to test out the relay control, the entire feature would be out of service until the trips were again connected. Because such circuits and relays would seldom be used, and because of the difficulty in testing it would probably often be found that, on account of broken wires or loose connections they were inoperative when needed. The scheme adopted insured that the circuits and relays used will come into play continuously during normal operation. The circuits are local at each station and are therefore much easier to test and maintain.

There is an interesting variation from this type of circuit in the control of the signal trip at the leaving ends of the stations. At these signals there is no overlap and the trip must rise directly back of a train. To avoid using the relays above referred to, the control is such that the trip never rises unless a train enters the approach section when the signal is red.

On the cars of the Market Street elevated line of the Philadelphia Rapid Transit Company, which run over the Frankford line, the valves installed to engage with the track trips are both at the same end instead of one being at each end as is usual. On that line the track trips are normally raised and fall only when a train approaches a proceed signal. Normally raised trips were found unsatisfactory in that a signal could be clear while through some fault the trip was raised and the motorman would find himself stopped without warning when passing a clear signal. Accordingly the Frankford specifications provided that the signals should be red whenever the trip is raised and that the trips should function correctly even when the valves on the cars are placed 38 ft. to the rear of the front wheels. This necessitated placing the insulating joint 38 ft. back of the signal trip. However the circuits adopted for the trips at the leaving ends of stations made it permissible to place this insulating joint close to the signal.

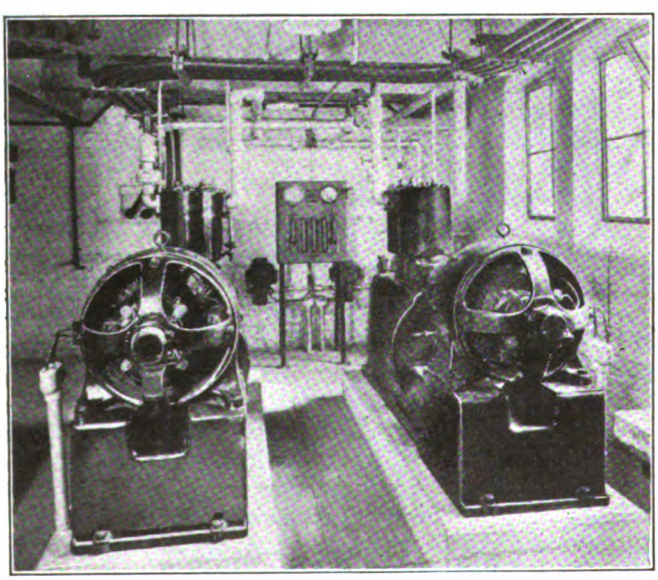
The trip is raised by a counterweight mounted in a box placed between the rails. The downward pull of the weight is opposed by air pressure in a cylinder. When there is loss of air pressure, or of the electric current controlling the valves, the weight at once raises the trip.

Motorman Can Depress Trip from Cab

The operating rules provide that a motorman arriving at a danger signal shall stop for a specified short period and shall then depress the trip and proceed under caution. To facilitate his doing so a control button for the trip is mounted on a special stand near the signal, where it can be easily reached from the cab window.

The provision of this control button is an interesting proof of the influence of the men under the Mitten management. When the plans for the new car were finished they were criticised by the men on the ground that there should be a door in the cab to give the motormen access to the station platform and to the bench walk. The men agreed that the main reason for such a door was to permit them to reach the track to depress a trip which was in the raised position. It was impracticable to provide such a door in the car, but instead the equipment just described was installed to allow them to depress the trip from the cab window. It is a feature which has been greatly appreciated by the men.

Affixed to each signal is a number, even or odd denoting respectively the east and west tracks. The num-



Pair of Motor-Driven Air Compressors in Substation

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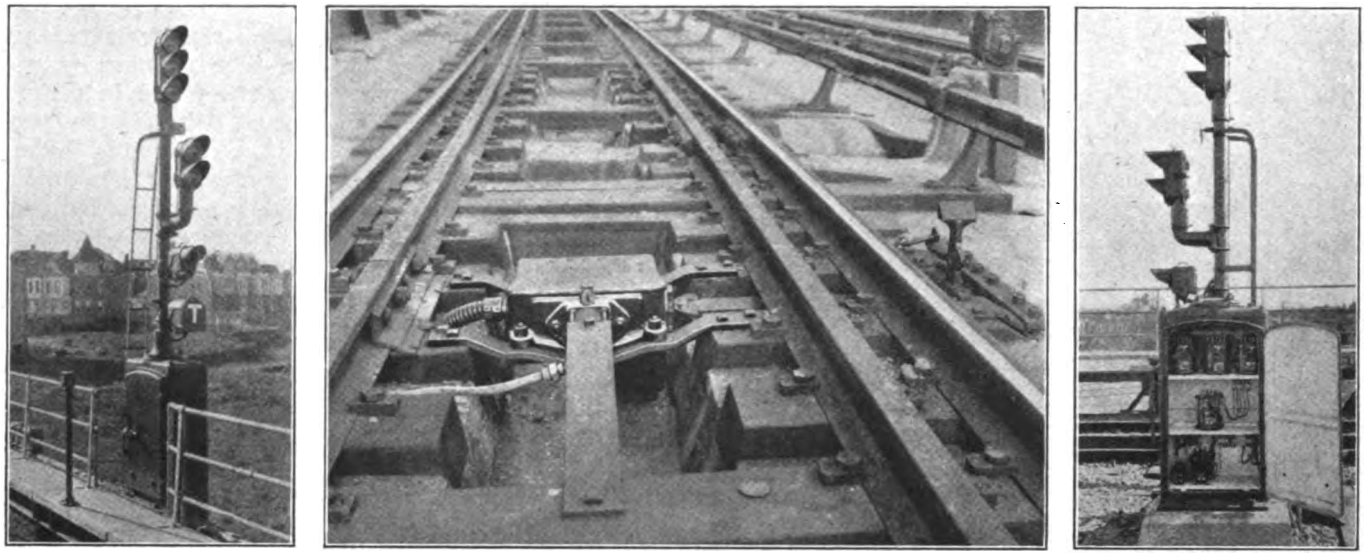


At Left, Another Color Light Signal with Train-Stop Key-Release Pedestal. In Center, "Close-Up" of Automatic Trip for Stopping Train When Signal Is Ignored. At Right, Vane Relay, Transformer and Reactor, Mounted in Case

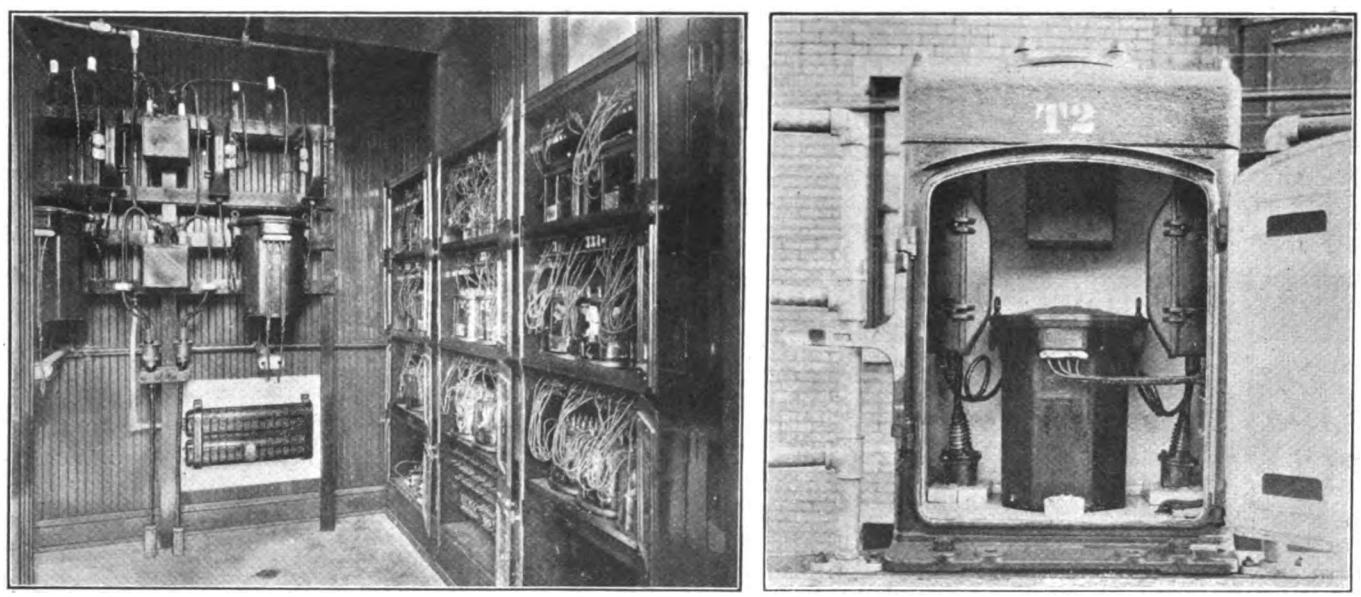
ber is chosen from the nearest house number on the street. In Philadelphia the house numbers increase by one hundred with every block and a slight knowledge of the city will enable one at once to locate a given house number. Thus signal No. 241 is on the west track near the beginning of block 24. Besides making it easy to determine the location of any signal, this system of numbering eliminates the awkwardness of giving new numbers when the signals are originally numbered seriatim.

Overlap protection is provided at all points, in length not less than the full braking distance required for a train running at the maximum speed attainable if it stops at all stations. With the following exceptions a train is guarded by two danger signals to its rear: A train standing at a station is protected by one danger signal located the full braking distance back. One which has just left the station is guarded only by the danger signal at the leaving end of the platform. The control of the signal at the station entrance is only to the signal at the leaving end and there is no overlap. However, a train which is stopped just after having left a station is protected by the fact that the following train makes the regular station stop and, if the train at the station should accelerate at the maximum rate, the maximum speed which it could attain when it has reached the trip is low and it would be brought to a standstill in a very short distance.

Track circuits are a.c., 60 cycles, and of the single-rail type. The rail next the center of the structure is reserved for the return of the propulsion current from the car motors to the substations, while the outside rail is reserved for the signals. Usually the outside rail is the farthest from the third rail, but it is kept for the signals regardless of the location of the third rail.

Relays are of the vane type. The ruggedness and simplicity of this type render it suitable for the vibrations and other severe conditions experienced on an elevated road. The relays are mounted on springs and enclosed in glass cases which permit an unobstructed view of the interior.

The track transformers are air-cooled and have two secondaries, one for the track circuits and the other for the lights. Each winding has several taps to permit



At Left, Steel Relay Cabinet and High-Tension Transformer in Substation. At Right, Transformer for Supplying Signal Current, Together with Fuse Boxes, Mounted in Cast-Iron Case

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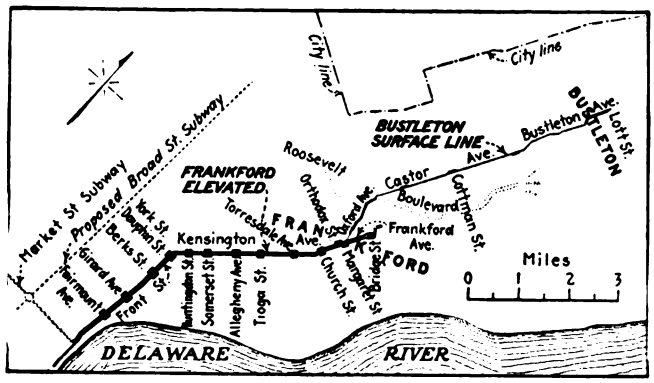


Map of Frankford Elevated Line in Philadelphia Showing Relation to Market Street Subway

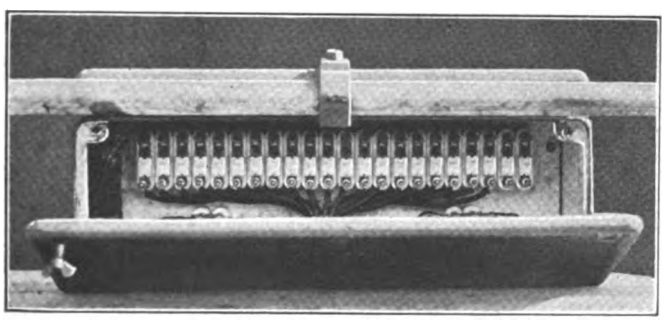
choice of voltages best suited for the conditions met. The insulating joints are Keystone. All other joints in the signal rail are bonded with a No. 2 A.W.G. stranded copper bond, flame-welded to the head of the rail. At each successive insulating joint the polarity of the track circuit is reversed. This permits immediate detection of defective insulating joints.

Novel Features in the Power Distribution

In the power layout some of the details are perhaps novel. All of the track transformers and other apparatus receiving power at 110 volts are fed from two mains of No. 6 copper running the length of the line. This size was chosen so that if any of the line transformers feeding the mains should burn out, or for any other reason go out of service, the voltage drop through the mains would not be sufficient to prevent any of the 110-volt apparatus from functioning even under the heaviest traffic that the signal spacing will permit.

At each of the line transformers one of the mains is sectionalized by a single-pole switch and fuse. At each of the emergency crossovers, which divide the line into four approximately equal parts, both of the mains are broken by a switch and fuse. Doubt had been expressed as to the feasibility of using continuous mains, so that the switches and fuses were installed to permit sectionalizing if necessary. Up to the present no serious trouble has developed and the mains have been maintained continuous from end to end. The use of continuous mains has been found very satisfactory.

The line transformers are 2,300/110-volt, and are placed at twenty-two different points along the line. At interlockings they are in duplicate. At some of the interlockings the capacity of each is 5 kva.; at all other points, 3 kva. The capacity was chosen such that in case any transformer should go out of service, those on either side would have enough spare capacity to carry the additional load without overheating. All of the transformers are fed through a loop feeder running from the substation to the several transformers and back. At each transformer this feeder is broken by two double-pole single-throw switches connected in series, and the transformer is connected between the two switches. By this arrangement, if any section of feeder should give trouble the switches connecting the section to the transformers on either side may be opened and full service obtained from the transformers through the remaining sections of the loop.



Terminal Board in Signal Circuits, in Case Hung from Walkway Railing

The low-tension wires, including the two mains above described, are assembled in a cable carried in a heavy galvanized steel conduit fastened to the outside ends of the angle irons supporting the bench walk. The cables vary in size from 5-conductor to 42-conductor. Each conductor has a braid over the rubber insulation and there is a double braid over the assembled wires. Braid over each conductor was specified rather than the tape permitted in the Railway Signal Association specifications because it does not untwist in the junction boxes. The taps from the mains across the tracks are 2-conductor cables and all other conductors across the tracks are single wires. Connections from lever machines to switches are 5-conductor cable.

Pull boxes are placed where necessary and in no case farther apart than 500 ft. Expansion joints are provided at junction boxes, transformer and relay cases, and at other suitable points. These are 15-in. nipples of steel pipe 1 in. greater in diameter than the conduit at that point. The end of the conduit is brought within the nipple and there is no screwed connection between the two. The diameter of the main conduits is 2 in., 2½ in. or 3 in., as required. The size at all points is such as to permit the installation of 25 per cent more wires than are installed at present. The use of a conduit on the structure for carrying the signal cable was adopted after its value had been demonstrated by eight years' uninterrupted service on the Market Street line. The high-tension feeder is a lead-covered cable carried in the underground duct line.

How Reliable Air Supply Is Assured

Compressed air is used for the operation of all track trips and switches on the Frankford Elevated. The air pipe is an extra-heavy galvanized-steel pipe 2 in. in diameter, carried in the same manner as the conduit for the cables but on the opposite side of the structure. Expansion is provided for by circular bends, about 3 ft. in diameter, placed not farther apart than 500 ft. At each bend is a 2-in. gate valve.

Drainage of the water which has condensed in the pipe was provided for by installing reservoirs at the bottoms of all slopes and at all expansion bends. These reservoirs are heavy conical castings about 8 in. across the greatest diameter and 10 in. high, supported with the apex downward. The reservoir is carried from the air pipe by a special hanger, as well as by the screwed connection. To remove from the reservoir the water which has collected, a ½-in. pipe is inserted to the bottom of the reservoir through the air pipe above it. The opening of a valve in the ½-in. pipe allows the air pressure to force out the water which has collected. Reservoirs are connected to the bottom of the pipe and all other connections are made at the top. Every 150 ft. connections are made for the use of air-operated track tampers.

Air is supplied from five compressors of a capacity of 110 cu.ft. each and one of a capacity of 35 cu.ft. These

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six compressors are located two in each of the three substations which supply power for the road. One of the compressors in each substation is arranged to cut in at a pressure of 75 lb. and the other at 80 lb. Mounted near the compressors is a panel board equipped with an air gage, a voltmeter, a plug and receptacle for connecting the voltmeter to either machine, two d.p., s.t. switches for cutting out either compressor, and a d.p., d.t. switch for connecting either compressor to either governor and so throwing the main load on either machine. Up to the present time one compressor in a substation operating only a small part of the time has been found sufficient to supply the requirements. Excess compressor capacity was supplied to permit the use of compressed air for operation of track tampers and for blowing out snow from the track switches. The compressors are water-cooled, and each is driven by a direct-connected, 600-volt, compound-wound motor.

Fastened to the outside of each substation building is a condenser consisting of thirty-four ½-in. pipes 9 ft. long, arranged seventeen in multiple and two in series. The effectiveness of the condenser is shown by the fact that since they have been in operation no water has collected in any of the reservoirs along the line. From the substation to the line the pipe is carried underground, imbedded in 4 in. of concrete.

An article on the signal equipment of this road is not complete without some reference to the work of installation. The order was given on June 6, 1922. Location for the field office, lumber for the shed, and telephone were obtained on June 7. Tools were shipped on June 8 and arrived on June 13. The air pipe, the conduit, the insulating joints, half the trunking and half the signal cases arrived on July 1. The work was finished on Oct. 21, 110 working days after the order was placed. The maximum force was 125 men. The equipment included five interlockings with sixteen switches, seventy high signals, sixteen dwarfs, 7 miles of conduit, 7 miles of air pipe and 1,800,000 ft. of wire conductor. Such an installation constitutes something in the way of a record.

The contractor for the work was the Union Switch & Signal Company. The detail parts were designed and manufactured by this company, which did the entire work of installation.

Credit is due A. O. Smith, signal engineer Philadelphia Rapid Transit Company, who is responsible for many details of the design, and to E. Baxter and H. Fugitt, of the same company, who were inspectors on the installation work. Stephen Harris, of the Department of City Transit, also had a considerable share of responsibility in connection with the work.

In a later article the interlocking plants will be discussed and attention will also be given to the speed-control signals, which form one of the most interesting features of the installation.

How Trainmen Can Sell Transportation

THE Dallas Railway recently issued a pamphlet prepared by a committee of Dallas trainmen appointed to study the problems of selling transportation. The committee met several times and discussed methods to be followed as a starter for merchandising transportation and drafted the following suggestions:

CONDUCTORS ARE REQUESTED TO:

Smile always.

Be neat—soap and water are cheap, and a clean shave makes you feel fine.

Thank passengers for buying tickets from you—you appreciate making the sale.

Offer to direct strangers who board your car at the Union Station or elsewhere—this voluntary offer of assistance on your part will be appreciated.

Help children and old people at every opportunity—some one may have the opportunity of helping your children or your mother or father some time.

Never dispute a passenger's word—the passenger is always right. If a passenger says he just got off another car, even though his transfer is old, say, "I beg your pardon, it is all right." Or, if you think a passenger has not paid the right fare and call his attention to it, and he says that he did pay the right fare, then say, "I beg your pardon," and *smile*. When a passenger claims to have given the signal but was carried by, don't argue with the passenger, just say, "I beg your pardon, I did not hear your signal."

Be careful not to embarrass a passenger in calling attention to an old transfer, or any of those other things like putting feet on the seats or spitting on the floor. Be very careful that no one else hears you when calling passenger's attention to same.

Be careful not to give too many small coins in change. When this is necessary apologize for doing so—for instance, "I am sorry, but I am going to have to give you some small change."

Keep race signs properly adjusted. When necessary to move the sign be careful not to offend.

Signal car to move up to cross-walks on muddy streets. Do this cheerfully and with a smile on your face.

When a passenger asks you how you feel, tell him you are feeling "fine." He is not interested in your sickness.

When you have to wait for a passenger, don't slam the door like it made you mad—*smile*. It isn't worth while to render a service grudgingly.

In outlying districts where only one end is available for exit, conductors announce, "This end, please" or "The other end please," as the case may be.

Call all streets, transfer points and public buildings in a loud and distinct voice.

Pay special attention to short-distance riders in the downtown district.

Be courteous all the time.

Think about your work from the standpoint of the passenger—he is the man who pays the bills and the one to be pleased.

MOTORMEN ARE REQUESTED TO:

Smile.

Be neat—soap and water are cheap.

Direct strangers.

Assist children and old people off the front end whenever possible.

Make easy starts and stops—jerking your car makes the ride disagreeable for the passenger and also for the conductor.

Stop at cross-walks on muddy streets—move your car up if necessary.

Operate your car on schedule time.

Co-operate with your conductor and with motormen on other runs and on other lines.

Announce streets when the car is crowded.

Think about your work from the standpoint of the passenger—he is the man who pays the bill and the man to be pleased.

Pay special attention to short-distance riders in the downtown district.

Be courteous all the time.

REMEMBER:

Politeness will keep you out of more difficulties and bring you more smiles than anything else.

Courtesy oils the wheels of life—removes the squeaks, jars and chatters that go with every position.

Courtesy pleases the customer. Think a moment and you will remember the time when you walked an extra block to deal with a salesman who had shown you courtesy the last time you were in the store.

Courtesy makes every job more pleasant—every task more worth while.

Courtesy is to some extent a test of civilization. Savages show little consideration and few people feel at home among them.

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Sweeping Changes Recommended in New Orleans

Report by John A. Beeler Recommends Extensive Relocation of Rail Lines, Rerouting of Cars, Suggests Scheme for Speeding Up and Amplifying Service and Relieving Traffic Congestion—Contemplates Expenditure of $2,500,000, but Saves $850,000 Annually

A COMPREHENSIVE report by John A. Beeler, consulting engineer, New York City, covering the physical plant and operation of the railway system of the New Orleans Public Service, Inc., has been presented to Paul H. Maloney, Commissioner of Public Utilities of New Orleans, La. The changes recommended are of a fundamental nature and of great importance to the people of New Orleans and to the local railway. It is probably a fair statement that the engineer's proposals contemplate the most extensive revision of the track layout and plan of operation that has ever been recommended by competent authority for any city in the country.

Of first importance is the recommendation to abandon 37.29 miles of present track which, it is claimed, is duplicate, and to add 34.04 miles of new track where it is needed. The two gages now existing are to be eliminated by changing 31.5 miles of standard gage track to the wide gage measure of 62.5 in. which prevails on 176.64 miles. In addition to these track changes, the five-track railway thoroughfare on Canal Street in the 1-mile section at the downtown end of the street is to be extensively rearranged and the single-track mileage reduced from 6.91 to 3.40, with elimination of 0.72 mile of curved track, forty-nine crossings and thirty-five switches with mates and frogs.

SAVING IN ROUTE-MILES RESULTS IN CONSIDERABLE SEAT-MILE INCREASE

Tied up with this change in trackage is an extensive rerouting program, which for the various lines would reduce the average round-trip mileage from 9.03 to 8.34, and the average route mileage from 7.37 to 5.73. The number of cars required for the evening rush-hour service would be reduced from 434 to 391, the total car-hours per day from 4,925 to 4,361, the total car-miles per day from 44,539 to 43,402, and the average speed would be increased from 9.04 m.p.h. to 9.96 m.p.h. The total seat-miles would be increased from 1,720,132 to 1,935,968, and the total average passengers per seat in the maximum evening rush-hour at the maximum point on each line, summarized, would show the improvement from 1.47 to 1.17.

In addition to producing a material reduction in the number of car movements in the 1-mile maximum traffic section adjacent to the Mississippi River on Canal Street, the principal business thoroughfare, the number of car turning movements would be reduced from 433 to fifty, and the total interferences from 845 to 100.

Considerable rebuilding of present rolling stock, including provision for one-man operation on many of the smaller cars, and the use of trailers are also covered in the report. There are recommendations covering various other matters also, such as energy saving, cooperative plan for employees, the use of automatic electric switches, loading platforms and skip stops and an adequate transfer system. As the plan affects practically every line in the city, the sequence of executing the various parts of the plan is very important, and the report includes a recommended order in which to carry this out.

THE ANNUAL SAVINGS IN THREE YEARS WILL CANCEL INITIAL EXPENDITURE

The total cost to the railway to carry out the complete program would be about $2,500,000, and it is estimated that this would effect savings amounting to some $850,000 per year. Mr. Beeler states that to continue to operate the system as it now exists under present labor and material costs means ultimately either a reduction in the quality and quantity of service or an increase in the rate of fare. By contrast, the adoption of the plan presented makes it practicable ultimately to lower the fare, thus realizing the desires of the public and fulfilling the obligations of the reorganizer. He says further that while it is rash to attempt to prophesy in these days, nevertheless under the conditions cited in the report, a reduction in the rate of fare should be practicable about September, 1924, under a ten-year amortization plan for taking care of the cost, or about October, 1925, under a pay-as-you-go plan. This reduction would be to the extent of selling four rides for a quarter. It would mean sixteen rides for a dollar, as compared with the former maximum of twenty, which, it is pointed out, "is not a bad showing for the railway, considering all things."

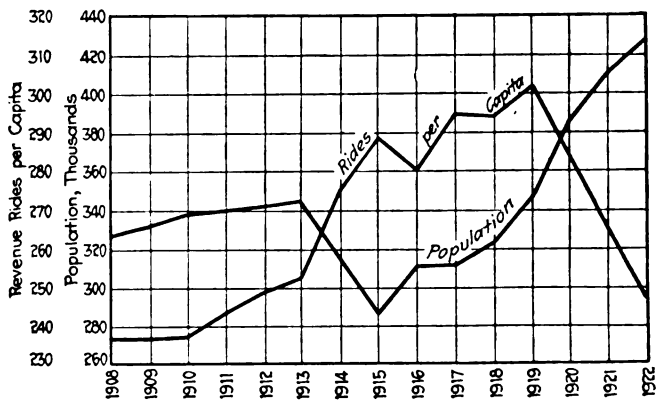

Fig. 1—Trend of Population and of Revenue Rides per Capita in New Orleans

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A feature of the report, the engineer points out, is that the recommendations are not made with the sole idea of cheapening the cost of service. More efficient operations are made possible and various economies are recommended. The adoption of them in no case, however, does other than to improve the service. The principle upon which the whole plan is based is adequate service first.

Section I Covers Track Rearrangement

The report is divided into seven sections, dealing respectively with the proposed track layout, routing, a particular study of Canal Street, improvements in service, order of installation of the changes, a new transfer system, financial results. Altogether, the report comprises 233 typewritten pages, numerous exhibits being included.

In Section I the report states that the survey of the street car situation shows that the city is inadequately served. Two track gages with a multiplicity of crooked, indirect, interlocked routes, concentrating in the congested districts, greatly impair the efficiency and limit the flexibility of the system. Consequently the railway does not render satisfactory service to the territory it covers, nor does it give promise of a satisfactory expansion, such as is necessary to the growth and development of the community. A close study of the history of the railway indicates that much has been fundamentally wrong with it for years.

As demonstrating some of the fundamental weaknesses of the present railway system, the report then shows a comparison of the population growth of New Orleans with the rides per capita. While since 1908 the population has increased from 328,681 to 427,238 in 1922, and the number of revenue passengers has increased in the same period from 77,459,499 to 105,712,903, the number of revenue rides per capita has shown an upward but more recently a downward trend, having risen from 236 in 1908 to 312 in 1919, but dropping back to 247 in 1922. This comparison is illustrated in an accompanying curve. In explanation of this the report states that the higher rate of fare, and certainly the 8-cent fare which was put in effect on Oct. 23, 1920, has of course been a factor in reducing the riding habit, but this cannot entirely explain it, for the present rate of 7 cents (effective on Sept. 28, 1922) is not far from the old 5-cent rate, measured by the standard of wages now paid. The increased use of the passenger automobile undoubtedly has had its effect on the falling off of street car patronage, but the jitney, which has affected street railways so detrimentally in many other cities, is not a factor here.

Referring to the distribution of trackage, as laid at present, the report states that there is much that is

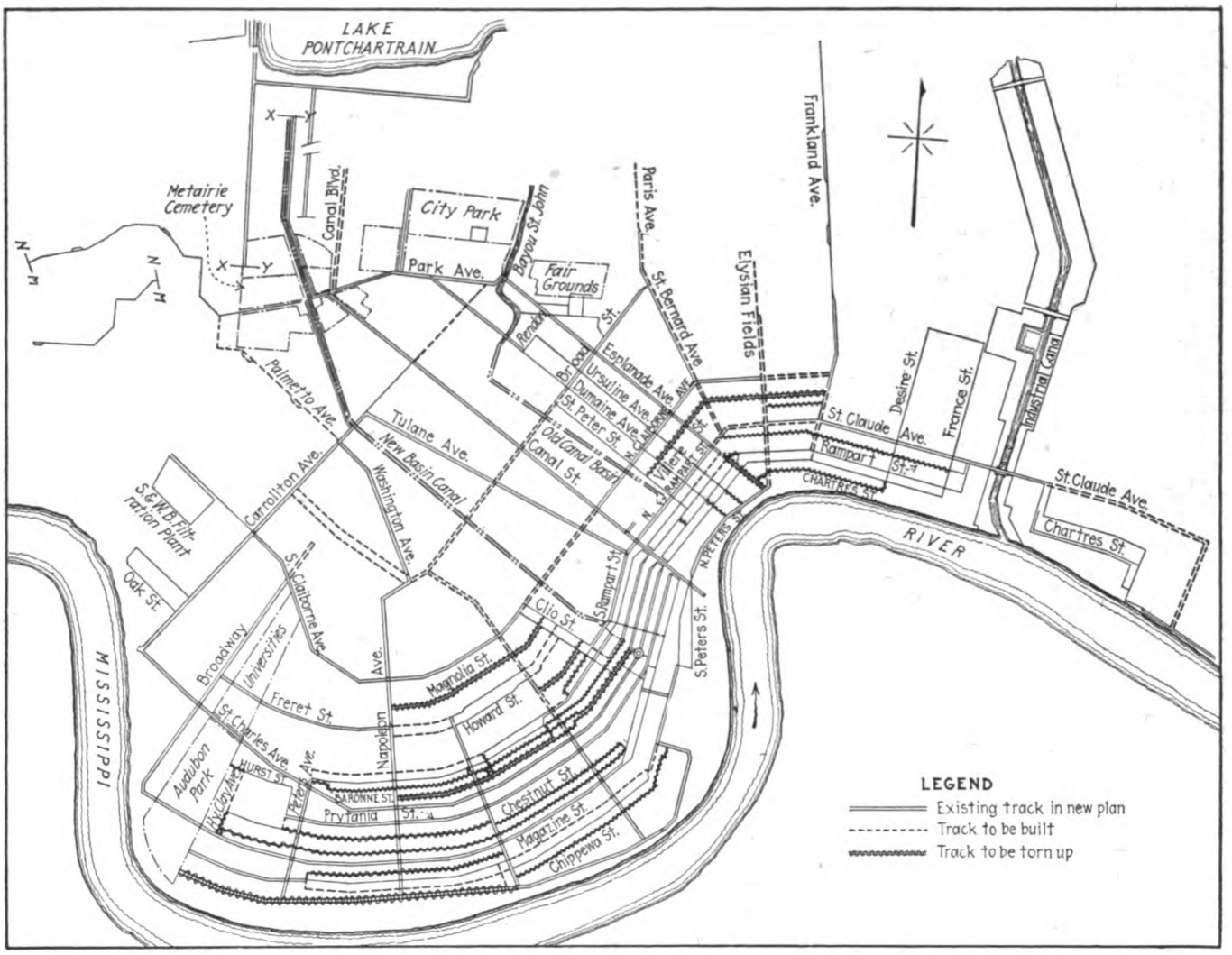

Fig. 2—Track Layout in New Orleans, Showing Present Track to Be Torn Up and New Track to Be Built Under Proposed Plan

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radically wrong with it. Many miles of track were constructed not for the sole purpose of better serving the public, but because in days gone by franchises were sought and lines were built for immediate profit. Little, if any, thought was given to the future growth and requirements of the city.

An analysis of the distribution of track according to population is shown in Table I, which compares the "Inside District," bounded by Broadway, Claiborne, Lafayette and River, with the "Outside District,"

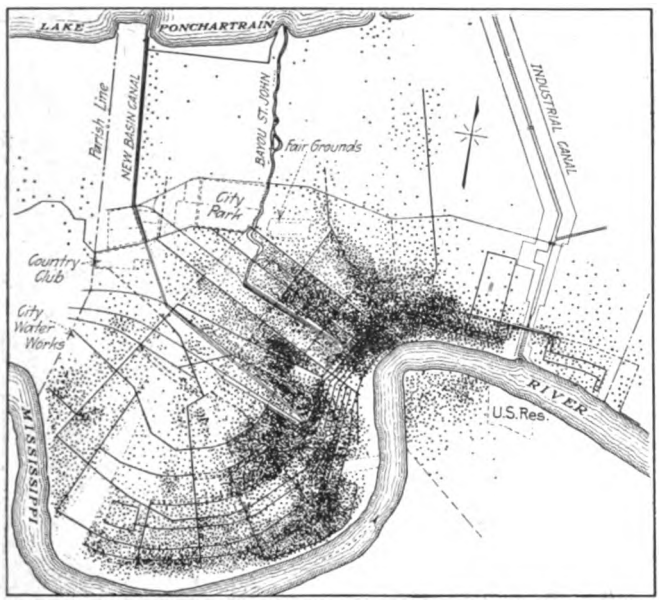

Fig. 3—Population Density Map of New Orleans Superimposed on Proposed Layout of Rail Lines

bounded by River, Broadway, Claiborne, Lafayette, River, Parish line, Florida Walk, Industrial Canal, Lake Pontchartrain and Parish line.

The inside district, representing less than one-fourth of the total area, has 60 per cent of the main-line trackage, while the outside district, covering more than three times the area, has but 40 per cent of the trackage. The inside district, with its concentrated population has but 1,680 people to the mile of track, while the outside district has 2,110. This impracticable distribution of track facilities has been the cause of misplaced service in one district and the witholding of needed facilities from the other.

TABLE I—ANALYSIS OF TRACK AND POPULATION DISTRIBUTION

	Inside District	Outside District
Area in square miles	9.1	32.1
Miles of main track	122.4	78.9
Population, 1920	206,081	166,426
Population per square mile	22,646	5,201
Population per mile main track	1,680	2,110

Such a condition is absolutely the reverse of what it should be. Densely populated, close-in districts should be served by trunk lines on frequent headways, while outside territory should be cared for by lines equitably spaced and adequately scheduled. The duplication of trackage is apparent in the uptown section between Rampart and the river, as shown in Fig. 2. For example, at Eighth Street, between Danneel and Tchoupitoulas, a distance of fifteen blocks, there are seventeen car tracks parallel to the river. Such duplication means excessive track maintenance and overhead costs and is largely the cause of infrequent headways and generally unsatisfactory service.

TABLE II—SERVICE PROVIDED AND FACTOR OF USE OF SERVICE

Year	Miles of Track Owned	Car-Miles Operated, Millions	Car-Miles Operated per Thousand Revenue Passengers	Car-Miles Track Operated Less Duplications	Revenue Rides per Capita per Mile of Track
1908	196.5	18.7	241	148	1.60
1909	197.7	18.7	238	149	1.59
1910	201.3	19.0	236	153	1.55
1911	206.9	19.3	233	158	1.54
1912	205.6	19.5	230	158	1.58
1913	205.6	19.8	228	158	1.60
1914	205.9	19.6	225	158	1.74
1915	217.4	19.4	233	169	1.70
1916	218.2	19.9	227	169	1.66
1917	218.5	20.1	217	170	1.74
1918	219.0	18.4	193	170	1.73
1919	222.1	19.0	176	171	1.83
1920	222.1	18.8	171	171	1.66
1921	222.1	18.6	170	171	1.55
1922	223.4	16.6	157	171	1.44

Figures compiled to indicate the service provided, Table II, show that the car-miles operated last year were less than in 1908, that the car-miles operated per thousand revenue passengers were only 167 in 1922 as against 241 in 1908, and that the revenue rides per capita per mile of track, based on the track mileage with duplications eliminated, were 1.44 in 1922 as against 1.60 in 1908 and a maximum of 1.83 in 1919.

It is pointed out that at present the only track connections between the uptown and downtown sections are by way of Lower Canal Street, forcing all traffic between these sections into the congested area. To permit a full normal growth of the city, through connections back of Rampart are necessary.

The plan proposed for relieving this situation and to provide a foundation upon which to build all the extensions required to care for the future growth of New Orleans, regardless of the direction or extent of such growth, is shown in Fig. 2. Unification of gage is one of the first requirements to afford greater flexibility of service. In even figures, the plan calls for the discontinuance of 37 miles of non-essential track, to be replaced by 34 miles. Of this latter, 9 miles are required for changes, such as double tracking, straightening out or otherwise improving existing lines. The remaining 25 miles are required for additions and new extensions. These changes are summarized in Table IV.

As a result of this relocation of track, the engineer states that service in territory now covered will be bettered, and extensions of service into sections now greatly in need of it will be provided. While the total track-miles will be slightly decreased, the effective main-line track will be increased from 171 miles to 205 miles. This will stimulate the growth of the city and increase the earnings of the railway. Fig. 3 shows a population density map of New Orleans superimposed on the proposed track layout.

On the matter of unification of track gages, the report notes that there is in the present track system 31.50 miles of standard gage (56.5 in.) track and 176.64 miles of wide gage (62.5 in.) track, or a total of 208.14 miles. Of this 3.04 miles is three-rail track, which is the equivalent of 1.52 track miles. The two track gages not only affect track, but apply to equipment as well, making it necessary to maintain two wheel gages on the rolling

TABLE III—ESTIMATED COST OF PROPOSED TRACKWORK

Unification of track gage	$232,350
Removal of non-essential tracks	295,260
Track required to permit route adjustments and track elimination	445,835
Double tracking existing single track	84,060
Extensions	917,665
	$1,975,170
Less salvage	276,210
Net total cost	$1,698,960

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stock. The cost and maintenance of the double-gage special work is, of course, much higher than single-gage would be. Owing to the preponderance of the wide gage, it should be adopted as the standard for the system.

In reference to this expenditure for track, the report states that as most of the track indicated for discontinuance is rapidly approaching a condition where it will have to be rebuilt, the major part of the expense of constructing new tracks will have to be incurred even though this plan is not accepted. The removing and placing of tracks where they are needed to improve the service will cost the company little if any more than to rebuild them in their present unsatisfactory location. The quicker these changes are made the better for all concerned. The cost may be spread over a period of years or paid for on the pay-as-you-go plan, which, with the adoption of the recommendations given in the report, will be largely out of savings made in cost of operation.

CIVIC IMPROVEMENTS

As a part of the track program the engineer took up certain needed civic improvements, including the widening of several streets and the opening up of several others to make through connections, recommended the straightening of two or three others and suggested that two new bridges were badly needed. He also pointed out that the neutral ground (center parkway) in some of the streets offers splendid opportunities for the installation of loading platforms, with their numerous advantages to the public and the railway. It is recommended that they be installed at all of the heavier loading points where practicable, especially at junctions where there is much transferring. The cost of the various civic improvements recommended was estimated at $310,130, which the engineer said should be divided between the city and the company, as may be determined by the parties interested.

Other sections of the report will be treated in succeeding issues of the JOURNAL.

TABLE IV—SUMMARY OF PROPOSED TRACK CHANGES

Old Line	Track Discontinued: Abandoned, Feet	Track Discontinued: Changed, Feet	Track Added: Changed, Feet	Track Added: Extensions, Feet	Proposed Line
.....	.....	.....	.....	2,700	Broadway
Canal Belt.....	.....	.....	.....	9,000	Canal Blvd.
.....	.....	.....	.....	4,200	Carondelet
City Park	1,700	.....	.....	.....	City Park
Desire.....	6,150	.....	600	.....	Desire
Peters Avenue..	.....	9,000	8,700	.....	Dryades
Dryades.....	2,700	.....	.....	.....	Dryades
.....	.....	.....	.....	15,000	Elysian Flds.
Louisiana.....	.....	4,550	4,200	5,000	Freret
.....	.....	.....	.....	15,700	Jackson
Napoleon.....	.....	11,500	8,100	.....	Palmetto
.....	.....	.....	.....	11,200	Fig-Eden
Laurel.....	.....	18,200	17,900	.....	Laurel
.....	.....	.....	.....	350	Louisiana
.....	.....	.....	.....	18,600	Napoleon-Broad
N. Claiborne...	5,200	.....	.....	5,200	N. Claiborne
.....	.....	.....	1,500	2,500	Paris
Prytania	1,200	.....	.....	2,000	Prytania
.....	.....	.....	4,700	7,300	St. Bernard
St. Charles.....	1,200	1,445	1,885	.....	St. Charles
Shrewsbury.....	.....	.....	450	.....	Shrewsbury
Tchoupitoulas..	26,800	.....	1,000	600	Tchoupitoulas
Gentilly	.....	.....	.....	4,000	Gentilly
Dauphine.....	13,900	.....	.....	7,200	St. Claude
.....	.....	.....	.....	20,000	St. Claude-Friscoville
Bayou St. John .	4,700	.....	.....	.....	.....
Carondelet.....	21,650	.....	.....	.....	.....
Clio.....	14,400	.....	.....	.....	.....
Coliseum	32,650	.....	.....	.....	.....
N. Peters	3,800	.....	.....	.....	.....
Villere.....	16,200	.....	.....	.....	.....
Total.....	152,250	44,695	(a)49,235	130,550 = feet	
	28.83	8.46	9.32	24.72 = miles	

Miles abandoned.....	28.83	Miles of extensions.....	24.72
Miles changed.....	8.46	Miles of changes.....	9.32
Total miles discontinued	37.29	Total miles added.....	34.04

These figures are exclusive of lower Canal Street changes.

Of the discontinued track, 19,900 feet or 3.77 miles is in paved streets and can be left in place indefinitely.

There is also approximately 16,050 feet of third rail track which is now carried as 1.52 miles of track operated; the change in gage will automatically wipe this out.

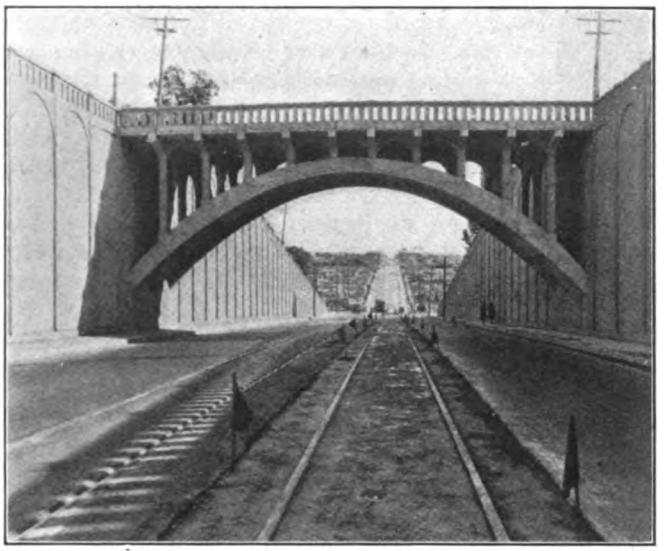
Note: (a) = Includes double tracking of single track.

Track Reconstruction in San Diego

Steel Tie Construction Used as Standard—Weather Conditions Permitted Work to Be Carried on Actively During Recent Months

DURING the past few months several interesting track reconstruction jobs have been done by the San Diego Electric Railway, notably the Adams Avenue and the University Avenue-East San Diego lines.

The Adams Street line is the one on which the track was torn up during the night last summer by the company's track forces as the climax of a long controversy between the city officials and the company over paving and other matters of dispute. After a court battle, a compromise was reached through the mediation of the State Railroad Commission, and reconstruction of the line was begun. The line will be double-tracked throughout its length to the end at Kensington Park, outside the city limits. Service was resumed on the line Dec. 23, 1922, although it was but partially completed at the time. This was a great relief to the patrons, who had been depending upon uncertain bus service, which could not be maintained in rainy weather because the adobe soil, used for roadway in the unpaved streets, is sticky and slippery when wet.



Reconstructed Track, Looking East from Park Boulevard. Track Is Ready for 2-In. Surfacing of Asphalt. Georgia Street Viaduct in the Foreground

The reconstruction work was carried out in accordance with the standards adopted by the company for all recent construction. The track construction comprises the use of twin steel ties, spaced 6 ft. center to center, with 93-lb. high T-rails for all straight track, 114-lb. rails for curves and 127-lb. guard rails for all special trackwork. All joints are electrically welded and the rails are electrically welded to the ties. All special trackwork is bonded with 350,000 circ.mil cable, and the welded tracks are cross-bonded every 500 ft. with cable of the same size.

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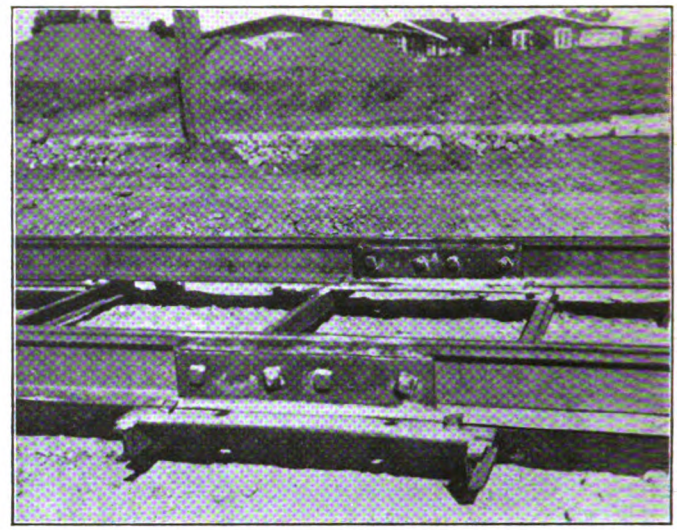
Soft Spot in Adobe Soil, Filled In with Broken Concrete Preparatory to Laying of Track Structure



Electrically Welded Joint as Used in San Diego Electric Railway Standard Track Construction

The trench for the track is excavated approximately 18 in. deep. Two feet outside the outside rails a trench is excavated 12 in. below the sub-grade and in it is laid a 4-in. concrete drain tile. The trench is then filled with crushed and disintegrated granite to within 14 in. of the grade.

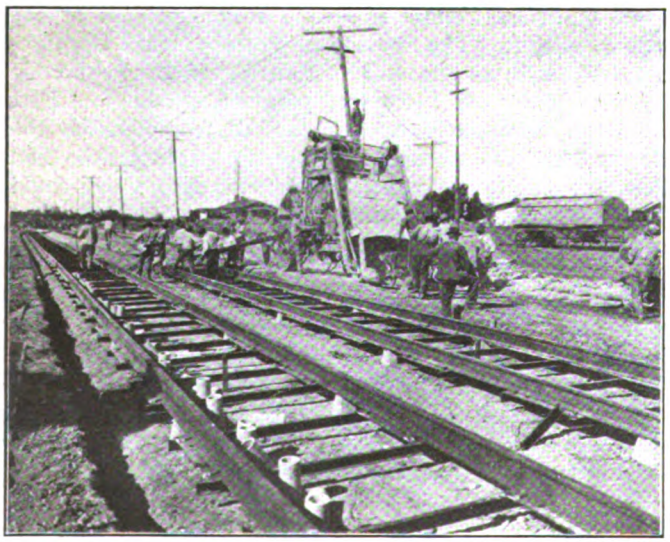
The rails are set on concrete pyramid-shaped piers spaced 12 ft. apart and are adjusted to exact grade by means of double cast-iron wedges placed between the rail bottom and the top of the piers. When they are finally adjusted the rails are firmly braced in place and a 14-in. layer of concrete is poured. The concrete is worked up against the under side of the head of the T-rail, but the balance of the concrete surface is left 2 in. below the street grade to allow for paving.

On Adams Avenue the company has been relieved of the paving obligation. The track is, therefore, being surfaced with disintegrated granite, a material which is plentiful locally, and which makes a good roadway.

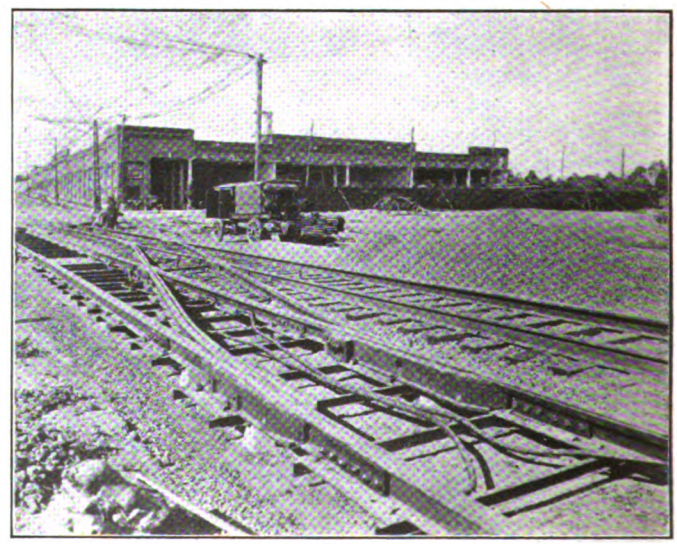
The reconstruction of the University Avenue-East San Diego line presented considerable difficulty due to the heavy traffic, the heaviest in the city, which it carries. The problem was solved by reconstructing one track at a time from Park Boulevard to the end of the line in East San Diego. A block signal system was installed to facilitate dispatching, and dispatchers with extra telephones were stationed at the turnouts where the eastbound and westbound cars are passed. Trains of two cars each were operated during the rush hours and a fourteen-minute headway was maintained, with extra tripper service added.

One of the special problems encountered by Engineer H. M. Kuehmsted, who was in charge of the work, was the caring for soft spots in the adobe soil. Generally these were caused by leaky water mains. The difficulty was overcome by excavating the soft soil until firm soil was reached and filling up to sub-grade with broken concrete.

The first work done by the San Diego Electric Railway under the new specifications was the reconstruction of the Broadway line from the Union Depot to Third Street, which was followed by the reconstruction of the Logan Avenue line, beginning last May. This work was described in the ELECTRIC RAILWAY JOURNAL at the time. Then came the Adams Avenue and University Avenue jobs, which will be followed by the construction of the Park Boulevard line, work on which is now due to begin. Then will come the new construction of the Sixteenth Street cutoff and the reconstruction of the Market Street line.



Track Reconstruction on Adams Avenue, San Diego, Showing Method of Supporting Track Previous to Pouring of Concrete



New and Old Track Construction on Adams Avenue, Showing Special Trackwork Near Carhouse

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Merit System Works Well in Los Angeles

In This System a Bonus Is Given for Good Records, and in 1922 Nearly $95,000 Was Distributed as Bonuses and Special Prizes Among the Trainmen—Methods of Keeping Records Are Described

By J. G. Jeffery
Director of Public Relations, Los Angeles Railway

THE random remark of a trainman that "as long as the fellows do the right thing, they're practically working without a boss" may serve as the keynote for a discussion of the merit and bonus system followed by the Los Angeles (Calif.) Railway for the past three years. The remark was overheard by a passenger who was sufficiently impressed to communicate with the general manager and, as a result, the saying has become a part of the system.

Let it not be presumed that the system followed by the Los Angeles Railway is developing a race of supermen in courtesy and efficiency, for the Southern California company faces most of the problems which confront other railways except that there is no union domination. It has the same wish as every other company to promote courtesy, safety and general efficiency, the same general type of men on the cars and the same problems in "selling" the trainmen on the right company spirit.

George Baker Anderson, manager of transportation, is the father of the Los Angeles Railway merit system. He has developed his plan into an effective force for improving service by increasing the general standard of efficiency of trainmen.

Perhaps the outstanding feature of the system is that a trainman "makes or breaks" himself.

He goes through the employment and instruction departments and receives the same training as other trainmen. If he is courteous, accurate and safe, he will build up an efficiency record that brings him a cash bonus of $5 a month or $60 paid at Christmas and puts him in line for an additional cash prize. If he is discourteous and careless, he soon lowers his record to the point of only 75 per cent efficiency, and that is automatic dismissal.

When a new trainman enters the company's employ he serves a probationary period of three months. Then he starts an efficiency record with a rating of 100 per cent. He does not participate in the cash bonus until he has been in service six months.

A trainman receives demerits for such offenses as discourtesy, derailments, running ahead of time, negligence at fare box and untidy appearance. A regular schedule of demerits is prepared governing the most common offenses. The demerits range from five to dismissal from service. Each five demerits or credits count as 1 per cent.

Credits are given for accuracy in reports, suggestions for betterment of service, special attention to students and reports of particular courtesy and safe operation. If a trainman goes through a month without marks against his courtesy and safety record he receives 10 credits for each, or an increased efficiency rating of 4 per cent. It will be noted that if a trainman merely follows an even course, keeping clear of demerits but not being reported for any special acts of efficiency, his record will build up month by month because it has been clear in safety and courtesy. If a man is off duty more than half a month he does not receive extra credits.

The office records are balanced monthly. Each 1 per cent below 100 per cent means a reduction of 25 cents from the month's bonus. A trainman whose record stood at 96 per cent at the end of the month would be credited with $4. A record of 85 per cent would mean only $1.25 bonus, and a balance of only 80 per cent would mean no bonus for that month.

The efficiency records date from Nov. 30 to Nov. 30, and the bonus is paid on Dec. 15, so that trainmen may have the benefit of the money before Christmas. In addition to the $60 regular bonus, special prizes were awarded in the past two years to some of the "top-notchers" of the five carhouse divisions. Extra prize money ranging from $10 to $100 was received by the ten top motormen and ten top conductors of each division and by the ten top safety car operators. The regular monthly bonus in 1922 totaled $91,011.51 and the

MATTER PRINTED ON UPPER PART OF RECORD CARD

CAUSES FOR CREDITS

(Each five credits to count 1 per cent on record)

1. Accurate daily reports	5
2. Clear record for one month for courtesy and safety (10 credits each)	20
3. Exceptional act to prevent accident or injury	50
4. Practical suggestion as to betterment of service	5 to 15
5. Reported dangerous conditions and practices	10 to 30
6. Special care in preparation of accident reports	10 to 30
7. Special attention to students	10
8. Miscellaneous	5 to 50

CAUSES FOR DEMERITS

(Each five demerits to count 1 per cent off record. Demerits are charged only when the trainman is considered to be at fault)

1. Discourtesy to passengers	10 to 50
2. Collision of cars; collision with vehicle or person	10 to Dis.
3. Injury to passengers on car	10 to 30
4. Step accident	20
5. Derailments and split switches	10 to 30
6. Ejectments, disturbances and disputes	10 to 30
7. Carrying passengers past destination	10 to 20
8. Passing up passengers	10 to 20
9. Failure to report accident	50
10. Starting or backing up without signal	40
11. Excessive speed	40
12. Running ahead of time	10 to 50
13. Failure to make prompt report of day's receipts	10
14. Failure to collect fares	10 to 50
15. Negligence in operation of fare boxes	10 to 30
16. Failure to account for fares collected	50 or Dis.
17. Failure to turn in lost articles promptly	5 to 20
18. Failure to report condition of cars	10 to 40
19. Failure to make safety stop	50
20. Failure to observe danger signals	50
21. Failure to observe crossing rules	5 to 30
22. Improper operation of block lights	25 to 50
23. Laxity in calling streets	5 to 20
24. Leaving car unattended	10 to 30
25. Leaving terminus ahead of schedule	10 to 50
26. Missed relief	10 to 30
27. Oversleep	10 to 50
28. Absence from duty without permission	50 or Dis.
29. Absent account of sickness without notifying office	5 to 30
30. Permitting money to accumulate on inspection plate	5 to 30
31. Violating road space	10 to 30
32. Smoking while on car	10 to 25
33. Committing nuisance	10 to 50
34. Untidy appearance	10
35. Visiting with motorman while car is in motion	10 to 30
36. Improper feeding controller	10 to 30
37. Wasting power	10 to 30
38. Miscellaneous	5 to 50

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special prizes were $3,905, making a grand total of $94,916.51. Checks were given to 1,830 trainmen. On Nov. 30 last, when the records for the year closed, 2,369 trainmen were in service.

In picking the 110 men for special prizes, the officials considered general attitude of a man toward his job, willingness to help in an emergency, and other factors that do not necessarily show in percentages on a trainman's record.

How the Records Are Kept

The majority of reports for credits and demerits come from company operators riding the cars to observe service conditions and from supervisors. Various departments, such as the safety bureau, frequently recommend credits or demerits in cases coming to their attention, and a goodly number of credits are given on reports made by the trainmen themselves.

The recommendations for credits and demerits are first passed upon by the transportation department officials. They are then given to the clerks who enter the marks on the record cards. There is a card for each employee. It is 8 in. x 11 in. and is known as his "Efficiency Record." The upper part of a typical card of this kind, to indicate the way in which the records are kept, is reproduced on page 721.

Notification of Credits

Div. No..... Date.....
To..... Cap No.....

It is a pleasure to advise that you have been awarded .....credits under Classification shown here below, as per list of Causes for Credits and Demerits posted at your Division. Should you desire further information as to the report upon which this action is based, you may obtain it by consulting your Division Superintendent.

Classification No.....Date Occurred.....
Place .....
.....

The award of these credits places your Efficiency Record at.....%.

.....
Supt. of Operation.

The Efficiency Record Is Kept on a Card, and Each Trainman Is Advised of Any Change in His Efficiency Record

With every entry of credit or demerit a notification slip is sent to the trainman affected. The slip for credit is printed on pink paper, with the wording as printed above.

The notification slip for demerits is printed on green paper and is very similar to that for credits except that the body of this reads: "This is to advise you that ..... demerits have been placed against your record under classifications shown here below, as per list of causes for credit and demerit posted at your division. Should you desire further information as to the report upon which this action is based, you may obtain it by consulting your division superintendent." The company also uses a yellow notification slip called "Notification of Cancellation of Demerit." This reads: "This is to advise you that demerits assessed against your record under date of ....., Classification No. ..... have been canceled. The cancellation of demerits places your efficiency at..... per cent."

Duplicate record cars are kept at each division. The division superintendent may administer demerits for certain offenses such as missing out or being absent without leave. Having duplicate record cards enables him to impose demerits in keeping with the offense. Repeated offenses draw heavier demerits than first offenses.

A trainman has the privilege of appealing demerits to the assistant superintendent of operation, the superintendent of operation, the manager of transportation and even to the general manager.

System Started Three Years Ago

The merit and bonus system was established by the Los Angeles Railway on April 1, 1920, at a time when industrial conditions were upset with the after-war adjustment of business. There was considerable skepticism among some of the men who prophesied that the demerits would always exceed credits and that little bonus money would actually be paid. What little prejudice remained at the end of 1920, was dispelled when bonus payment for the eight months equalled a total of $58,605.75.

New trainmen are told about the details of the merit and bonus system when they apply for employment. It is presented to them solely in the light of special reward for special endeavor and not as a Christmas present. It becomes a business proposition to bring out the best that is in a man. To the company it is an investment in good service which pays big returns.

As stated in the first place, the Los Angeles Railway does not claim to be developing supermen of the street railway industry, but it has raised the standard of morale and efficiency of all to a point conceded by all in authority to be the highest in the history of the company.

Berlin Rapid Transit Conditions

THE total railway traffic in Berlin in 1918 amounted to about 1,570,000,000 passengers, divided among the city's own surface lines, the privately owned elevated and subway, and the Stadtbahn and Ringbahn, owned by the state. Of this number of passengers, 1,056,000,000 used the surface lines, 117,000,000 the subway and elevated lines and 395,000,000 the government-owned Stadtbahn. Today these figures have changed entirely. Stadtbahn passengers now number about 746,000,000 a year, while only 520,000,000 ride on surface cars, and the traffic on the subway and elevated lines has remained almost stationary. This 80 per cent increase in the traffic of the state-operated steam trains, which supply a sort of rapid transit service on an elevated structure or in open cuts in Berlin, results in a very dangerous crowding on the platforms and trains.

This great change in the distribution of travel is due to the fact that these government lines have not increased their fares to anywhere near the extent of the local lines. In consequence they charge a very low fare, which is made possible by a considerable subsidy from the Prussian Government. The street railway system, on the other hand, is operated by the city and is passing through strenuous times in the effort to become self-supporting. To reduce expenses the headways have been greatly lengethened, much unprofitable night service has been cut out and one-man operation has been introduced to a considerable extent. At the same time fares have been increased until, in February, 1923, the single fare was 200 marks, with 100 marks extra for a transfer. This, at the pre-war rate of exchange, would be equivalent to $50 for a single ride with $25 extra for a transfer.

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New Shops for Toronto

More than $2,000,000 Is Being Spent on Shops, Office Building and Storehouse for the Toronto Street Railway System—Full Particulars of the Shop Layout Are Given

ONE of the important improvements under way by the Toronto Transportation Commission for the Toronto Street Railway is the erection of new repair shops.

Before the road was taken over from the Toronto Railway Company in 1921 it was evident that new shops would be required in the very near future. The buildings which housed the repair work of the system were so dilapidated physically, so antiquated in their layout and so inadequate in size that they were obviously of little or no value to the combined and enlarged system, operating with the larger and newer type of rolling stock. It was only natural that the company whose franchise was expiring should not make any improvement in the shops when it had only a short time to enjoy the advantages of it. This condition, however, made the erection of new shops the more imperative when the property was once taken over.

The old shops and stores, which are still in use pending the completion of the new buildings, comprise four main units, namely: (1) A one-story building containing the truck and motor shop, the blacksmith shop, the machine shop, the brass foundry, the armature shop and the electrical shop; (2) a three-story building, located a block away, for car body repairs, with an elevator to raise the bodies from floor to floor; (3) a storehouse, and (4) a paint shop, which is located 2½ miles from the other units.

Site and Arrangement of New Shop

The new shops are located fairly centrally to the system and will be more so as the city expands. The site is at the corner of Bathurst Street and Davenport Road and was without buildings when purchased. It measures 930 ft. by about 950 ft. and contains 22.24 acres. It is served by a railroad siding. Besides the shop, a storehouse will be erected on this plot to serve both the Toronto Street Railway system and the Toronto Hydro-Electric system, with a view to economy in both capital and operating accounts.

The shop layout comprises a main building which includes all shops concerned with the repair of the cars. The area of the main building is 186,560 sq.ft., which is equivalent to approximately 156 sq.ft. per car, based on a 1,200-car system. A general stores building, an office building, a boiler house, a coal and ash handling plant, a garage and various subsidiary buildings such as oil stores, scrap bins, etc., are also provided for.

The single-unit plan, as adopted for the main building, includes the following departments: (a) Woodworking shop, (b) erecting shop, (c) paint shop, (d) car painting shop, (e) truck shop, (f) motor shop, (g) forge shop, (h) machine shop, (i) armature shop, and (j) a controlling department, called "free stores."

The main building as designed is a one-story structure with a steel frame and brick walls. The roof is of precast gypsum and is of the sawtooth type with fixed monitor sash giving a north light. The floors are of concrete, wood block or mastic, as is most appropriate, and the inspection pits are of concrete framed on steel columns and beams. The heating is an indirect hot air system except in the paint shop, where direct radiation is provided. A complete system of automatic sprinklers is provided throughout the building and a system of fire hydrants throughout the adjacent yard. As an auxiliary supply for fire purposes, a 100,000-gal. tank is to be built.

The main building is divided by a covered transfer table runway to facilitate the moving of cars, and the general working of the shop may be classified under the following headings: (1) Repair and overhaul of rolling stock, (2) repair and overhaul of parts and materials received from the operating divisions, (3) manufacture and assembly of car and truck material for stock and (4) miscellaneous orders for departments other than the rolling stock department.

Routing of Work

The general routing of the work, considered under the headings mentioned above, is as follows:

A car for general overhaul enters the shop at the south door at the west end of the transfer table runway and is moved to the west set of car hoists in the erecting shop. Temporary trucks replace the permanent trucks, which are removed and transferred to tracks in the truck and motor shop for overhaul. Motors are removed and sent to the armature shop. The car body is then sent to the erecting shop for body overhaul, thence to the washbay and car paint shop, and thence to a car hoist at the east end of the motor shop. The rebuilt trucks then replace the temporary trucks, which are returned to one of the tracks in the erecting shop. The car then goes to the paint shop, where the trucks are painted, and then via the transfer table to the west end of the shop and out by way of the north door. If cars are sent to the shop for accident repairs the routine described is varied according to the damage.

The second division of the work mentioned above is the repair of parts. Materials and parts from divisions for repair will be received in the "free stores" department, where they will be registered and tagged for the shop. The parts and material are then sent to the proper department as work on the machines permits. When finished, the part is returned to the "free stores" and sent back to the division or to the general stores building as directed.

Requisitions or orders for new work for stock are sent through the "free stores," and materials on these orders are sent out through the "free stores." Under this part of the work comes the ordering of parts from one department to another. These orders and the finished article will be handled through the "free stores."

The employees' entrance is at the east end of the building south of the transfer table runway and is under control from the watchman's room opposite. Adjacent to this entrance is the lunch room. Banks of wash basins are located at the east end of the locker rooms, and the toilets are located on galleries above. A section at the extreme east of the shop is provided for buses.

The boiler house will be located just west of the main

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building and will be of brick with a steel frame. It is connected to the main building and the general stores building and office by a tunnel through which the steam pipes will be conducted for the heating of all buildings.

The general stores building will be a reinforced concrete structure of flat slab type with brick walls and steel sash. It will be sprinklered throughout and will be heated by steam pipes brought from the main boiler house through the tunnel mentioned. At present this building will be three stories in height, with a basement, but the foundations will be ample to carry four additional stories when required. The total floor area in the general stores building, as designed, is 132,600 sq.ft.

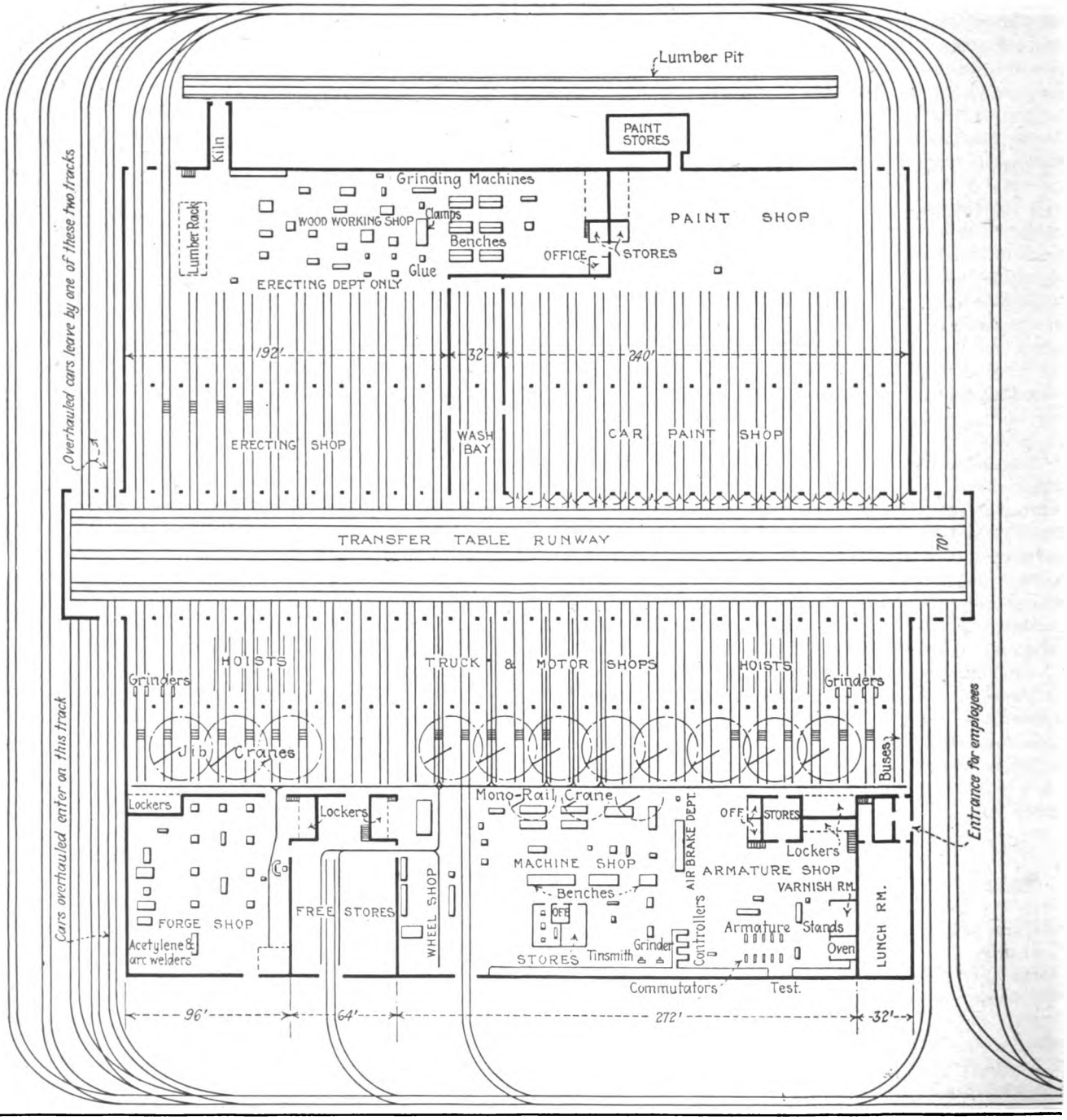
The office building will accommodate the superintendent of rolling stock and his staff and will include a first aid room and an employment office. It will be a two-story brick building with steel frame and wood floors and will be located just north of the main entrance to the property.

The estimated cost of the project, excluding land, is as follows:

Buildings	$1,660,000
Trackwork and overhead	220,000
Equipment	200,000
	$2,080,000

The work of construction has been begun and it is estimated that the shops will be completed and in service before the end of the present year.

Before deciding on the present plan the commission's engineers made an extensive study of various shop layouts and visited the shops in Cleveland, Montreal and Detroit. A general plan, as developed by Jackson & Moreland in connection with the city's case in the arbitration proceedings for the purchase of the Toronto Railway, was also made available to the commission, and the services of C. A. Remilius were utilized in connection with the general layout and equipment.



General Plan of New Repair Shops, Toronto Street Railway, Now Under Construction

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Pulverized Fuel Plant at Providence

The United Electric Railways Is Making Power Plant Improvements to Cost Upward of a Million Dollars—New Boilers Equipped to Burn Pulverized Coal Are Being Installed in One-Half of the Boiler House

THE United Electric Railways, Providence, R. I., operates all electric railway lines in Providence, Pawtucket, Bristol, Woonsocket, Warren and more than fifteen other municipalities. Since the reorganization of the property in July, 1921, following a receivership, many improvements have been inaugurated, to cost ultimately several million dollars. A fair share of the amount will be spent on the company's power system, which is taxed to supply the constantly increasing demand for power. The company supplies at present approximately 95 per cent of the power used for its railways and will, on completion of certain extensions to its system now in progress, supply over 99 per cent. The net energy production for 1923 will amount to about 70,000,000 kw.-hr.

The company's power plant is located in Providence. It will have a capacity of 50,500 kw. after improvements now under way are completed. The plant was excellent for its day, but was outgrown both as to capacity and style of equipment. When the situation was explained to the directors, who through their committee on power matters keep in close touch with details in this department, they unanimously approved a comprehensive plan of rehabilitation involving the scrapping of $600,000 worth of obsolete apparatus, representing 8,000 kw. of capacity, and the expenditure of more than $1,100,000 for new. Work now under way and planned for 1923 construction on transmission and distribution lines, substations and signals will bring this total to nearly $1,750,000.

The superseded equipment included four old engine units, two of 1,500-kw. capacity with alternating-current generators and two of 2,500-kw. capacity with direct-current generators, together with piping and auxiliaries of various kinds; also 2,080 hp. of B. & W. boilers having cast-iron headers. These boilers comprised one-quarter of the sixteen 520-hp. units which made up the boiler plant and which were arranged in batteries of two on two decks.

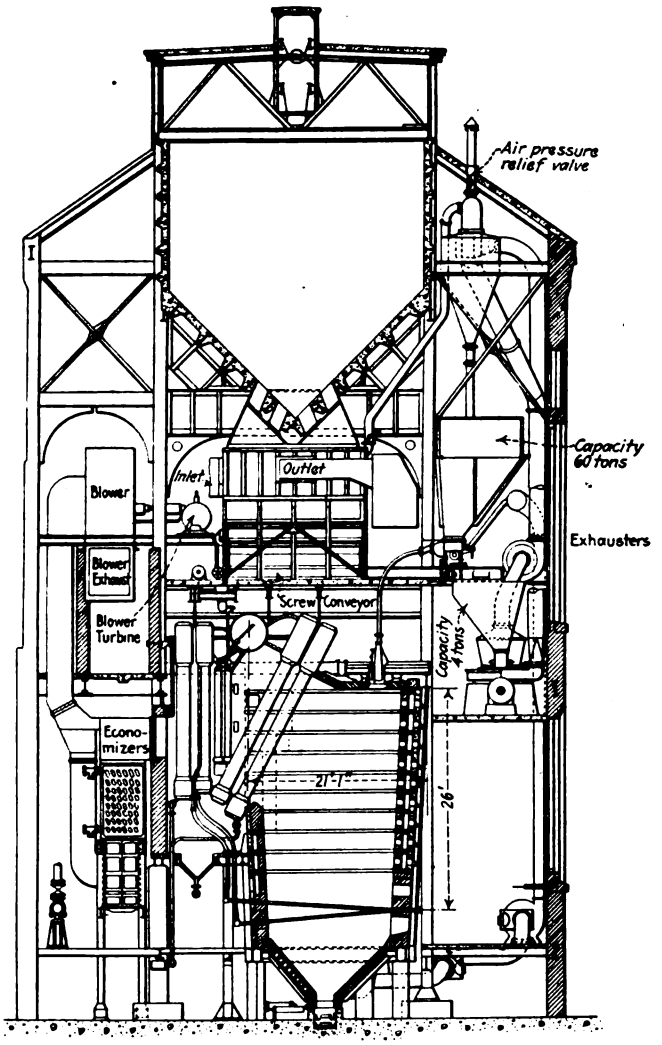
The improvements consist of the installation of an 18,000-kw. turbine unit with auxiliaries, three new boilers with auxiliaries, equipped to burn pulverized coal, together with numerous changes in the layout, including the provision of a machine shop in the power plant building, all of which will be covered in a later article.

Why Certain Detail Selections Were Made

The plant, as remodeled, has been laid out to secure the best results as regards both capacity and economy with the coal now used, namely, good bituminous coal of 14,000 B.t.u. heating value. At the same time the furnace design was so arranged as to permit burning, with more or less reduced capacity and economy, poor grades of fuel, including even anthracite if found economical. Provision has also been made for burning oil in the same furnaces.

A pressure of 300 lb. at the turbine was selected in order to secure the thermal benefits of reasonably high pressure without incurring excessive cost of the turbine and of high-pressure auxiliaries and pipe fittings.

With the boilers selected it will be possible to go to 325 lb., and the regular operating pressure of the boilers will probably be from 315 to 320 lb., allowing for pressure drop between steam drum and turbine throttle.



Vertical Section of the Boiler Plant, Simplified to Show Essential Elements

With the pressure determined, a superheat of 175 deg. followed naturally because a total temperature of about 600 deg. was thought the maximum desirable to assure as large a degree of freedom as possible from plant maintenance trouble and expense, although in actual operation the temperature may go somewhat above this at the high rating possible with the furnace design selected. It will, however, even in extreme cases, be well below what is considered the outside limit of 700 deg.

One of the ruling considerations in the new boiler layout was the shape of the boiler house and the location of the building columns. A vertical or upright

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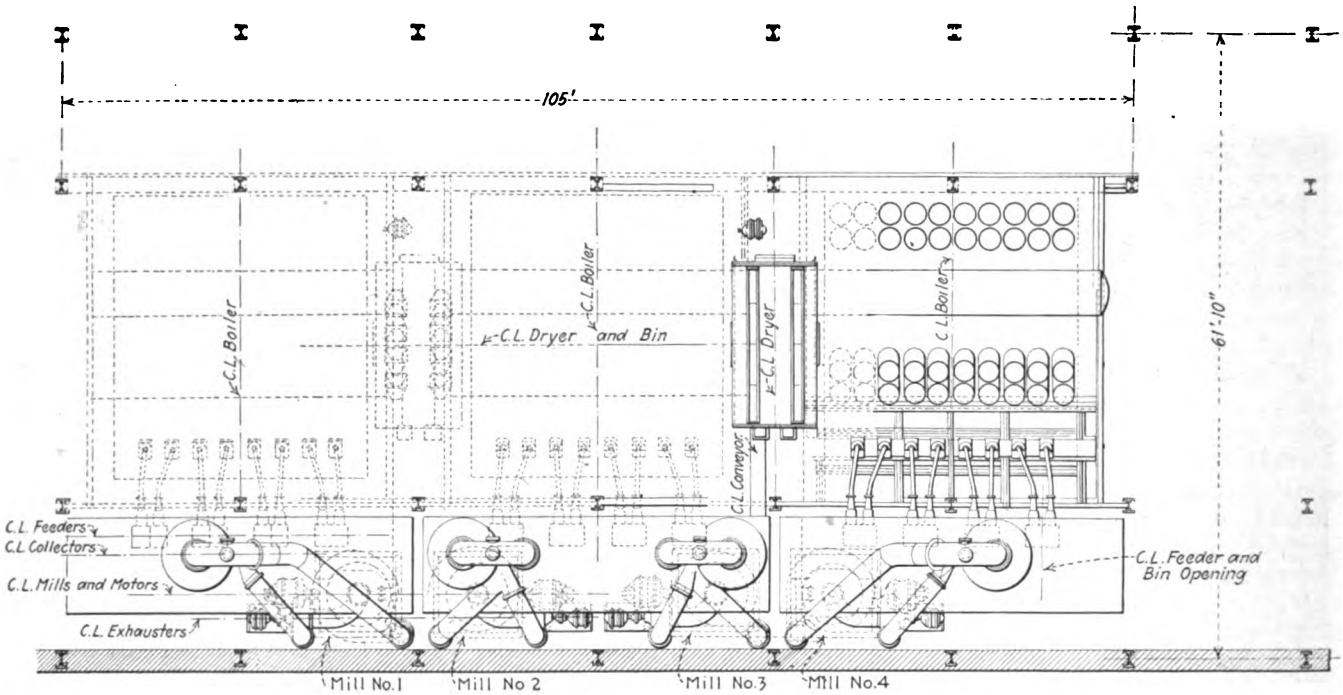
type of boiler was selected because it fits conveniently into the building and also lends itself well to the provision of the necessary large combustion space for the burning of pulverized fuel. It was impossible to use any large single-set horizontal-tube boiler of about the same horsepower because of building-steel interferences.

The preference was for singly set boilers to avoid the middle wall required with the battery arrangement, and because it was desired to have them accessible all around. The objection to the middle wall is the difficulty of cooling the refractory satisfactorily at high ratings. With the single setting, provision has been made for cooling of the walls with air. As large a boiler as possible was selected that would still leave reasonably ample passage space between units. Bigelow-Hornsby 1,266-hp. boilers, approximately double the size of the Bigelow-Hornsby boilers installed in 1914, were selected. Three of these boilers are being installed now and provision has been made for a fourth.



Plan Designed Particularly to Show Pulverized-Coal Equipment

BOILER WALLS WELL VENTILATED

The boilers are hung from steel girders mounted between the building columns. Where necessary these were reinforced at the bottom with a heavy concrete envelope cast integral with the floor mat. The boiler walls are of steel plate lined first with "silocel" brick carried on horizontal structural steel H-sections attached to the sheet steel about 2 ft. apart. The refractory lining is mounted, a short distance away, inside the wall, to which it is attached by special firebrick shapes and iron clamps supported by the H-sections. Horizontal courses of these special shapes at the levels of the H-sections form air ducts which lead from the back of the bridge wall and from the sides of the boiler to the front, where they discharge into the combustion space.

Between the front and rear sections of the boiler a Foster superheater is mounted. This is connected with the steam drum in such a way that the steam enters at the back of the superheater, giving rise to the term "counter-current" superheater. Thus the cooler steam is in contact with the cooler gases and a greater heat absorption in the superheater results.

A Foster steel-tube economizer, having a heating surface two-thirds that of the boiler, is mounted directly back of each boiler, taking out the gases at a point about midway of the boiler height.

Near the bottom of the combustion space is a water screen divided into sections, each section connected at one end with the top and the other end with the bottom unit drum of the third row of unit sections of the boiler. This serves to precipitate part of the dust, preventing the formation of slag, while absorbing some heat of combustion. Below the water screen are hoppers from which the deposited ash dust will be removed through power-operated gates into a scraper conveyor moving in a trench filled with water. At the rear of the boiler smaller hoppers are provided to catch dust that gets through the boiler tubes.

The Lopulco system of pulverized coal burning is being installed in accordance with an arrangement mutually devised by the engineers of the Combustion Engineering Corporation and the United Electric Railways.

The boiler house, having been built high on account of the previous double-deck boiler arrangements, provided sufficient space for installing the entire equipment inside the main boiler-plant building. The original reinforced concrete bunker built close under the roof was retained but was divided by partitions into three sections in which different kinds of coal can be stored if desired, thus allowing the making of predetermined mixtures at will as the coal is passed by gravity from the bunker through chutes to the driers, of which two are now being installed. One drier is over and between boilers 1 and 2, the other between boilers 2 and 3, and a third will be added when boiler 4 is installed. Through the driers will be drawn some of the flue gases after leaving the economizers.

From each drier the fuel will be fed to a pair of pulverizers, which are Raymond mills, from which it will be lifted by an exhaust fan to cyclone separators

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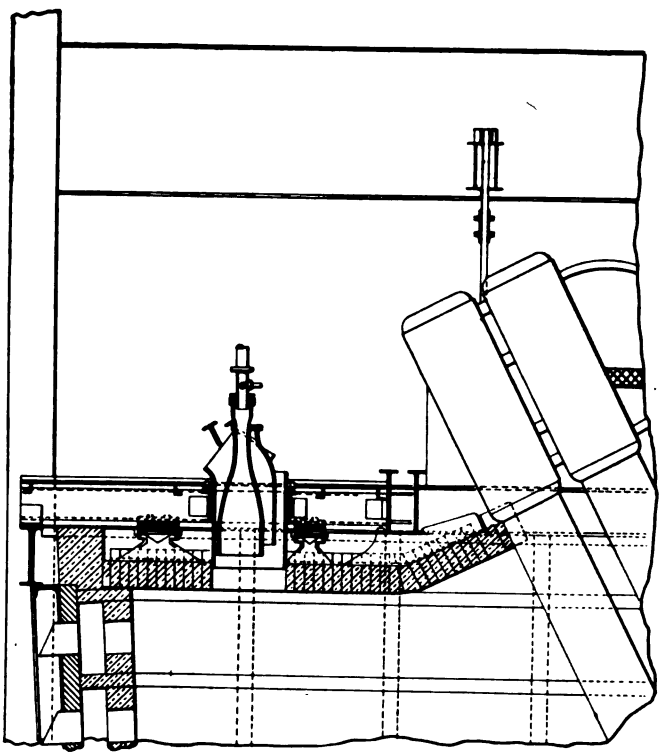
high above. There are four mills now going in and there is sufficient space for two more mills if required. By a system of cross-connection pipes between separators and pulverized coal bins two separators will discharge into two bins and two into three bins by gravity. From each separator a pipe leads to one or the other of the two coal driers to permit removal of excess air from the separator systems. The air ultimately will find its way to the main stack through the fans which draw the flue gases through the driers.

From the separators the fuel will fall into bunkers of about 60 tons capacity each from which feeders, driven by Reeves variable-speed motor drives, will convey the coal through pipes to the burners. There are



Cross-section of Burner and Mounting

four double feeders to each boiler, each feeding two burners. Air for the feeders will be supplied from fans installed near the main floor level and drawing their supply from a duct so located as to draw cooling air through air spaces in the hopper bottoms.

Draft for the furnaces will be furnished by a brick stack 312 ft. high by 16 ft. in diameter, and by 10-ft. induced-draft fans, one for each economizer and boiler. The fans, driven by geared turbines, are mounted in the space behind the boilers and above both the economizers and the main flue. Up to 300 per cent of loading the flue gases will pass through the economizers; for higher ratings they will be bypassed.

Twin Condensers Provided as Operating Economy

The turbo-generator unit, which is about ready for operation, is of General Electric make. The turbine is designed for 20,000 kw., the generator for 18,000 kw., this arrangement being well adapted for handling the short evening peaks characteristic of the railway load of the system.

The turbine is supplied with Westinghouse-Leblanc twin condensers, designed to provide for operation at high efficiency with different loads on the turbine and to give maximum flexibility in operation. If necessary, one-half of the condenser can carry the load in off-peak hours, and the load during several hours after midnight will require but one-half for best economy.

Each half of the condenser is individually driven by a steam turbine. The two halves are set at an angle, the shafts converging so that a motor set in the angle can be connected either to one condenser or the other by turning it on its foundation. This is an operation requiring a comparatively short time.

Other Improvements Under Way

The decision of the board of directors of the United Electric Railways to invest such a substantial amount in rehabilitating its own power plant is of interest at this time when a number of railway properties have adopted the opposite policy of purchasing power from central stations.

In addition to the above-described work there are now under way, or otherwise planned for construction in 1923, power-system improvements involving new substations, transmission lines and distribution circuits both overhead and underground, as well as a track circuit block signal system on about 8 miles of high-speed road. The task of handling the large amount of additional engineering and construction work required has been met very largely by the company's own engineering staff and construction forces, additional men having been added to its organization from time to time as conditions required. W. C. Slade, superintendent of power and lines of the United Electric Railways, is in charge of the power-system changes, while H. W. Sanborn, chief engineer of the company, is in charge of all building and structural-steel work involved. A. S. Davis, assistant superintendent of power and lines, is in immediate charge of the construction work in progress in the generating plant and is being aided by J. C. Millard of the engineering staff.

This article is of a preliminary nature and aims merely to give the salient features of the new parts of the plant. When it is complete a more detailed and fully illustrated account will be given, followed in due course by operating data.

Massachusetts Superpower Act Should Encourage Railroad Electrification

GOV. CHANNING COX of Massachusetts has signed a bill permitting electric companies to unite in financing and building generating stations and the necessary interconnecting transmission lines and equipment. The Department of Public Utilities will maintain its usual regulatory interest in the financing and development of installations under the act.

The bill was brought before the present session of the Legislature in the interest of several New England power companies. It is proposed that the Montaup Electric Company be formed primarily to develop a power project on Mount Hope Bay, Fall River. A generating station will be built to have an ultimate capacity of 200,000-kw., with an initial unit of 30,000-kw. The first outlay will be about $5,500,000, which will cover this unit and a part of the transmission lines. The design and construction will be handled by Stone & Webster.

This plant and its connections will, no doubt, play a part in the electrification of railroad lines in New England when conditions otherwise are favorable for such a step.

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Joint Service Widens Interurban Freight Field

Ohio and Michigan Lines Have Entered Into Joint Overnight Freight Service and Have Secured Considerable Freight Business Not Heretofore Available

WHAT gives promise of bringing a large increase in the volume of freight business handled by the electric railways in the central territory is a plan that has been developing during the past year of establishing joint service with connecting interurban lines. The co-operative movement began in April, 1922, when the Northern Ohio Traction & Light Company entered into an agreement with the Cleveland, Southwestern & Columbus Railway, the Cleveland, Alliance & Mahoning Valley Railroad, the Stark Electric Company and the Pennsylvania-Ohio Electric Company for a joint freight service in northern Ohio. The Detroit & Cleveland Navigation Company and the Cleveland & Buffalo Transit Company, both steamboat lines, and the Lake Shore Electric Railway subsequently adopted the plan.

Recently the Detroit United Railway joined the arrangement, which gives connection for the Ohio lines into various Michigan cities, including Detroit, Jackson, Flint, Pontiac, Port Huron and other points. Similarly, more recently the Columbus, Marion & Bucyrus Railway and the Columbus, Delaware & Marion Railway have entered the plan, and service to Buffalo and intermediate points has been arranged by way of the Nickel Plate Railroad.

The outstanding features of the new service are the convenient loading points and overnight delivery. For example, freight reaching the Cleveland station during the day or evening is delivered at its destination the following morning. Through freight trains leave Cleveland nightly for the more important points, and a local way freight train handles the traffic to intermediate stations.

An attractive card describing the character of the service rendered has been sent by first-class mail to all shippers in the territory. The rates on all classes of freight are the same as charged by the steam railroads, and flat rates are offered for carload lots.

At first the shippers did not "fall over themselves" in the rush to utilize this feature of electric railway service. A few of them, however, liked the "overnight delivery" idea, and tried it out. Then the word passed quickly among the shippers that the new freight service was fast, that the loading point was advantageous, that care was exercised in loading and unloading, and that the "overnight delivery" was real.

At the time the Northern Ohio Traction & Light Company entered the freight business it had been doing for some time an express business under the title "Electric Package Agency." The officials of the company were a little skeptical about the new venture. It was feared that perhaps the business would be all in one direction. However, the existence of the package express business made it possible to try the more ambitious freight-handling scheme without any additional heavy investment. The company had eleven motor cars and four trailers, and four more trailers were immediately bought and put into service. During the first month about 17,000 freight car-miles were operated with gross earnings of $8,824.

Operating expenses, however, were greater than revenue, and April showed a loss of $1,500, but when it is remembered that no business was obtained by personal solicitation and that the 5,000 tons carried in the first month was attracted simply by the high quality of the service offered, it will be seen that the experiment appeared promising from the very beginning.

Experience amply justified this expectation. At the end of the first six months the small deficit had become a monthly profit of $8,000, and six more trail cars had been ordered to take care of the increasing volume of traffic. The comparative figures for April and October are interesting. They are given below:

	April	October	Per Cent Increase
Motor cars	11	11	...
Trailers	8	8	...
Motor car-miles	10,560	19,289	83
Trailer car-miles	6,659	10,799	62
Car-hours	1,084	1,857	72
Tonnage	5,108	11,926	133
Gross earnings	$8,824	$29,567	236
Ratio operating expense to gross revenue, per cent	117	71	*46

* Decrease.

It has not been possible to increase the volume of traffic very much in the past few months because the capacity of the equipment was almost reached last fall. But recently, fourteen new freight cars, including two motor cars, and two specially built trailers for handling milk have been purchased for May 10 delivery. Also, two of the older, large passenger cars have been rebuilt for this freight service.

Nowadays the Cleveland freight house of the Northern Ohio Traction & Light Company is frequently jammed to the doors and shipments have to be piled outside for want of space inside. Shippers seem very desirous of having their consignments handled over the system, but the company has reached the point where it can no longer take on additional business. As soon as more trail cars have been secured it will be possible to accommodate the growing demand for transportation.

Despite the remarkable increase in freight business, none of the express business has been lost. The latter amounts to about $20,000 a month, and if the freight revenue is taken at approximately $30,000 monthly, the total income from this service is now $50,000 a month or $600,000 a year.

The additional investment required has not been large. Four trailers purchased in the very beginning cost about $21,000. A freight house was built in Ravenna and some additional track laid; another freight house was built in Barberton with some new track. Massillon and Dover have had new freight depots, and the company spent $5,000 on the Cleveland terminal. Altogether the investment required during the period for which the revenue figures are quoted did not exceed $50,000.

Among the other companies included in the joint arrangement the success of the plan has been equally marked. The Pennsylvania-Ohio Electric Company, for example, reports that the tonnage carried increased 177 per cent during the first six months, while the car-hours operated actually decreased. The particular advantage of the joint arrangement is that each road is able to accept freight, particularly carload lots, from points on its own line for points on other lines. This part of Ohio is a thickly-settled region with a great diversity of manufacturers, and there is a vast amount of freight business which does not lie wholly within the territory of any one railway. But under the present

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arrangement, whereby the several systems are tied together for the purpose of giving through freight service, it is possible to accept shipments for almost any point from Buffalo on the north, New Castle, Pa., on the east, Columbus, on the south, and Jackson, on the west.

Rebuilt Passenger Cars Used for Freight on N. O. T. & L.

It was found economical and practical by the N. O. T. & L. line to rebuild two of the large 60-type interurban cars for freight service. These cars were selected because they were the strongest of the large old interurban cars. The sides of this type of interurban car are reinforced with a 20-in. x ⅜-in. steel plate running almost up to the windowsills. This reinforcing is in addition to the heavy wooden undersills and trusses.

It was found necessary to cut this plate at the center of the car for the side door. Large aisle posts were put in beside the doors and an overrunning truss was added to both sides. This resulted in a car more capable of carrying a load of 50,000 lb. evenly distributed. M.C.B. radial drawbar couplers were put on the car and anchored to heavy steel plates. The gearing of the motors was changed from 22/55 to 17/60 to provide greater starting torque and pulling power.

The drop platforms were raised, making a straight-sill car. The rear doors were boarded up, the belt rail removed and the window openings covered with siding and sheet metal plates, extending 38 in. up around the entire car. The interior was sheathed all the way up the sides. Seats and the hot water system were removed and a new coal stove installed in place of the water system. These cars will be painted standard interurban red with the usual monogram, and will resemble the company's latest type baggage cars.

The twelve freight trailers recently bought, as mentioned above, are 43 ft. long. It was found advisable to make these trailers shorter than the standard 50-ft. baggage trailer in use at present, as the large baggage trailers develop considerable trouble from overloading, or uneven loading. The smaller cars have been made stronger than the old cars. They are of 60,000 lb. capacity and are built to stand the strain without sagging. The underframe is constructed of four 8-in. channel irons and two extra 8-in. wooden sills. Four truss rods in place of the usual two were used on these cars. The bolster construction was also made much heavier than that used under other freight equipment.

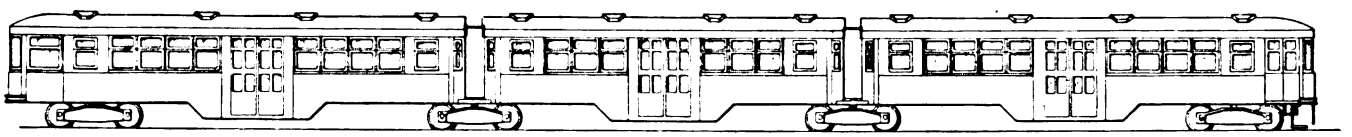
These cars are designed more to carry freight and express matter but the ends have been rounded. They will be painted a standard interurban red on the sides with the usual monogram, but the ends will be painted a traction orange color the same as used on the city cars. This will make them visible for a greater distance and is done as a safety measure.

The trucks under the cars were made by the Pressed Steel Car Company. They are standard diamond freight car trucks.

The Latest in Articulated Cars

THE Woodward Avenue line, Detroit, has the distinction of being one of the heaviest traffic routes, if not the heaviest, in the country among the two-track surface lines. This line not only operates over the principal business street of Detroit, but at its southern end it serves the ferry to Windsor, Ont., and near the northern end is an extensive residential district and also the principal factory of the Ford Motor Company. Car service at present is given by two-car trains, consisting of a motor car and a trailer, operating at close intervals all through the day, but even these are hardly sufficient to accommodate the passengers who wish to be carried. In consequence, the management of the Detroit municipal railway has been looking into all methods of increasing the carrying capacity of the line.

The accompanying drawing shows a three-car articulated train recently suggested and being seriously considered. Its principal advantage is that with only 18 ft. additional track space this train can seat 150 passengers, or forty-nine more than a two-car train, which seats forty-six passengers in the motor car and fifty-five passengers in the trailer. This seating capacity for the articulated train is based on longitudinal seats in the second and third car and cross seats in the first car. The length of the train over buffers is 113 ft., as compared with 95 ft. for the two-car train. There is also a saving in weight, that of the articulated train being estimated as 86,000 lb., or 570 lb. per seat, as compared with 73,000 lb., or about 722 lb. per seat, for the present two-car train. Another advantage is in reducing the number of operators. Two articulated trains require only eight men, or four each, whereas three two-car trains, having the same number of cars, require nine men.



Articulated Three-Car Train Proposed for Woodward Avenue, Detroit

As designed, the articulated train would have passageways between the different cars, the vestibule consisting of a vertical steel cylinder with openings in it to permit the passage of people from one car to another. The motor equipment would consist of four motors, the end trucks probably being the motor trucks, as this location would make it easier to get the motors out. It is not believed that any more stops would be required with this train than with a two-car train, because a designated system of stops is used on Woodward Avenue, and most of these stops have to be made now by the two-car trains.

The designated stops average on Woodward Avenue about ten to the mile. The train would be run over loops at each end and would be single-ended. It is expected that a train of this kind could be purchased equipped for about $30,000.

The London Underground Railways is now installing automatic railway ticket machines in theaters and department stores adjacent to the Underground stations.

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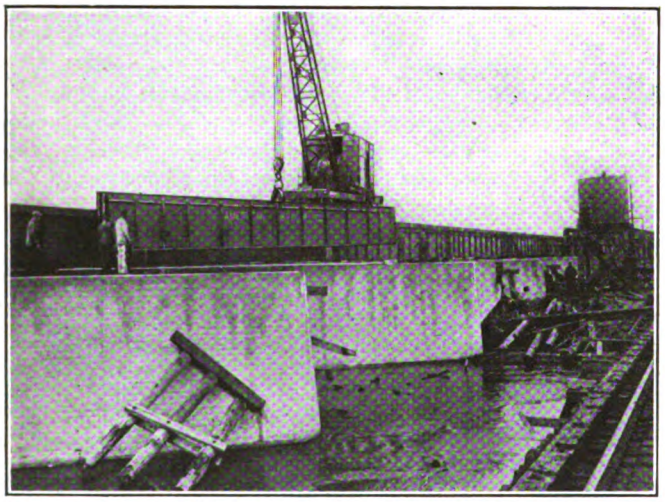
Railway Co-operates in Flood Control

New Bridge Over Los Angeles River Is Completed by Pacific Electric Railway in Conjunction with County Board of Flood Control and War Department

DURING the years 1919 and 1920 the Los Angeles County Board of Flood Control and the War Department of the United States Government undertook an extensive program of flood control work on the Los Angeles River in southern California. The purpose of the undertaking was to confine the storm waters, prevent erosion of adjacent property and reduce the possibility of serious damage to surrounding farm



Setting a Steel Girder for the Los Cerritos. Bridge of the Pacific Electric Railway

lands, such as had occurred in the past when the flood waters overflowed the regular channel. In the past ten years the stream has frequently changed its course during heavy storms, particularly in the district between the bridge on the Pacific Electric Railway's Long Beach main line and the point where the river empties into the Pacific Ocean. Numerous interruptions to railway service have resulted from this. The work undertaken and completed by the county and government consisted of widening and straightening the channel, constructing levees for a distance of approximately 3½ miles and installing new highway bridges. The railway company maintained a 1,000-ft. double-track pile trestle bridge over the old undefined channel at Los Cerritos, but as this structure did not harmonize with the improvements carried out by the government, it had to be replaced. Thus the railway became a partner in the flood-control enterprise.

The fact that the old bridge was 7½ ft. below the grade of the present levees and was not located at a proper angle to the newly defined channel of the stream made it necessary for the railway to build a new structure 1,500 ft. in length and to raise the level of the approach tracks. This involved the construction of 1,080 linear feet of double-track pile trestle and 420 ft. of double-track steel spans set on concrete piers. Under the existing conditions it was impossible to handle the reconstruction of the bridge while it was in service. Accordingly a single-track "shoo-fly," approximately a mile long with 350 ft. of temporary pile trestle spanning the stream and equipped with standard automatic block signals, was provided in order to maintain service on the line.

The new Los Cerritos bridge will cost about $275,000 and has seven spans, using altogether twenty-eight steel bridge girders, each 60 ft. long, 6 ft. deep and weighing 9½ tons. The total weight of all steel in the structure is 630,000 lb. The spans rest on eight concrete piers skewed 45 deg. with the track. Each pier is built upon a foundation of thirty-five piles driven to a total depth of 38 ft. below the bed of the stream, while the piers begin 18 ft. below. The dimensions of the piers are: Base, 11 ft. 3 in. x 45 ft.; top, 4 ft. 3 in. x 28 ft.; height, 32 ft., and each contains 348.7 cu.yd. of concrete. On one side of two of the piers reinforced concrete brackets were formed to carry the trolley poles.

Cofferdam methods were required for driving the piles and for placing the piers. For this particular job and future bridge construction the railway company purchased a new oil-burning steam locomotive crane. at a cost of $13,000. It has a 40-ft. boom, 20-ton capacity, and is equipped for pile driving, digging, concrete handling, loading and unloading and switching cars of material. The crane is mounted on standard gage railroad trucks and wheels and, including ballast, weighs 120,000 lb. Both efficiency and economy are promoted by the use of the new crane as it relieves motor work cars, previously used on bridge jobs, for use elsewhere.

The Readers' Forum

Concrete Ties Satisfactory in Chickasha

CHICKASHA STREET RAILWAY COMPANY,
CHICKASHA, OKLA., April 18, 1923.

To the Editors:

I have been interested in the numerous articles which have appeared in the ELECTRIC RAILWAY JOURNAL relative to substitutes for wood ties. In this connection the experience of our railway may be of interest.

About seven years ago the writer began experiments with a concrete tie, which, after numerous changes, was developed into a type that, after four years of service, is perfectly satisfactory. The tie is of reinforced concrete 24 in. long, 18 in. wide and 8 in. thick, placed lengthwise under the rail.

Two ties take the place of two wood ties. Extra wide ties are used at joints. The rails are held to the ties by means of spikes imbedded in the concrete. The track gage is preserved by means of tie bars placed at the joints and midway between, and there has been no trouble with spreading of the track.

We have had concrete ties in use in concrete streets about two years. These ties are laid under 65-lb. rail, and the concrete paving is filled in 6 in. deep, finished smooth on top, with a filler every 6 ft. The paving to date shows no cracks or effects of movement of the track. Heavy single-truck cars are used by this company, and these, in my opinion, are more destructive of tracks than double-truck cars.

On a small road like this one and located as we are, the freight item on ties is serious. We can buy the material as needed, so that the monthly outlay is not large. We install the ties within ten days after they have been made.

The design of these ties is covered by patent.

W. H. WADSWORTH, Superintendent.

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American Association News

Public Opinion and the Steam Railroad Situation*

By Britton I. Budd
President Chicago Elevated Railroads

WITH the return of business and industrial activity, the efficient handling of the transportation of the country becomes a question of the gravest import to every citizen. Railroad executives have a tremendous responsibility resting upon them. They deserve and should have the active and intelligent support of every business man.

To an interested outsider this support appears to be lacking. Instead of receiving encouragement in the great constructive work they are doing, the railroads are being constantly criticised for failing to do the impossible. Actual accomplishments are lost to sight, or greatly minimized, while failures are magnified to such an extent that the public is losing confidence in the ability of the roads to perform their functions. If this state of public mind is permitted to go unchecked and to become confirmed, the results will be disastrous to the railroads and to the country.

The reasoning business man should understand that prosperity and the expansion of trade and commerce are definitely limited to the extent that the railroads are able to supply the means of transportation. In many instances, however, we find his mind diverted from the real problem by glittering generalities of waterways, motor transportation and other subjects which are merely incidental.

With the unthinking mass, lack of confidence in the railroads takes a different form, which leads directly to government ownership and operation. Although the experience of the country with government operation of railroads should be sufficient to determine future policies for a generation at least, it does not appear to have had that effect, for the clamor for public ownership and operation, although somewhat diminished, has by no means been stilled. Another serious phase of the present dissatisfaction with the railroads is the effect it has on the credit of the various companies.

How is confidence in the railroads to be restored? That is the most important problem which confronts them. There can be no doubt of the ability of the roads to give the country adequate transportation if they have the confidence of the people. It seems equally certain that the confidence of the public cannot be secured by making apologies and explanations.

The policy which the railroads generally have pursued should, in my opinion, be completely reversed. Their publicity departments should stop making apologies and explanations, and tell the public some of the things the railroads have done and are doing. A notable few are pursuing that course, but the policy should be general. It should be systematic, extensive and intensive.

There is every reason why the railroads should drop the negative and assume a positive position in their publicity and advertising. They have a wonderful story to tell. The record of accomplishments stands out so prominently that it commands at once the attention and admiration of every thinking citizen. It should be made known to every one who speaks and reads the language of our country.

When the railroads were turned back to their owners by the government the extravagance and inefficiency which had marked government operation became fairly well known. It was not, however, exploited as fully and as extensively as it might have been. The story of how the roads reduced the number of employees by hundreds of thousands, while at the same time they increased the tonnage carried, was of absorbing interest, and advantage might have been taken of the situation to squelch effectively the menace of government ownership and operation.

They met the extraordinary demand made upon them following the resumption of coal mining in a manner that should have earned them the lasting gratitude of the country which they saved from the serious consequences of a coal famine. But, while they earned the gratitude of the people, they did not receive it. Instead they were criticised for not doing more, and they contented themselves with explanations of car shortage rather than in telling the public what they actually accomplished.

Success Begets Confidence

There is nothing, in my judgment, which makes as favorable an impression on the public mind as a definite record of achievement and of steady progress. Success begets confidence. The public takes little interest in the financial troubles of a railroad, or of an individual. Excuses and explanations cause only irritation. An appearance of prosperity does much in the way of establishing credit.

To an outsider the publicity policy of the railroads would appear to be a plea for public *sympathy*. That is wrong psychology, in my opinion. It may relieve the feelings of a man suffering with rheumatism to tell a friend how miserable he is, but it does not interest the man who has to listen. He would rather hear about something else.

So it is in the case of the railroads and the public. That the roads are not earning fair returns on the invested capital is a matter that is quite serious to railroad investors, but is only of minor interest to the public.

*Abstract of address presented at a meeting of the executive committee of the American Electric Railway Association, held in New York April 6, 1922. Mr. Budd was talking about the psychology of winning public approval and cited the steam railroad situation as an example.

Engineering-Accounting

A FRUITFUL meeting of the joint Engineering and Accountants' Associations committee on engineering-accounting was held in New York on April 24. The day was spent by the committee in working out the details of such subdivisions of the items in the standard classification of accounts as would give the engineering department what it needs in the way of data to enable it to keep track of detail costs. The feeling of the committee was that, by co-operation between the accounting and engineering departments, such data can be secured as will permit the maximum of economy in the carrying out of engineering work. At the same time it was realized that the accounting department should be burdened only with such an amount of routine work as will actually prove useful.

The New York meeting was attended by Chairman L. R. Brown, Rochester, N. Y.; E. D. Dreyfus, Pittsburgh, Pa., and C. R. Harte (sponsor), all of the Engineering Association; and Chairman G. F. Dinneen, Holyoke, Mass., and J. E. Heberle, Washington, D. C., of the Accountants' Association.

News of Other Associations

Spring Meeting of A.S.M.E.

AT THE meeting of the American Society of Mechanical Engineers, to be held in Montreal, Canada, May 28 to 31, three simultaneous technical sessions will be held each morning, and the afternoons will be devoted to visits to interesting industrial plants in the city.

Iowa Association to Meet

THE annual convention of the Iowa Electric Railway Association will be held at the Hotel Hanford, Mason City, Iowa, on June 20, 21 and 22. This will be held in conjunction with the annual convention of the Iowa section, National Electric Light Association.

Southwestern Association

THE program is being arranged for the annual convention of the Southwestern Public Service Association, which will be held in Fort Worth May 15 to 17. Announcements of the details will be made in an early issue of this paper.

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Maintenance of Equipment

Spray Painting of Electric Railway Cars

Results Obtained from the Use of Spray Painting on Numerous Electric Railways Show That It Saves Time, Is Economical in Material and Is Not Injurious to Workmen

By Leon L. Wolf
Railway Sales Manager R. F. Johnston Paint Company, Cincinnati, Ohio

During the war and following the war labor was very scarce and prices high, both for labor and materials. This created a pressing demand for a system whereby the electric railway companies of the country could paint and protect their rolling stock at the lowest possible outlay of money. Many companies during the war had allowed their equipment to go without paint and this had caused a rapid deterioration. It was the consensus of opinion that one of the most important problems confronting them was the protection of their equipment from deterioration, as most properties were operating at a loss and did not have the money to spend to protect their equipment due to the expensive methods that were necessary to accomplish the results. Not only were the expenses taken into consideration, but the length of time a car was laid up in the paint shop under the old methods was excessive and the railway companies needed every piece of equipment they had.

About this time the R. F. Johnston Paint Company of Cincinnati, Ohio, began carrying on an extensive and intensive campaign of tests of spray machines and materials for the painting of cars. Up to that time spraying had been used to a certain extent for spraying furniture, automobiles and freight cars. With the co-operation of the manufacturers of spray machines and with the improving of many materials that were available, great speed and economy were attained without sacrificing durability. And with this successfully accomplished, we produced a line of paints whereby street cars could be properly, quickly and economically painted and protected from the elements by the use of the spray gun without keeping cars in the paint shop longer than two and one-half to three days, whereas under the old systems it required from eight days to four weeks from the time the car came into the paint shop until it went into service again. Proceeding along the line that the spray could be successfully used, it was first tried out on new car work, and the writer was invited by a car manufacturer to spray fifty new cars which were under construction. This test showed that great speed could be obtained and a very smooth job, free from brush marks and with an even film, could be produced, and during this test one man was able to spray a coat of enamel on a one-man safety car in twenty-eight minutes. This test proved economical in both time and labor.

The next test was to ascertain the amount of material consumed per car. To ascertain this, two cars 48 ft. over all were painted, one by hand and one by spray. It required 17 per cent less material to paint the car with a spray than it did by hand. This clearly demonstrated that a real saving could be made by the adoption of the spray system, and an actual saving in labor and material in the painting of street cars between brush work and spray work amounted to approximately 47 per cent.

In one of the largest electric car manufacturing plants in the country this system was installed three years ago and every car turned out of that plant since has been sprayed. The writer has been informed by the general manager of this plant that there never has been a complaint and they have never had to repaint a car turned out with this system, whereas by the old methods they had been called upon to repaint cars in many instances or make allowances for repainting of cars that had required it within a year.

The spray system was tried by the Milwaukee Electric Railway & Light Company and it proved so successful that it was adopted as its standard in November, 1920. Since that time the company has been able to double its production at a greatly reduced cost. Another large property to adopt the spray system was the Eastern Massachusetts Street Railway, where it has been used with great success.

The Bloomington & Normal Railway has cut its expense by use of spray painting. The Oklahoma Railways in 1921 under the old system turned out twenty-four cars in its paint shop, or two cars per month. In 1922 with spray painting it painted 124 cars, or ten and one-third cars per month. This was five times as many cars as it had painted the year previous at practically the same labor cost. The Georgia Railway & Power Company, Atlanta, Ga., finished five and one-half cars in as many days at an average labor cost of $38.16 per car. I had the pleasure of inspecting these cars after they had seen a year of service and found all to be in good condition, notwithstanding the fact that many had been stored out in the open.

Many electric railways have since adopted the spray painting system, among which are: The Tri-City Railway, Davenport, Iowa; Birmingham Railway, Light & Power Company, Birmingham, Ala.; Memphis Street Railway, Memphis, Tenn.; Indianapolis Street Railway, Indianapolis, Ind., and Interstate Public Service Company, Indianapolis, Ind.

The old methods of street car painting were good in their time, but improvements were necessary to keep pace with other electric car developments. It is possible now to paint a car in one-half to one-third the time, to keep the equipment looking as good for as long a period of time as ever before and at the same time to reduce both the cost of labor and material.

Some labor organizations contend that the spraying of paint is injurious to the workman. However, my investigations along this line have proved conclusively to my satisfaction that no one is in any wise harmed. Furthermore, there are just as many men employed in all the shops where the spray system has been put into use as formerly, but the production has been in all in-

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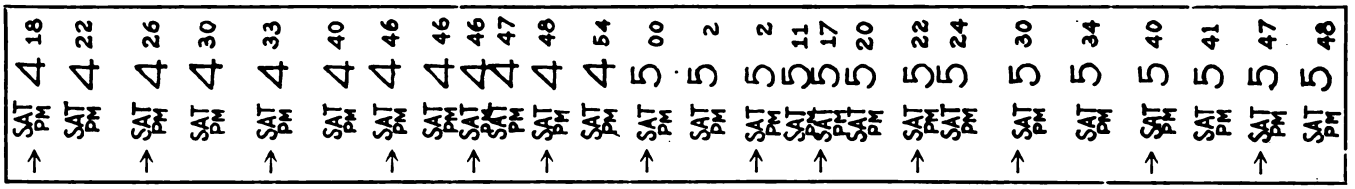


Section of Recorder Tape

stances materially increased, and in some cases quadrupled.

In conclusion, it is obvious that the spray method of painting is the logical system to employ because it is enabling the various properties to keep their equipment economically and well protected from deterioration, with suitable paint and varnish coatings.

The scientific sections of the research departments of the Paint Manufacturers' Association of the United States and of the National Varnish Manufacturers of the United States concur in my statements to the effect that there is nothing injurious in paints and varnishes when used with spray any more than there would be if applied by brush, and at recent meetings of the various associations the use of the spray gun has been recommended highly. Many coatings which have been used in the paint shops of the street railway industry for years have contained more or less white lead.

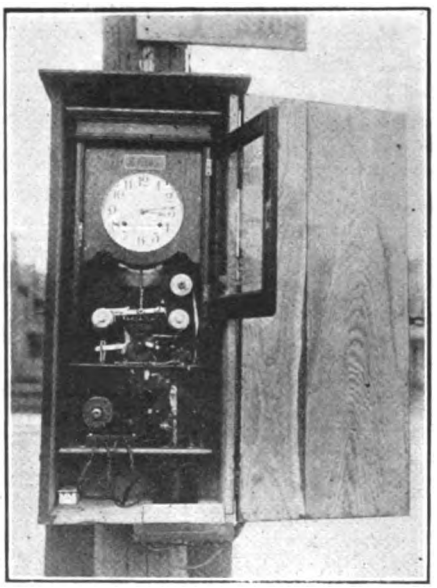
Direct-Reading Headway Recorder

THE accompanying illustrations show a Cincinnati Time Recorder Company's clock, which has been converted into a direct reading headway recorder by the addition of some mechanism in the shop of the Lehigh Valley Traction Company, Allentown, Pa. Most railway men are familiar with the operation of this time clock in stamping time cards, which are placed in position through a slot in the front while the handle is pulled down to record the time.

In order to use this clock as a headway recorder, the Lehigh Valley Transit Company added the mechanism necessary for installing a tape which would be fed automatically underneath the time stamp by a ratchet mechanism. An electric solenoid was installed for the operation of the time stamp, and by having a contact on the trolley wire the circuit is closed by each passing of the car and the clock mechanism is thus operated. The stamping of the tape thus gives a record of the time that each car passes the location where the recorder is installed.

A general idea of the mechanism may be obtained by referring to the accompanying illustration which shows the clock open. The roll of tape is installed on the upper right-hand reel and passes from this down to the plate and across this underneath the time stamp, where it passes over a roller and thence down to another reel which receives the tape. This latter reel has a ratchet attachment, and each operation of the stamp ratchets the reel around so as to move the tape to a new location for the next time stamp. As the tape winds up on the receiving reel this increases in diameter, and of course the distance between the time marks will increase accordingly. The ratcheting mechanism is arranged so as to give a distinct marking with the smallest diameter of tape. The operating solenoid is installed underneath the clock at the lower right-hand side and operates the mechanism through connecting links.

Headway Recorder Clock in Box on Pole with Operating Contactor on Trolley Wire



Headway Recorder Clock Open to Show Operating Mechanism

Where it is desired to record the headway of single-track lines or in but one direction of double-track lines, the mechanism just described is all that is necessary, but where a record is desired of the headway in both directions on a double-track line, an additional index with operating mechanism is necessary. This operation is accomplished by having a small index plate with an arrow which slides back and forth underneath the time stamp. With the arrow directly underneath the stamp its operation will cause an indication to be stamped on the tape, and by placing this a short distance to the left, no indication is given. For operating this sliding index, two solenoids are used, and of course with the double-track operation two contacts are necessary on the trolley wires. The operating circuit is then from the contact through the solenoid operating the index and then to the large solenoid which operates the time stamp. The arrow index is then pulled into position for stamping whenever a car passes on one track, and is pulled out of the way so that no arrow appears on the record for cars passing in the opposite direction on the other track. The movement of the index is accomplished through a bell crank lever, one end of which is attached to the rod connecting to the solenoid.

In Allentown rolls of tape are used made from the usual type of adding machine tape by cutting it in two to give a width of $\frac{7}{8}$ in. An accompanying illustration shows a section of tape as stamped by the recorder. This mechanism provides a direct reading record and, of course, is entirely automatic. As the time clock requires winding but once in eight days, very little attention is neces-

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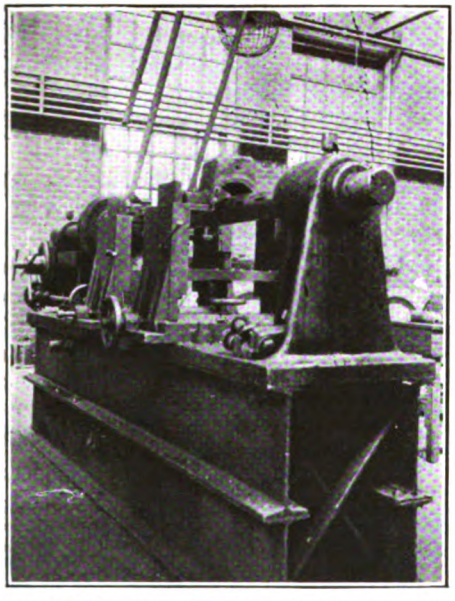
sary other than to make certain that sufficient paper is provided for the record.

In Allentown the clock is installed in a box which is mounted on one of the poles at the side of the street. A cut-out switch and fuse is installed in the circuit for protection to the operating mechanism, and in the summer months a lightning arrester is also added. The front of the box is closed and locked so that the mechanism cannot be tampered with.

Special Machine for Boring Bearing Caps



Special Machine Used for Boring Bearing Caps at Providence

WHERE the number of jobs of a similar character in a railway maintenance shop is sufficiently large, it sometimes pays to arrange special machinery for performing specific operations. This applies, on the property of the United Electric Railways, Providence, R. I., among other things, to the boring of bearing caps.

For this purpose a boring mill, of the form shown in the accompanying halftone, is used. The bed of this is constructed of light I-beams, diagonally braced and mounted with a cast-iron top carrying the headstock and tailstock. A pair of special carriages of the form shown permits quick clamping and adjustment of the cap over the boring bar. This machine was originally built and used for reboring armature bearing seats in motor frames before the purchase of a standard horizontal boring machine more suitable for the work.

New Equipment Available

Attachment for Control Switches

AN ATTACHMENT that can be added to any type CS circuit-breaker control switch to make automatic the circuit breaker controlled from it has been placed on the market by the Westinghouse Electric & Manufacturing Company. With this attachment added, the breaker cannot be held in the closed position on overload or short circuit when arranged to trip from the current transformer only or from a current transformer actuating circuit closing relays.

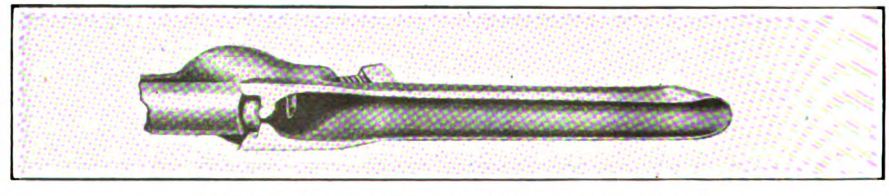
To apply the attachment to existing installations of type CS control switches it is only necessary to shorten the switch shaft and drill a hole for the engaging pin. The attachment consists of a coil, a magnetic circuit, a moving core, and a trigger normally engaging the switch shaft, so arranged that when the coil is energized, either from a direct current source through relays or from excessive current when connected to current transformers, the core is moved in the direction necessary to release the trigger. This allows the switch shaft to return to the neutral position.

When a circuit breaker is closed on an overload or a short-circuit, the trip-free attachment immediately operates and allows the control switch to return to the neutral or off position simultaneously with the tripping of the breaker. Before the circuit breaker can be again closed, it is necessary to turn the switch handle to the off position to engage the switch shaft.

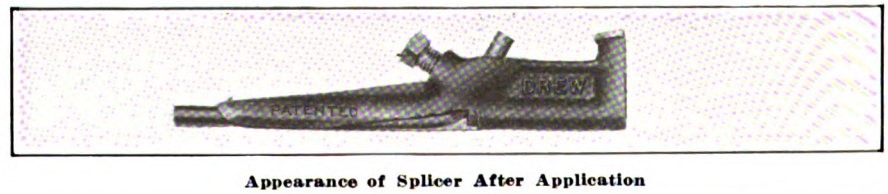
Improved Trolley Splicer

A GOOD trolley splicer should join the wires positively and present a smooth surface thereafter for wheel, shoe or pantograph. The improved Clark splicer, put on the market by the Drew Electric & Manufacturing Company, Cleveland, Ohio, is said to meet these requirements. The photographs show the construction. It is of cast metal, the lips having reinforcing lugs cast inside at the inner end. Whether the wire going through the splicer is full thickness or worn, these lugs rest on the wire when the lips are peened over. The lips extend lengthwise beyond these lugs toward the center of the splice and rest firmly on a shelf built into the splice body. These two features make a solid, smooth under-run when the splice is first put up and prevent the later formation of the notch or rough spot so common to many splicers.

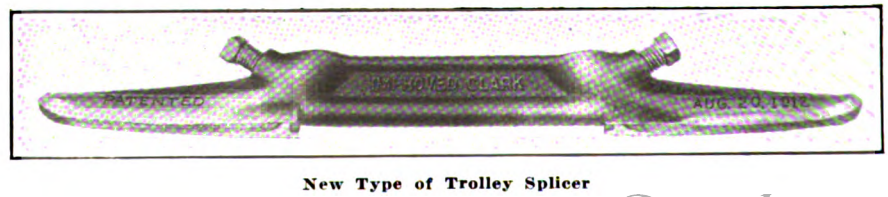
The splicer is made in two forms, one of which, shown in the illustration, is for repairing breaks in the line, while the other is in the form of a suspension ear. Both designs are made for sizes of wire from No. 0 to No. 0000 inclusive.



Under View, Showing Lugs for Holding Wire in Place



Appearance of Splicer After Application



New Type of Trolley Splicer

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The News of the Industry

Arbitration in Cleveland

Men Demand Fifteen Cents an Hour Increase, Which Will Cost Car Riders $1,140,000

Interesting facts and statistics regarding the income and expenditures of motormen and conductors were brought out in the arbitration proceedings on the demand of Cleveland (Ohio) Railway trainmen for a 15 cents an hour wage increase. The arbitration proceedings have just been concluded and the arbitrators are to announce their decision in time for whatever increase is permitted to take effect May 1.

Although the men had demanded an increase from 50 cents an hour for the first three months service, 53 cents an hour for the next nine months service and 55 cents an hour thereafter, to 65, 68 and 70 cents an hour, respectively, when the arbitration proceedings began they asked that they be permitted to introduce evidence showing the necessity for an even greater boost. They were overruled in this contention, however, and the arbitrators held that the question that would be decided was: as follows:

Shall the wages of trainmen be increased from the present rate to a sum not exceeding 65, 68 and 70 cents per hour, and if so, to what sum?

W. M. Rea, secretary of the carmen's union, testified that the minimum amount of money required to take care of a family of five in Cleveland, without allowing anything for savings, was $2,143. In a detailed budget he itemized this expenditure as follows:

Food, $686.42; rent, $540; clothing, $312.85; shoes, $67.50; fuel, $144.00; renewal of furniture and maintenance of household effects, $85; sundries, $57; union dues, $18; insurance, $71; ice, $12; barber, $9; street car fare for family, $13; amusements, $26; doctor and dentist, $50; tobacco, $36.50; summer recreation, $15.

In the sundries item he allowed $25 for Christmas, $26 for church, Sunday school and charity, and $6 for literature. His budget was based upon the needs of a man and his wife, with a boy eleven years old, a girl five and a baby two years old.

In rebutting this budget, the company contended that a family of four could get along on $1,480 a year, divided as follows: Groceries, $391.73; meats, $96.12; clothing, $191.28; rent, $510; heat and light, $113.52; miscellaneous, $177.84.

The company offered figures to show that wages of trainmen had increased 83.33 per cent since 1914, while living costs, according to their figures, had gone up only 69.12 per cent.

The company said that one-quarter of each 5-cent fare is now going for the wages of motormen and conductors, and quoted figures to show that in 1919 wages paid trainmen amounted to $4,266,000 and in 1920, when the men's wages were at a maximum of 70 cents an hour, the total amounted to $6,002,000, while under a 20 per cent wage reduction in 1921 the total the company expended for wages was reduced to $4,979,000 and with a further reduction of 8½ per cent in 1922 the cost of wages for trainmen was $4,338,575.

The company said that for each penny an hour advance to the men the extra cost to the company is $78,450 a year, and if the men got the 15 cents an hour rate they demanded, the total cost each year to the car riders of Cleveland would be $1,140,000.

Paul E. Wilson, secretary of the company, testified that a survey of the 2,827 trainmen employed by the company showed that 77 per cent of them were married, that approximately 50 per cent of the married trainmen owned their own homes or were paying for their own homes, and that 16 per cent of them owned automobiles. He said that the average rent paid by the trainmen was $33.36 a month, as opposed to the $42.50 a month rental claimed by the men.

The men introduced testimony to show that painters in Cleveland are getting $1.12 an hour, pattern-makers from 90 cents to $1.10 an hour, pavers $1 to $1.25 an hour, and other skilled tradesmen equally high wages. They contended that on the basis of a nine-hour day, the men would have to receive 78 cents an hour to earn $2,143 a year, the minimum budget, according to their contention, for a family of five.

The feeling is held in Cleveland that the board of arbitrators, consisting of Fielder Sanders, former Street Railway Commissioner, chairman; Thomas P. Schmidt, named by the company, and Judge Frederick P. Walther, named by the men, will grant the men an increase of between 5 and 10 cents an hour.

John J. Stanley, president of the company, says that other employees of the company will receive an increase in pay if the board of arbitration decides to boost the trainmen's wages.

Railway and Bus Companies Apply for Rights

Moves Made Recently in Los Angeles Would Provide for Constructing First Unit of a $20,000,000 Subway System, with $6,000,000 to Be Spent at Once for Bus and Railway Extensions

FORMAL applications have been made by the railways at Los Angeles, Calif., to the local Public Utility Commissioners for approval of a program of extensions, including the establishing of three jointly operated crosstown motor bus lines on Western Avenue, Vine Street and on Vermont Avenue. They embody plans that call for the immediate expenditure of $6,000,000 to improve transportation conditions to meet the tremendous growth of the city. This, however, is just one phase of the matter.

On April 18 William G. McAdoo, counsel for the People's Motor Bus Company, applied to the board for one-year permits to operate motor buses in the city over twenty-nine routes. He stated in his applications that if permits are granted his company will place its buses in operation within thirty days after the permits are passed. If the board is unwilling to grant one-year permits, his company will accept permits for the rest of the calendar year 1923. This request for the permits is regarded as an attempt of the McAdoo-Hellman interests to establish lines at once, without waiting for the "straw vote" at the May 1 primary election on the plan to give his company twenty-one-year franchises.

The People's Motor Bus Company originally asked for franchises over nineteen routes, paralleling railway lines, and serving Hollywood and other sections of Los Angeles, and coming to the edge of the prohibited congested district of Pershing Square. In the latest applications for one-year permits ten additional routes are set forth. Fares are not mentioned, but it is presumed that they will be 10 cents. The lines covered by the latest applications would reach into practically all sections of the city, parallel the street car lines and compete with them.

Another bus concern known as the Glendale Motor Bus Company is also seeking permits to operate its buses over sixteen routes in various parts of the city. It, too, is asking for one-year permits from the board pending the outcome of the twenty-one-year franchise fight at the May 1 primaries.

The Traffic Betterment Association is conducting an active campaign against the motor bus interests. It is advertising in the daily papers and is also distributing hand bills outlining the facts in the fight. The Automobile Club of Southern California, with 80,000 members, has issued a resolution protesting against the invasion of Los Angeles by the bus.

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It is understood that the Board of Public Utilities will not take any action on the bus applications until after the May 1 election.

Pacific Electric Applies for Subway Franchise

On April 20 the Pacific Electric Railway formally filed with the City Council of Los Angeles an application for a forty-year franchise for the construction of a rapid transit subway for its interurban trains. The company says that the $5,000,000 subway which it is willing to build from First and Glendale Boulevard to Pershing Square is the most important project yet suggested for the relief of traffic congestion in the city of Los Angeles.

In September, 1922, the company obtained a forty-year franchise to construct a rapid transit subway for serving Glendale, Hollywood and San Fernando Valley points, but proposes, if granted the right by the City Council, to extend this subway from its Hill Street terminal to Pershing Square as the first unit of a $20,000,000 subway system. Other subways will radiate from Pershing Square terminal east and west. The use of Pershing Square as a centralized terminal for the system of subways is in accordance with the idea submitted by public officials and engineers and approved by the Los Angeles Planning Commission, Los Angeles Traffic Commission, Community Development Association and the Los Angeles Chamber of Commerce.

Under the subway franchise sought the railway would pay the usual 2 per cent of its gross revenues for the subway right.

Action on Viaducts Over River

On April 20 the City Council accepted the proposed division of the expense of grade-crossing separations and new viaducts over the Los Angeles River, as recommended by the Council's special viaducts committee, under which the city's share of the expense will be one-fifth of the $6,000,000 required to carry out the proposed improvement program. A bond issue for $1,200,000 to pay the city's share of the improvement will be placed before the voters at the June 5 city election.

With similar formal acceptance by the county of Los Angeles, street railways and steam roads of the division of the expense, a contract can then be entered into and the work commenced of constructing six new viaducts over the river. It has been tentatively agreed that 40 per cent of the total expense of the six new viaducts, including track depression and damages, shall be borne by the steam railroads, and the remaining 60 per cent be divided equally among the city, the county and the electric railways.

Majority on Utilities Board Favors Only One Permit

While it is thought the Board of Public Utilities in Los Angeles will not act on the deluge of applications received from various sources for one-year permits to operate motor bus lines in the City of Los Angeles, yet Commissioner Bogardus stated that the board in making its recommendations would recommend all bus permits to one concern—that the board would not split up the permits, allowing one company certain routes and another company other routes—that a unified system is wanted, and to this end they will recommend that the permits be awarded on the basis of the greatest advantages to the greatest number.

$4,000,000 in Improvement Demanded

Cincinnati Street Railway Passes Resolution Requiring Traction Company to Meet Lease Terms—President Schoepf Expected to Reply Soon—Has No Comment to Make at Present Time

THE Cincinnati (Ohio) Street Railway has made formal demand on the Cincinnati Traction Company to make repairs and replacements to the electric railway system of Cincinnati to the extent of $4,000,000. The Cincinnati Traction Company, which leases the properties of the Cincinnati Street Railway, is in default of its franchise obligations, according to resolutions adopted by the board of directors of the lessor company.

The action was taken following a report made to the board of directors of the Cincinnati Street Railway by its special counsel, Judge Rufus B. Smith, Samuel Assur and Robert A. Taft. Under the franchise terms the Cincinnati Traction Company has ninety days in which to meet the demands made upon it.

W. Kesley Schoepf, president of the Cincinnati Traction Company, said that he would answer the Cincinnati Street Railway in due time, but for the present had no statement to make regarding the demands.

The report recites the legal relations between the Cincinnati Street Railway and the traction company and also summarizes the physical condition of the Cincinnati Street Railway as found by Stone & Webster, Inc., Boston, Mass., who had been engaged to make an expert investigation.

The action of the Cincinnati Street Railway board is regarded as the initial step in the movement to settle the traction problem in Cincinnati by means other than mutual negotiations. In the event the traction company fails to comply with the demands made upon it in the specified time, the matter will go to arbitration. If the arbitrators find the defaults exist, as claimed, action to terminate the lease will be initiated along lines provided for in the leasing document. It is understood that the Cincinnati Street Railway will seek this severance of relations amicably, but if necessary is prepared to resort to litigation.

Without regard to the question of how such a big improvement program may be financed, it is said to be an engineering impossibility to put through the betterments and repairs demanded in less than two or three years.

Accompanying the report was a schedule of the repairs said to be necessary to tracks, equipment plants and other properties. The repairs and replacements as indicated totaled $3,947,918, with an additional $965,400 for replacement of obsolete cars. This would make a total of $4,912,917, but in the item of cars the Cincinnati Traction Company has under construction a large number of new cars for this very purpose.

The Cincinnati Traction Company claims it has spent more than $12,000,000 on the properties for improvements, betterments and extensions, and these items would be the basis for substantial claims by that company. When the Cincinnati Traction Company leased the Cincinnati Street Railway's properties in February, 1901, it also assumed its franchise which was granted through a special act of the Ohio Legislature in 1896 and which does not expire until 1946.

The Cincinnati Street Railway can make no further move until the three-month period is up. During that time it is expected the Cincinnati Traction Company will present a detailed statement in reply to all demands and claims made by the lessor company.

The action of the Cincinnati Street Railway was unanimous with the full directorate in attendance. The directors are: Samuel Assur, Charles P. Taft, Robert A. Taft, Bayard L. Kilgour, A. J. Becht, Judge Rufus B. Smith, Charles Dupuis, Charles Windisch, Charles D. Jones and George Lewis.

The report of the special counsel for the directors of the Cincinnati Street Railway, made under date of April 20, contained a summary of the work which Stone & Webster reported should be carried out. A recapitulation of these repairs and replacements follows:

Repairs to tangent track	$786,769
Repairs to layouts of special work	315,092
Repairs to cars	101,500
Repairs to Pendleton power house equipment	110,800
Repairs to buildings and structures	39,903
Repairs to pole lines, etc.	28,750
Total repairs	$1,382,814
Replacements of tangent tracks	1,943,379
Replacements of paving	295,206
Replacements of layouts of special work	326,118
Total replacements	$2,564,703
Total repairs	1,382,814
Grand total	$3,947,517
Replacement of 198 cars	965,400

In the matter of replacing the 198 cars the special counsel explain that they understand the lessee has contracted for seventy new cars. These cars, say counsel, are to be purchased by the issuance of equipment notes. Under these circumstances they feel that the sum estimated for this replacement should not at the present time be included in the repairs and replacements specifically to be requested of the

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lessee company, but that it be dealt with on a separate basis.

As counsel see it "the report of Stone & Webster thus shows serious defaults of the lessee company under the covenants of the lease." They then say:

A security of the lessor company for any default of the lessee is the property itself. It is contemplated by the terms of the lease that the property shall always constitute a first-class modern and efficient street railroad system so that in case of any default, the lessor can at once take possession and operate the property without the necessity of expending large sums for repairs and replacements. A street railroad system requiring more than $4,000,000 of repairs and replacements is not the security contemplated by the lease. It is a fundamental principle of the lease that the system be kept in first-class repair.

In concluding its resolution directing the attention of the Cincinnati Traction Company to the existing conditions the company said in part:

We hereby notify you that you are in default under the provisions of said lease, and we further notify you to do and perform the covenants thereof in the following respects, to wit:

1. Proceed forthwith to make certain repairs in and about the trackage (tangent track and layouts of special work), street cars, buildings, power houses, equipment, poles, lines, and overhead structures of this company, an itemized list of which repairs and the approximate cost thereof is hereto attached marked Exhibit A, and made a part hereof.

2. Proceed forthwith to make certain replacements and renewals in and about the trackage (tangent track and layouts of special work of this company), an itemized list of which replacements and renewals and the approximate cost thereof is hereto attached, marked Exhibit B, and made a part hereof.

3. Proceed forthwith to restore the street paving in and about the making of the replacements and renewals set forth in Exhibit B, an itemized list of which is attached hereto, marked Exhibit C, and made a part hereof.

Be it further resolved, that the Cincinnati Traction Company is in default under the provisions of said lease in the following respects, to wit:

1. It has acquired materials, machinery, rolling stock, equipment and other property (acquired and used for and in the operation of the leased premises) subject to liens prior to the liens reserved in said lease to the lessor, which liens are not in favor of mechanics or material-men; such acquisition of rolling stock, equipment or other personal property either in kind or value and amount as delivered under said lease; all in violation of the covenants contained in the first paragraph of said lease.

2. It has failed to maintain, keep in good order and repair, renew and replace the necessary power houses of the lessor, and maintain and perpetuate the said street railway plant entire, all in violation of the fourth paragraph of said lease.

3. It has failed to make additions, renewals and replacements to rolling stock necessary to meet the requirements of the business, in violation of the fourth paragraph of said lease.

Be It Resolved, That notice in writing of said default and failure to perform the covenants of said lease be given to the Cincinnati Traction Company under the provisions of Section 11 of said lease, which notice shall be in the following form.

The Cincinnati Traction Company:

We hereby give you notice under the provisions of paragraph No. 11 of the lease from the Cincinnati Street Railway Company to yourselves dated Feb. 21, 1901, that you are in default under the provisions of said lease, and further notify you to do and perform the covenants thereof in the following respects:

1. That you pay off all liens on materials, machinery, rolling stock equipment and other property acquired and used for and in the operation of the leased premises, and prior to the lien reserved in said lease to the lessor, except liens on rolling stock, equipment or other personal property either in kind or value and amount as delivered under said lease.

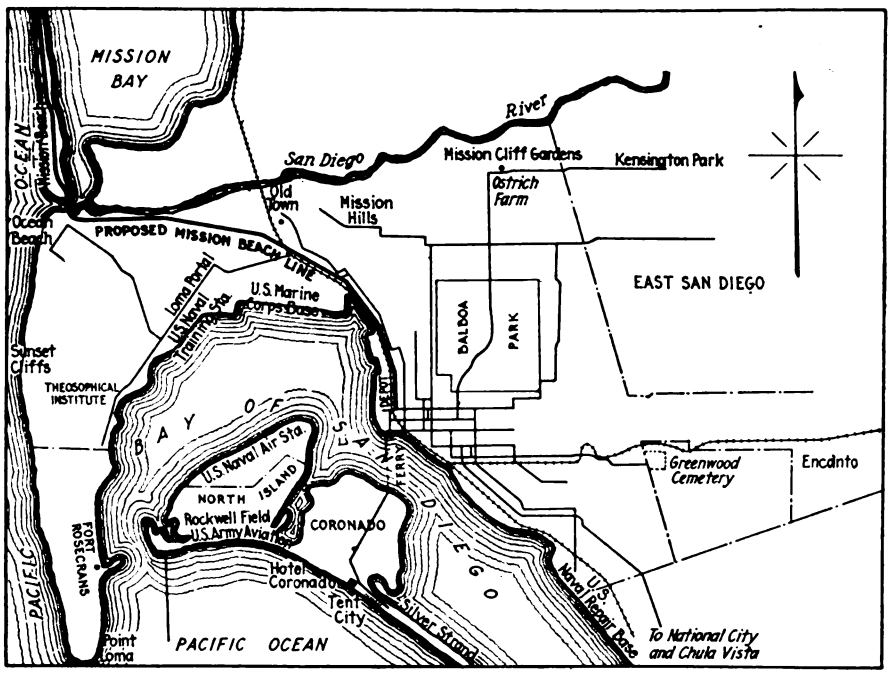
2. That you maintain, keep in good order and repair, renew and replace the necessary power houses of the lessor, and maintain and perpetuate the street railway plant entire in such respect.

3. That you make all additions, renewals and replacements to rolling stock necessary to meet the requirements of the business.

$2,500,000 on New Development

San Diego Electric Railway Has Applied for Franchise for Railroad Line to New All-Year-Round Beach Resort—Business and Residential Sections to Be in Close Contact

PROMISING to construct an all-year beach resort different from any on either the Pacific or Atlantic coasts, the San Diego (Calif.) Electric Railway announces that it will spend about $2,500,000 in the development of Mission Beach, in San Diego. The project as announced by Manager Claus Spreckels of the railway company involves the building of 8.08 miles of double-track electric railway, or 16.16 single-track miles, and the building of an auditorium, dance floor, bathhouse and housing for amusement concessions covering about 30 acres, construction of an ocean pier and dredging a portion of Mission Bay for boating and swimming. Application was made April 2 to the City Council for the necessary franchise for the new railroad line and construction work is to be rushed as soon as the necessary permission is secured.



Map Showing Relation of Mission Beach Line to the Rest of the San Diego Railway System

Mission Beach, white and hard and with a gradual slope into the ocean, is said to be one of the finest beaches in California. A few hundred feet across the strand lies Mission Bay. A portion of this, to be known as Bonita Bay, will be dredged out for boating and swimming. Bathers can enjoy either the surf on the ocean side or swimming in the warmer water of the bay side of the strand, or both, as they choose. The beach has been popular with the people of San Diego despite the lack of transportation. With the completion of the new electric line the beach will be only fifteen or twenty minutes ride from the business district of San Diego.

In conjunction with the building of the beach resort and electric railway, the Mission Beach Company, also controlled by the Spreckels interests, is converting the remainder of the Mission Beach land into home sites. Since last fall work has been in progress grading and paving streets, laying gas and water mains and sewers and installing electric service and assisting lot buyers in building homes, with the result that a sizable community already exists as potential patrons of the new car line. They are now being served by a "stub" service from Ocean Beach.

The relation of the proposed new line to the existing street railway in the city is shown on the accompanying map. The new line will run largely over private right-of-way, so stops between the beach and the business section will be few and service correspondingly speedy. The result will be to place the new beach resort and residential district in as close communication with the city as are the choicest existing residential sections of the city. The route of the new line is shown on the map by the heavy black line and the existing routes by the lighter lines.

Later on, it is stated, the new line may be extended to La Jolla, a fashionable seaside community toward the extreme northern limits of the city of San Diego, now without rail transportation, but nothing definite about this was announced at this time.

The type of construction of the new line will differ from the standard on which the company's city lines have recently been reconstructed and is described at length in the Track & Roadway columns of this issue.

The San Diego Railway has ordered fifty cars from the American Car Com-

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pany of St. Louis and they will be completed in time to be put in service on the new line. They were described in the April 21 issue of this paper.

The building of the new Mission Beach line and the construction of the all-year-round resort at Mission Beach is the largest single construction enterprise to be undertaken in San Diego since the building of the exposition of 1915-1916 and reflects the faith that John D. Spreckels, president of the San Diego Electric Railway, has in the future of the city of San Diego.

Heavy black lines on the accompanying map show the proposed new electric railway to Mission Beach, construction on which is to begin at once and which, together with the all-year-round resort at the beach to be built by the company, will cost around $2,500,000. The line will start at the Santa Fé (Union) station, at the foot of Broadway, and run northerly and westerly to the bridge over the entrance of Mission Bay, thence northerly to the north line of the Mission Beach subdivision, a total distance of 8.08 miles. At present Ocean Beach and the intervening territory are served by the Ocean Beach line, paralleling the proposed new line as far north as Barnett Avenue, thence turning westerly past the United States Marine base and the United States Naval Training station, then turning north on Voltaire Street to Bacon Street.

Illinois Appellate Court Says Thompson Suit Was Properly Dismissed

The Appellate Court of Illinois decided on April 24 that the Thompson administration suit to collect the city's Surface Lines profit, outside of the franchise contract, was properly dismissed by Municipal Judge McKinley.

These profits, 55 per cent of the net receipts, now total more than $8,000,000, which, as mentioned in the issue of April 7, was tendered the city and refused by the Thompson administration. Then it brought suit to collect this money on an implied contract for the use of the streets. If successful the sum collected presumably would not have to go into the traction fund, but presumably could have been used for general city purposes.

The Appellate Court does not decide in its opinion whether the contract ordinances have been canceled, nor does it decide whether there was an implied contract. The court does say:

"It appears, then, that the city, while averring that said ordinance has been cancelled and annulled, at the same time attempts to rely upon that ordinance to make out its claim of a contract implied in law."

The court asserts that such a position is legally impossible and therefore the suit was improperly brought, and was properly dismissed by the municipal court.

Corporation Counsel Busch said that it will be decided later whether the city will appeal the case.

Effort at Last-Minute Compromise in New York

The Assembly of New York on April 25 killed the several motions of Minority Leader Donohue to report the administration's public service and transit bills out of the rules committee for final passage, thus assuring the defeat of those measures so far as this year's session is concerned.

A conference was held later the same day at the Executive Mansion, and while nothing definite was determined as to the exact language of the compromise transit bill a ray of hope was held out that some sort of an agreement will be reached. The conference was attended by the Governor and the Republican and the Democratic leaders.

The attitude assumed by the Governor is that the city of New York with its hundreds of millions invested in subways is entitled to an honest chance to attempt to solve its own transit problem in its own way.

The State Public Service Commission will, under the proposed measure, keep a check on what the city does, will co-operate with the city of New York in all ways possible to make a success of its venture and will advise as to capitalization and service of any of the lines which may continue to be operated by the transit companies themselves.

Under the measure to be presented, the city of New York, however, is not to be permitted to engage promiscuously in the business of bus transportation, except that under certain conditions the city may obtain from the Public Service Commission a certificate of convenience and necessity for the operation of lines in conjunction with existing transportation systems or to serve new territory where either the company operating present lines of traction does not feel justified in making an extension or installing buses or the Public Service Commission does not feel that the utility is justified in investing the aditional capital so required.

All in all the new bill will be an experimental step toward complete regulation of transit facilities in the city of New York by the municipality; its success will depend on the frame of mind of the persons responsible for its enforcement. It will not give all that has been asked; it will not ruin vested interests; but it will, with all proper safeguards to the security of live capital invested, give promise of solving the present problem, if the city itself, through its administrative facilities and proper co-operation, can bring such solution about. An extra session of the Legislature seems likely.

Wage Increase Announced by Market Street Railway

The Market Street Railway, San Francisco, Calif., has announced a wage increase for platform men beginning April 29. The new scale in cents an hour is as follows:

First six months	.46
Second six months	.48
Third six months	.50
Next twelve months	.52
Thereafter	.54

This is a 4-cent an hour increase for men in their first six months of service and 2 cents an hour for all other classes. Men now on the 42-cent rate will be advanced to 46 cents for their next six months of service, after which they will enter the 48-cent class. The present rate has been in effect for a little more than six months.

Three Cents an Hour Increase in Los Angeles

An increase in pay of 3 cents an hour was made to trainmen of the Los Angeles (Calif.) Railway on April 16. The increase affects approximately 2,300 men and increases the annual payroll $200,000. The old and the new rates in cents an hour are as follows:

	Former Scale	New Scale
First three months	.46	.49
Next nine months	.47	.50
Second year	.48	.51
Thereafter	.50	.53

Safety operators on shuttle cars receive an extra 2 cents an hour and safety car operators on main lines 4 cents additional an hour. This is a continuation of the scale given safety car operators since the cars were introduced in 1920.

The increase brings the pay scale only 1 cent an hour in each class lower than the highest point reached by increases made in the after-war period of business readjustments. The scale ranging from 46 cents to 50 cents has been in effect since October, 1921. The minimum guarantee for new men is increased from $100 to $125 per month.

Mr. Storrs Praised for His Coal Plan

In urging engineers to take up with their employers and clients the advisability of securing an earlier movement of domestic coal—a step taken at the request of John Hays Hammond, the chairman of the President's Coal Commission—the Federated American Engineering Societies has addressed a letter to its member societies, of which the following is a part:

The Coal Commission is particularly impressed by the plan devised by L. S. Storrs, president of the Connecticut Company. Under that plan the employee submits, prior to April 1, an estimate of his winter fuel needs. Delivery is to be made at the option of the retail dealer during the six months period beginning with April. Full payment for the coal will be made by the company at any time delivery is effected.

The company is reimbursed by deducting the cost of the coal from the employee's salary. These deductions, however, are spread in equal installments over the six months period. Under this plan, the employer can see to it that the coal is purchased at the best possible price. He can influence the dealer to deliver the maximum practicable amount of coal early in the season. The employees, many of whom are accustomed to buying coal in very small lots during the period of highest prices and distribution difficulties, can make substantial savings and be assured of a sufficient quantity of coal when needed.

Will Fill Vacancy Immediately.—Mayor Doremus of Detroit and the Street Railway Commission will take immediate steps to secure a trained executive to fill the position made vacant by the death of Joseph S. Goodwin, late manager of the Department of Street Railways.

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Financial and Corporate

Will Resume Fare Hearings

Property Valuations of Minneapolis and St. Paul Railways Up Again—City Awaits Expert's Return

The Minnesota Legislature has ended its biennial session without changing the laws governing street railways and the decks are cleared for hearings before the State Railroad & Warehouse Commission to determine proper rates of fare based on property valuations of the Minneapolis Street Railway and the St. Paul City Railway. The rate is now 6 cents for either company and 12 cents for interurban trips.

Power to make rates was granted to the commission by the Brooks-Coleman bill passed at the 1921 session, and three bills offered at the 1923 session aimed to amend or repeal this law. Had the law been repealed proceedings would have ended.

A fourth bill, which was not enacted, provided a metropolitan one-fare zone, or one fare between Minneapolis and St. Paul points, instead of two fares when city limits are crossed on interurban lines.

This latter bill was a St. Paul measure. The Minneapolis Aldermen opposed the plan on the ground that under the proposed law Minneapolis would carry the burdens of St. Paul, as figures indicated that the Minneapolis system is a profitable one and that the St. Paul system is having a hard time to make both ends meet.

These figures, prepared by D. F. Wilcox, the valuation expert, showed St. Paul's deficits to have been as follows: 1918, $157,310; 1919, $37,903; 1920, $135,216; 1921, $167,857. Minneapolis profits were: 1918, $758,259; 1919, $799,746; 1920, $870,142; 1921, $440,903; 1922, $999,284, the latter large figure being due to an increase for Minneapolis after the free fare zone extending into St. Paul about 2 miles had been abolished.

Mr. Wilcox from a survey had determined that Minneapolis is entitled to a street car fare four-fifths of a cent lower than the fare in St. Paul, on the basis of cost of service within the two cities; if the operating incomes of the two companies were pooled through the proposed consolidation so as to keep the fare the same in both cities the uniform fare would be about three-tenths of a cent higher than the fare required to support the Minneapolis service standing alone and about half a cent lower than the fare required to support the St. Paul service alone. An increase would be required of about three-tenths of a cent in fare in the two cities if the one fare rate metropolitan zone were put in.

St. Paul had conducted an investigation over a long period with the findings that a single fare for the two cities would create a labor market ideal for all industries in both cities, would save $600,000 annually to interurban riders of the two cities, would expand the western district of St. Paul into a greater manufacturing center, would make the show places of both cities available at one fare, and would reduce operating expenses of the street railways by unification of lines.

An agreement is to be reached at once between all concerned as to the date in May when the hearing will begin before the commission. The commission and the Minneapolis Street Railway are ready and it is understood that as soon as Mr. Wilcox returns from Denver the city will be ready to present its arguments.

Income and Traffic Increase in Detroit

The total operating revenue of the Department of Street Railways, Detroit, Mich., for the thirty-one days ended March 31, 1923, was $1,851,535, against $1,619,266 for the month of February. The revenue from transportation amounted to $1,755,955 for March, compared with $1,528,539 in February. Total operating expenses advanced from $1,185,779 in February to $1,339,794 in March. The net revenue in March was $511,741, against $433,487 in February. The net income showed an increase of $57,191, being $98,025 in March. The total passenger traffic in March was 43,227,309 and in February 37,707,665.

Valuation Hearings Resumed

The Public Service Commission has resumed hearings on the valuation of the physical properties of the International Railway, Buffalo, N. Y. The figures introduced at the hearing will be used as the basis of the rate hearing to be held at a later date. The city has complained against the 7-cent fare or four tokens for 25 cents. It seeks the restoration of the 5-cent fare. The company has filed a value of $96,539,185 and the commission has been taking testimony to determine whether or not the figure is excessive. From the Buffalo city line to the villages of Depew and Lancaster the value of the company's right-of-way amounts to $29,269, according to E. A. Chamberlain, Buffalo real estate expert. Buildings not used in operation of the railway which were purchased with the land were appraised at their commercial value at $58,850. The company's total land holding and rights-of-way were valued at $3,957,717, and William M. Raignel, in charge of grading, tracks, bridges, culverts and crossings, fences and signs, testified that the value of the grading amounted to $3,741,887.

Good Showing in March

Community Traction Company Reports Surplus of $20,000—New Wage Demands Made

Operations of the Community Traction Company, Toledo, Ohio, for the month of March, as reported to the board of control at the meeting on April 15, shows the most successful financial results since the enactment of the ordinance more than two years ago.

A surplus of $20,449 from operations and $505 interest on cash balance was credited to the fare stabilizing fund, bringing it to a total of $237,110, with its deficit reduced to $162,890. In various other operating reserves and funds there were cash balances of $39,636, and in addition to the $364,000 of Community Traction Company stock owned by the city now there was a cash surplus in the sinking fund available for the redemption of more bonds for the city amounting to $101,077.

The March credit to the stabilizing fund was exceeded by that made for December, 1922, but additional maintenance and depreciation charges made in March when considered show March more favorable by $6,159 than December.

The average daily riding has grown to 187,539 from its low point of 148,658 in August, 1921.

Gross revenue for March amounted to $353,768, an increase of $45,941, or 14.92 per cent, over the same month of last year. Operating expenses of $245,966 represent an increase of $32,318, or 15.12 per cent increase over the same month a year ago. Increased car mileage is largely responsible for the rise in costs. There were operated 660,971 car-miles in March, as compared with 639,656 for the same month last year.

The first half of April shows that business is continuing very near the March level. A few days of bad weather brought the results down a trifle.

The company will be called upon to negotiate new contracts with interurban lines for trackage rentals on May 1 and a new wage contract has been submitted to take the place of the present agreement, which expires on May 21.

The platform men and shop men have asked for increased wages, but the amount demanded has not been announced to the public.

New Reorganization Plan Means Capital Reduction

Under the terms of the reorganization of the United Gas & Electric Corporation, New York, N. Y., first preferred shareholders of the present company will receive seven shares of common and seven shares of preferred in the new company for each ten shares held. Second preferred shareholders will receive common stock of the new company on a share for share basis. The new common is of $10 par value. Holders of the present common stock will receive one share of the new stock

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for every three shares held. The common stock of the Berkshire Corporation, a concern controlling three electrical companies operating in Lancaster County and included in the reorganization, having no preferred, will be exchanged on a share for share basis with the common stock of the new company.

The new company will have an outstanding capitalization of $6,499,360 preferred and $2,404,636 common, making a total of $8,903,996. The new preferred stock will be preferred both as to dividends and assets in liquidation, and will draw 5 per cent cumulative dividends the first two years, 6 per cent cumulative dividends for the succeeding two years, and 7 per cent cumulative dividends thereafter. It will be redeemable in whole or in part at the option of the corporation at $105.

Outlook for British Columbia Electric Railway Improved

The gross earnings of the British Columbia Electric Railway, Vancouver, B. C., for the year ended June 30, 1922, show a decrease of $124,299 as compared with the previous year, due mainly to a decrease in passenger and freight traffic. This has been offset, however, to some extent by economies in operating expenses and also by an increase in the revenue from gas and lighting, so that the net revenue showed a decrease of only $58,409. The sales of electricity constituted a record in the history of the company. The company is well equipped to take care of the demand for light and power.

J. Davidson, who presided at the meeting of the company in London on Jan. 22, explained in reading the remarks of R. M. Horne-Payne that through the purchase in 1920 of the undertaking of the Western Power Company of Canada the company had a large reserve of water-power resources available for development to meet the demands for electric power for many years to come. He said that a large increase in the volume of water at Stave Lake will be obtained by diverting the waters of Lake Allouette. In addition the company expects to be able to obtain as much as 80,000 hp. from the development of a second water power site lower down on Stave River. Plans for this development are in course of preparation.

Notwithstanding a year full of difficulties the company was able to show results which made it possible to recommend the declaration of final dividends of 18s. 8d. per cent on the preferred ordinary stock and £2 9s. 8d. per cent on the deferred ordinary stock, both free of income tax, making, with the interim dividend already paid, total dividends for the year of £4 13s. 8d. per cent free of tax on the preferred ordinary stock and £6 4s. 8d. per cent free of tax on the deferred ordinary stock.

In referring further to the annual report of the company, Mr. Davidson said that as was the case last year the revenue shown on the profit and loss account did not include any profit on exchange derived on the remittance of money from Vancouver to London, such profit being of an exceptional character. The net profit on exchange has been carried direct to the reserve fund. This is considered a wise measure because it is impossible to forecast how long the company may derive any advantage from this source. Should it become necessary to remit money on capital account from London to Vancouver before the rate of exchange becomes normal the premium on the dollar may be a disadvantage to the company, against which contingency the present profit on exchange forms a useful reserve.

In referring to the fare situation at Vancouver, of which mention has been made previously in the ELECTRIC RAILWAY JOURNAL, Mr. Davidson said that the bill which the provisional Legislature had passed to provide for the regulation of passenger rates chargeable to the company would, through the appointment of a commissioner, provide a peaceful and it was believed equitable means for the settlement of fares in any municipality or district served where the company and authorities concerned were unable to arrive at a mutual agreement.

He said that he was glad to be able to report that an agreement had been reached with the city of Vancouver establishing the fare in the city at 6 cents for a further period of three years from Nov. 8, 1922, and providing that either party should be entitled at the end of three years to have the fares then charged revised by mutual agreement or, failing mutual agreement, by arbitration.

He took occasion to express appreciation of the reasonable and fair attitude displayed by the Legislature of the province and the Council of the city of Vancouver in arriving at a settlement of these matters. He said that the announcement which he made would go far to remove the feeling of distrust with which Canadian investments are unfortunately at the present time looked upon by British investors and would make it possible when the time came to raise capital not only for the development of this enterprise but also for the other Canadian enterprises.

The company has built up at Vancouver and vicinity an enterprise at a cost of $59,000,000. He explained that the company was preparing for the benefit of the shareholders and those interested in it an illustrated booklet, as it was felt that the enterprise had grown to such an extent that many of the shareholders themselves did not quite understand the great value of the property which they own. It was expected that this booklet would be ready in the course of a few months. The intention is to send a copy of it to every shareholder.

Maine Railroad Does Better in 1922

The Cumberland County Power & Light Company, Portland, Me., experienced a good year during 1922. The surplus for the year was $368,672 as compared with $344,624 for the previous year. The deficit of the Portland Railroad, leased by the company, was $4,913 in 1922 compared with $62,796 in 1921.

The company, about Nov. 1, 1922, according to program, completed the new steam station with two 5,000-kw. units installed. This plant has operated efficiently and is altogether very satisfactory. The company is, however, still confronted with the necessity of continuing the expansion of its power

Conspectus of Indexes for April, 1923

Compiled for Publication in this Paper by

Albert S. Richey
Electric Railway Engineer
Worcester, Mass.

	Latest	Month Ago	Year Ago	Since War High	Since War Low
Street Railway Fares* 1913 = 4.84	Apr. 1923 **6.89**	Mar. 1923 **6.89**	Apr. 1922 **7.14**	May 1921 **7.24**	Apr. 1923 **6.89**
Street Railway Materials* 1913 = 100	Mar. 1923 **174**	Feb. 1923 **174**	Mar. 1922 **156**	Sept. 1920 **247**	Sept. 1921 **156**
Street Railway Wages* 1913 = 100	Apr. 1923 **207**	Mar. 1923 **207**	Apr. 1922 **212**	Sept. 1920 **232**	Apr. 1923 **207**
Steel—Unfilled Orders (Million Tons) 1913 = 5.91	Mar. 31 1923 **7.40**	Feb. 28 1923 **7.28**	Mar. 31 1922 **4.49**	July 31 1920 **11.12**	Feb. 28 1922 **4.14**
U.S. Bank Clearings Outside N. Y. City (Billions)	Mar. 1923 **15.43**	Feb. 1923 **13.22**	Mar. 1922 **12.78**	March 1920 **18.54**	Feb. 1922 **10.65**
Business Failures Number	Mar. 1923 **1,696**	Feb. 1923 **1,563**	Mar. 1922 **2,297**	Jan. 1922 **2,722**	Sept. 1922 **1,469**
Liabilities (millions)	**48.98**	**38.15**	**61.77**	**105.7**	**31.92**

	Latest	Month Ago	Year Ago	Since War High	Since War Low
Eng. News-Record Construction costs 1913 = 100	Apr. 1923 **213.5**	Mar. 1923 **205.2**	Apr. 1922 **164.7**	June 1920 **273.8**	Mar. 1922 **162.6**
U.S. Bur. Lab. Stat. Wholesale Commodities 1913 = 100	Mar. 1923 **159**	Feb. 1923 **157**	Mar. 1922 **142**	**May** 1920 **247**	Jan. 1922 **138**
Bradstreet's Wholesale Commodities 1913=9.21	Apr. 1 1923 **13.93**	Mar. 1 1923 **13.93**	Apr. 1 1922 **11.53**	**Feb. 1** 1920 **20.87**	June 1 1921 **10.62**
Dun's—Wholesale Commodities 1913 = 120.9	Apr. 1 1923 **193.1**	Mar. 1 1923 **191.2**	Apr. 1 1922 **166.3**	**May 1** 1920 **263.3**	July 1 1921 **159.8**
U.S. Bur. Lab. Stat. Retail food 1913 = 100	Mar. 1923 **142**	Feb. 1923 **142**	Mar. 1922 **139**	**June** 1920 **219**	Mar. 1922 **139**
Nat. Ind. Conf. Bd. Cost of living 1914 = 100	Mar. 1923 **159.2**	Feb. 1923 **157.5**	Mar. 1922 **154.7**	**July** 1920 **204.5**	Aug. 1922 **154.5**

*The three index numbers marked with an asterisk are computed by Mr. Richey, as follows: Fares index is average street railway fare in all United States cities with a population of 50,000 or over except New York City, and weighted according to population.

Street Railway Materials index is relative average price of materials (including fuel) used in street railway operation and maintenance, weighted according to average use of such materials. Wages index is relative average maximum hourly wage of motormen and conductors on 105 street and interurban railways in the United States, operating more than 100 passenger cars each, and weighted according to number of cars.

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capacity, owing to the rapid growth of the power and lighting business, accelerated, undoubtedly, by the high price of coal. The directors now have in contemplation several plans for proceeding with the development of power production, including among others the consideration of doubling the capacity of the new steam station immediately and adding to the hydro capacity.

The operations of the Portland Railroad improved during 1922, and despite a small falling off in gross revenue, as compared with 1921, expenses decreased, so that as noted previously the deficit for the railroad for the year 1922 was $4,913 as against $62,796 for 1921. In the cost of service of the railroad is included operation, maintenance, taxes, depreciation, interest on the bonded debt and the 5 per cent guaranteed dividend upon its common stock. The railroad therefore in 1922 earned $95,037 of the total $99,950 of dividends upon its common stock. No increases in fares were made during 1922 nor have any increases been made in the power and lighting rates, which remain on a pre-war basis.

STATEMENT OF PORTLAND RAILROAD FOR YEARS ENDED DEC. 31.

		1922	1921
Gross income		$1,668,239	$1,696,279
Operating expenses	$1,220,276		
Taxes accrued	105,328	1,325,604	1,410,402
Gross income less operating expenses and taxes		$342,635	$285,877
Deductions from income		247,598	248,723
Net income		$95,037	$37,154
Dividends		99,950	99,950
Deficit		$4,913	$62,796

The comparative combined results of the operation of the Cumberland County Power & Light Company and subsidiary and leased companies, namely, York County Power Company, Westbrook Electric Company and Portland Railroad, with inter-company items of earnings and expenses eliminated, for the years ended Dec. 31, 1921 and 1922, were as follows:

		1922	1921
Gross income		$3,467,564	$3,305,110
Operating expenses	$1,940,488		
Taxes accrued	295,077	*2,235,565	2,242,835
Gross income less operating expenses and taxes		$1,231,999	$1,062,275
Deductions from income		719,472	697,876
Net income		$512,527	$364,399
Preferred stock dividends		159,646	241,500
Surplus		$352,881	$122,899

* For the year ended Dec. 31, 1922, the sum of $229,200 was included in the item of operating expenses for depreciation.

Railway Securities at Auction

Electric railway securities sold at auction by A. H. Muller & Sons, New York, on April 26 were as follows:

$11,000 South Carolina Gas & Electric Company first mortgage 6 per cent bonds, due 1942; 72⅜ per cent.

60 shares Cities Service Company preferred B; $5¼ per share.

$8.50 Cities Service Company common cash scrip; $21.25 Cities Service Company common cash scrip; $5 Cities Service Company preferred stock scrip; $36 lot.

$4,000 Brooklyn Union Elevated Railroad Company first mortgage 5 per cent bonds, due 1950, coupons, February and August; 82¼ per cent.

Two Utah Interurban Properties Made Money in 1922

The annual statements of electric interurban railroads operating in Utah have been filed with the Public Utilities Commission. The statements showing the results for 1922, follow:

Bamberger's Electric Railroad

The Bamberger Electric reports an operating revenue of $570,000, of which $421,500 is from its passenger service and $105,500 from its freight service, with $35,000 additional from express and various small items making up the remainder. Decreases are shown in each item of revenue except from baggage, and total approximately $73,500. However, the operating expenses of $406,000 for the year show a decrease of $153,000 as compared with the year 1921.

From the net revenue from railway operations the company paid nearly $40,000 in taxes. Other principal outlays were $72,000 in interest on funded debt, $13,000 on unfunded debt, and from the balance, which was transferred to profit account, the railroad paid a preferred stock dividend of $30,000. Some other expenditures, including nearly $11,000 in adjusting accounts with the Ogden Terminal Company, left a net increase in the corporate surplus for the year of a little more than $5,000. No dividends were paid on common stock. Depreciation and operating reserves for the year were increased by about $67,000. The books indicate an investment in road and equipment of about $3,720,000.

Utah-Idaho Central Railway

The Utah-Idaho Central shows a book investment in road and equipment of $5,600,000, with a depreciation set up during the year of $12,000. Its operating revenue of $822,000 was $111,000 less than last year, while its operating expenses of $514,000 were $149,000 less than last year. The net revenue from railway operations, therefore, $308,000, was $39,000 more than in 1921. Taxes amounting to more than $70,000 were the first charge against this. The company received as contributions during the year one year's interest on certain bonds and convertible notes amounting to $37,000. Thus, the total gross income, after deducting operating expenses, was $375,000. Interest charges, however, were $311,000, so that the company realized a loss of $36,000 during the year, and paid no dividends.

The company's passenger revenue during the year, close to $350,000, was $40,000 less than in the previous year, and its freight revenue of $375,000 showed a falling off of $88,000 as compared with 1921. There was an increase of $10,000 in express revenue.

Salt Lake & Utah Railroad

The Salt Lake & Utah Railroad, generally known as the Orem Electric Railroad, made a net income of $70,383 for the year 1922, as against $29,824 for 1921. The figures show a gross income for last year of $753,797, which is $43 more than that of 1921. There is a big drop in operating expenses, however, this having been $526,278 for 1922 as against $568,715 for 1921. This leaves a net revenue of $227,518 for 1922 in comparison with $185,040 for 1921. The interest charges for 1922 were $157,136 and those in 1921 were $155,216.

Charges for amortization of discount and miscellaneous debits dropped from $15,558 in 1921 to $8,686 for 1922, and $18,087 is charged to depreciation in 1921 and $18,546 in 1922. These figures leave a balance on hand for the year 1922 of $43,151 as against a deficit for 1921 of $3,821.

Receiver Operating Property.—The St. Albans & Swanton Traction Company, St. Albans, Vt., is being operated under the direction of Receiver P. E. Sullivan.

Brooklyn Foreclosure Sale Set for May 11.—The properties of the Brooklyn (N. Y.) Rapid Transit Company are scheduled to be sold under foreclosure on May 11. This is another step in connection with the reorganization of the company.

Dividend Declared—The trustees of the Eastern Massachusetts Street Railway, Boston, Mass., have declared an initial dividend of 2½ per cent in cash on the adjustment stock. The dividend will be payable May 15 to holders of record on May 1.

Net Income of $360,095.—The Market Street Railway, San Francisco, Calif., for the three months ended March 31, 1923, reports a railway operating revenue of $2,374,439 and operating expenses of $1,696,090. The net income realized was $360,095.

Railway Buys Property.—Contracts have been made for the sale to the Public Service Corporation of New Jersey of the property adjoining its home office and railway terminal in Newark. The purchase was made to take care of the growing needs of the business.

Denies Right to Abandon Line.—The Interstate Commerce Commission recently denied the application of the Boise (Idaho) Valley Traction Company to abandon a line of railroad in Ada County, Idaho, extending from Onweiler's Junction to McDermott, a distance of approximately 4 miles.

Trustee Appointed.—The Federal court has appointed C. G. Taylor of Lima, Ohio, as trustee to reorganize the Lima & Defiance division of the former Ohio Electric Railway. The Lima & Defiance Railroad, the new company, will operate a line 42 miles long built over a private right-of-way between the two cities.

Offer Portland Bonds.—National City Company and Halsey, Stuart & Company are offering an additional issue of $2,000,000 of first lien and refunding mortgage 6 per cent gold bonds of the Portland Railway & Light Company, Portland, Ore. The price is 94½, to yield 6.45 per cent. The bonds are dated May 1, 1922, and are due in 1947.

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Traffic and Transportation

Recommends Return of Higher Fare in Seattle

In a report to the City Council, George F. Russell, superintendent of public utilities, recommends a return to the 8½-cent carfare on the Seattle Municipal Railway lines. Mr. Russell also recommended a draft on the general fund to help meet railway expenses, but the City Council refused to consider such a plan.

In the report, Mr. Russell comments on economies that he believes will greatly reduce operating expenses, among them being the use of one-man cars.

He states that forty-five cars were converted last year, and that the department hopes to convert seventy-five cars this year. The report recommends the discontinuance of the Youngstown and Ray Street shuttle, stating that it will save $17,500 a year. The report also calls attention to the law passed by the recent Legislature allowing the organization of improvement districts for the payment of street car line extensions by bond issues, and says that many neighborhoods are becoming interested in the plan, which will bring further relief to the street railway system. The cost of extensions last year is placed at $70,000.

In discussing the matter of the failure of the 5-cent fare to attract many additional riders Mr. Russell said:

> We do not believe that a single automobile owner left his car at home to ride in the cars because of this reduction. Nor is there any reason to think there has been increased interest shown by the people to stimulate increased patronage. No serious hardship has been worked upon the system by this trial, nor has anyone suffered any loss. While it is true that the rate has been in effect but forty days, there is enough evidence in hand to show the car riders are not sufficiently in favor of a 5-cent fare to ride enough to cover the loss in receipts occasioned by the drop.

Buses for New York State Railways

The New York State Railways, Rochester, N. Y., is going into the bus business in earnest. This is shown by the fact that orders for twelve buses were placed during the week ended April 21 and that on April 24 officers were elected of the Rochester Railways Co-ordinated Bus Lines, Inc., and the Utica Railways Co-ordinated Bus Lines, Inc., both recently incorporated under the laws of the state of New York.

The buses are scheduled for delivery late in June. They will be of the twenty-five passenger type, Brockway chassis with Kuhlman bodies. Five are of the trolley bus type for use on Dewey Avenue, Rochester, and seven are gasoline vehicles which will be distributed in various cities. The gasoline service proposed for Rochester is an extension of the Dewey Avenue rail line, into the adjoining town of Greece. In Utica service is planned across town, east to west, over the Parkway. Bus developments by the same interests are pending also in the cities of Syracuse and Schenectady.

Higher Fare Suggested

Committee of Shreveport Citizens Suggests Return of 8 per Cent on Invested Capital

The Shreveport (La.) Railways is entitled to a net return of 8 per cent on its invested capital. This is the opinion of a committee of citizens of Shreveport appointed by Huey P. Long, chairman of the Public Service Commission of Louisiana, to investigate the affairs of the company, and recommend action that would improve the service rendered. The committee has submitted its report to Commissioner Long.

The committee also recommended to the Mayor that an ordinance be enacted outlining regulations for the operation of jitneys and that operators be required to follow designated routes and maintain fixed schedules. A bond of $10,000 is also suggested as a requirement to be exacted from each jitney operator.

The committee's investigation was made in connection with the hearing on the traction company's petition for an increase in fares from 5 cents to 7 cents. The chairman of the committee was Major V. Grosjean.

After recommending that additional cars be placed in service on several lines and that extensions be built on the State Fair Grounds line to the United States Sheet & Window Glass Company's plant at Jewella, the committee presented an analysis of the company's earnings under the present 5-cent fare and showed what earnings probably would be under a 6-cent fare. The committee finds that for the year ended Dec. 31, 1922, the operating expenses of the company totaled $536,067. If to this sum there was added the increased operating costs arising from the proposed increase in service, the total operating cost would be $590,309. This would leave a net revenue for the company of $39,769, or a return of 1.78 per cent on the $2,244,163 physical valuation of the property now owned by the company and as increased in the recommendations for extensions.

On a 6-cent fare the committee presents the deductions that the income from 11,919,602 passengers (during 1922 the company carried 10,837,513 passengers, and it is claimed the extensions would add 1,092,089 passengers) would be $715,176; income from school tickets $32,698; income from advertisements $1,400, making total income $749,274. Operating costs for the year are estimated at $590,309. This would leave a net return of $158,965, or 7.08 per cent on the invested capital.

Gorgeous Elevated Cars in the Spring, Tra-La

The first orange colored elevated train of the Manhattan Elevated Railway, New York, N. Y., burst upon the New York sky line on April 24. For several days previous to the operation of the first repainted car whispered hints had emanated from I. R. T. creators of transit fashions that orange trimmed with black would be the *dernier cri*, as the *Tribune* put it, for elevated trains this spring.

President Hedley of the Interborough Rapid Transit Company, which operates the elevated lines under lease, explained at the time of the operation of the first newly-painted train that, after trying several shades of blue and red, orange finally had been selected as the best color to repaint all the elevated cars. It was found to be the most sanitary, he declared, and in the long run, the most economical.

The cars are being reconditioned at the rate of twenty-one a week, so that it will require nearly two years to finish painting the rolling stock now in commission. The ceilings of the cars are to be a glazed white, which will add 25 per cent to the illumination at night. There will, however, be no decrease in the quantity of artificial illumination.

Besides Mr. Hedley, the "Goldenrod," as the new trains have been popularly named, on its maiden trip carried W. L. Pepperman, vice-president of the Interborough; H. H. Vreeland, director of welfare; S. V. Smith, superintendent of elevated railways; A. L. Merritt, superintendent of subways; G. H. Pegrim, chief engineer, and other officials.

The train left Rector Street at 11:36 a.m. and went as far as 155th Street. It went at once into the regular schedule.

The writer of the account contained in the *Tribune* of the running of the new train said in part:

> The sophisticated zephyrs that ventilate the financial district became audible with astonishment yesterday when what at first sight they must have taken for a flight of yellow taxis swept grandly up the Sixth Avenue "L" tracks from South Ferry, and came to rest at the Rector Street station. It was the Goldenrod Limited!
>
> Frank Hedley, president of the Interborough, with one hand resting negligently upon the controller, which had just been relinquished to him by the motorman for pictorial purposes, stuck his head out of the cab and graciously permitted the cameramen to do their stuff. Traction officials, reporters, and a few dazed patrons of the Elevated Railroad clambered aboard. Mr. Hedley gave place to Mr. McGuire, the motorman. The Goldenrod, redolent of very fresh paint, and bearing on its brilliant sides the legend "Fresh Air Line," resumed its gorgeous progress.
>
> Notwithstanding these announcements, when the Goldenrod paused at the Eighth Street station, Greenwich Villagers were heard to tell one another excitedly that if elevated trains were to be decorated like Village tearooms that nourish Village genius, the debasement of Art—with a capital A—in America was complete. At Herald Square, a small boy informed the platform at large that the Goldenrod must be President Harding's special train, and declined to embark until promised by the guard that he would not be arrested.

The management of the Interborough company has issued a twenty-one-page pamphlet entitled "The New Rapid Transit Problem," in which it explains, in an open letter to the public of New York City, the railway's position rela-

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tive to the public needs. The company has also issued a small circular entitled "Ride on the Open Air Elevated," which will be of special interest to baseball fans as it contains a list of the ball games to be played in New York during the coming season.

It also contains a map of the I. R. T. elevated lines and other special features pertaining to the service.

Suggests Ten Rules for Safety

According to the Wisconsin Public Utilities Bureau ten safety rules suggested by studies of the cause of automobile-street railway collisions in Wisconsin have been proposed by B. W. Arnold, chairman of the electric railway section of the Wisconsin Utilities Association.

To illustrate the need of closer cooperation between users of the streets with the view of checking the increasing number of accidents, Mr. Arnold quoted statistics compiled by R. M. Howard, vice-president of the Wisconsin Railway, Light & Power Company, showing that more than 50 per cent of the street railway accidents in Wisconsin are automobile-street car collisions.

Mr. Arnold suggested that every railway send the following ten safety suggestions to motor car owners in their territory:

1. Make sure street car is not coming when starting out from the curb.
2. Do not trail street car too closely.
3. Cross crossings cautiously.
4. Be watchful of street car making curve so as not to be hit by the swing of the rear end.
5. Avoid parking cars near street car curves in narrow streets so as not to be caught "in the pinch."
6. Avoid speeding to get ahead of street car when other cars are parked at the curb.
7. Avoid crossing in rear of street car. Other cars, unseen, may be coming in the opposite direction.
8. To get ahead of street car, make sure it is well to the rear before cutting in front.
9. Observe the law and do not pass street car while it is taking on or discharging passengers.
10. When parking at curb in narrow streets, be sure there is plenty of room for street cars to pass.

Mr. Arnold said that the total number of automobile-street car accidents in Wisconsin in 1922 was 5,780; in 1918, 3,497. Further that the records show fully 90 per cent of the collisions were caused by motorists running into street cars.

Bandits Get $400 in Trolley Holdup.—Three bandits held up the crew and seven passengers of a Pittsburgh (Pa.) Railways car near West Alexander shortly before midnight on April 23. After pulling the trolley from the wire and throwing the car into darkness they robbed the occupants of the car of more than $400 in cash and jewelry.

Through Routes and Intrastate Rates Given.—The Michigan Public Utilities Commission on April 12 at Lansing reinstated its former order giving the village of Dewitt through routes and intrastate rates. The defendants in the case were the Michigan United Railways and five steam properties. The ruling of the commission follows the order of the Interstate Commerce Commission.

Traffic Survey Made.—John A. Beeler has submitted his report of the electric railway situation in New Orleans, La. He says that the present system cannot take care of the increase in territory, since no extensions have been made since 1915. Among the recommendations is a new track layout calling for the elimination of 37 miles now in use and installation by way of extensions at other points of 34 miles.

Appeals for Railway Patronage.—The Oregon Electric Company, operating in the Willamette Valley of Oregon, has made an appeal to the merchants and other business men in the valley reminding them that continued patronage of truck lines in preference to the railway will mean that the company must go into the hands of the receiver.

Extends Transfer Privileges.—The Public Utilities Commission has issued an order increasing transfer privileges between the Washington Railway & Electric Company and the Capital Traction Company in the northwest section of Washington, D. C. The order became effective on April 1. The order was in the form of an amendment to the permit under which the Washington Railway & Electric Company operates motor buses on Park Road.

Eight-Cent Fare Upheld.—As a result of a recent decision of the State Supreme Court of Pennsylvania the 8-cent fare on the lines of the Scranton (Pa.) Railway is upheld. The court approved the ruling of the Pennsylvania Public Service Commission in placing a valuation of $9,000,000 on the property as a basis for the 8-cent fare. The city of Scranton appealed against the ruling of the commission more than a year ago and this decision is the result.

Better Service Promised Improvement Club.—The Tacoma Railway & Power Company has promised a trial of fifteen-minute service on the South Tacoma Avenue line, Division Avenue to Center Street, as first fruits of the campaign for better service on the Avenue by the Tacoma Avenue Improvement Club, which started eighteen months ago. The club will endeavor to secure the routing of the Tacoma Avenue cars beyond Center Street across the bridge to South Tacoma.

Applies for Bus Rights.—The Trenton & Mercer County Traction Corporation, Trenton, N. J., has applied to the Trenton City Commission for permission to operate buses on Olden Avenue and also one line to start from the Murray Company plant in East Trenton and through Greenwood Avenue to Front and Montgomery Streets in the heart of the city. Rankin Johnson, president of the traction company, in making application before the commission said that his company was anxious to serve the people living on streets where no trolley cars were operated.

Council Rejects Bus Franchise.—The City Council of Buffalo by unanimous vote rejected the application of the International Railway for an exclusive franchise to operate motor buses in Delaware Avenue to the Buffalo city line at a 10-cent fare and 3-cent transfer charge. The City Council also deferred action on the company's application for a bus franchise in Bailey Avenue at a 7-cent fare with free transfers. Merchants and property owners along Delaware Avenue pleaded with the municipal authorities for the issuance of a bus franchise to the International Railway or any other responsible company. The City Council believed that a 10-cent fare and 3-cent transfer charge to cars of the International Railway were too high and the International was asked to adopt the universal 7-cent fare with free transfers on its bus line, the same as the local traction lines.

Fair Grounds Fare Discussed.—The decision of the Minnesota Supreme Court filed April 20 in what is known as the State Fair rate case has a bearing on the interurban fare between Minneapolis and St. Paul. The Twin City Rapid Transit Company got permission from the Minnesota Railroad & Warehouse Commission to put in a one-rate fare between Minneapolis and the State Fair grounds, 12 cents being the regular rate. The Fair ground gates are nearer St. Paul than Minneapolis and are within the one-fare zone from that city, and the city got a restraining order from Judge F. M. Catlin of the Ramsey District Court on Aug. 12, just before the Fair. It is now about eight months since the commissioners appealed to the Supreme Court for aid, and it is significant that the decision did not appear until after the Legislature decided not to repeal the state law under which the commission has the electric railway rate-making power. Notwithstanding its attitude in the State Fair rate matter St. Paul subsequently prepared a bill to make the two cities a one-fare metropolitan area, a bill which was not passed.

I. C. C. Must Pass on Interchange Book.—Inquiries having been received by the Central Electric Traffic Association from various electric carriers indicating that they might possibly wish to honor the new non-transferable interchangeable steam railroad book, the association took up the question with the Central Passenger Association to ascertain whether or not electric carriers could be made a party to a steam railroad tariff covering this ticket, and if it would be permissible for the electric carriers to honor the ticket without selling the same. The reply from Chairman Fox of the Central Passenger Association indicates that it is the individual conclusion of the members of the association that the book arrangement be not made applicable interchangeably with electric lines operating in the Central Passenger Association territory. The federal court at Boston on April 23 issued an order enjoining the I. C. C. from enforcement of its order and relieving the railroads from the obligation of placing interchangeable mileage tickets of a face value of $90 and good for 2,500 miles on sale at $72.

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Personal Items

Michigan Railroad Men Promoted

F. W. Brown New General Superintendent—All Men Promoted Have Risen from Ranks—Officers' Careers Reviewed

FOLLOWING the resignation of Harro P. Harrsen as assistant general manager of the Michigan Railroad, Grand Rapids, Mich., operating 159 miles of interurban railway, a number of changes were made in the personnel of the company. F. W. Brown, formerly traffic manager, was made general superintendent of the western and northwestern divisions; J. H. Weldon, formerly chief of the traffic bureau, was made traffic manager; O. J. Hansen, formerly chief clerk, was made superintendent of the western division; J. C. Taylor, formerly trainmaster, was made superintendent of the Northwestern division, and C. P. Gerth, formerly local freight agent, was made chief of the tariff bureau. Mr. Harrsen, it will be recalled, resigned from the company to become connected with the Electric Bond & Share Company, New York.

FREDERICK W. BROWN

Mr. Brown gained his first railroad experience at the age of twenty-two of the Michigan Railway and continued in this capacity until the amalgamation of this and the other properties into the Michigan Railway Lines, at which time he was made traffic manager of the consolidated Michigan Railway Lines. Mr. Brown remained traffic manager until the recent resignation of Mr. Harrsen. He was then promoted to the position of general superintendent of the Western & Northwestern lines of the Michigan Railroad.

Frederick W. Brown

James H. Weldon

Olaf J. Hansen

J. Claire Taylor

Carl P. Gerth

During the war he also was acting general superintendent in addition to traffic manager, and in 1920 was made acting assistant general manager owing to the enforced absence of that official. At one time, therefore, he was solely responsible for the execution of all the duties connected with these three offices.

In electric railway circles throughout the Middle West Mr. Brown is given most of the credit for demonstrating the practicability of the transportation of freight electrically. It was he who conceived the idea of developing the freight end of the business and advanced as his solution of the congestion problems which immediately presented themselves the contention that freight trains should be moved at night, when the tracks and equipage were not in use for passenger service.

Mr. Brown was born on a farm near Battle Creek, Mich., in 1871. Until he was fifteen years old he lived the usual rugged life of the early Michigan farm lad. When he had reached the age of fifteen, his parents moved to Olivet, Mich., and it was there that Mr. Brown secured his education. Shortly after his family had settled in Olivet, Mr. Brown was enrolled in the local high school and upon his graduation, four years later, he entered Olivet College, completing his course there in 1892. It was then that Mr. Brown struck out for himself and commenced railroading. Mr. Brown's sympathetic understanding, his kindliness and cordiality have made him one of the most highly respected and genuinely liked men in Middle Western electric railway circles.

JAMES H. WELDON

Mr. Weldon was born in the village of Farmer, Ohio, in 1875 and received his education there. In 1898, when he was twenty-three years of age, he, like Mr. Brown, became a telegraph operator for the Lake Shore & Michigan Southern Railway. Later, while in steam railroad work at Lansing, he as a telegraph operator. After long service with steam roads he accepted his first position with an electric railway. This was in 1907. He went to Jackson, Mich., as general freight and passenger agent for the Michigan United Railways. In 1913 he was made superintendent of the Michigan & Chicago Railroad.

Inasmuch as Mr. Brown's service since 1907 has been confined exclusively to roads which were the predecessors or forerunners of the present Michigan Railroad system, it almost may be said that he has been with his present company for sixteen years. Both the Michigan & Chicago Railroad and the Michigan United Railways later became part of the present Michigan Railroad.

In 1915 Mr. Brown was appointed superintendent of the Western Division became acquainted with Mr. Brown, and the two have been closely associated most of the time since then.

In 1909 Mr. Weldon entered electric railway work with the Michigan United Railways as chief clerk in Mr. Brown's office, remaining there until September, 1913. At that time the Allegan division was taken over from the Michigan Central and Mr. Weldon was made chief of tariff bureau, which position he occupied until his promotion to traffic manager of the present Michigan Railroad in December, 1922.

Mr. Weldon is considered by his associates an unusually thorough student of traffic and tariff problems. The institution of various Interstate Commerce Commission rulings and the formulation of other problems relating to this phase of the business have re-

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quired the utmost application and care in their solution and Mr. Weldon's disposal of them has been considered particularly efficient.

OLAF J. HANSEN

Mr. Hansen was born at Holland in 1884. In 1906, after graduating from high school, he entered the employ of the Grand Rapids, Holland & Chicago Electric Railway as a motorman. He was promoted successively to the position of bonding foreman, then carhouse foreman and later inspector. Until 1916 he occupied the last mentioned position, and then was made trainmaster of the Northwestern division of the Michigan Railway lines. Following the signing of the armistice Mr. Hansen, who in the meantime had entered military service, returned to Michigan and resumed his connection with the Michigan Railway as trainmaster of the Western division of the Michigan Railway lines.

After a short period of service in this capacity, he was appointed assistant to H. P. Harrsen, who then was assistant general manager of the Michigan Railway lines. Following the reorganization in December, 1922, Mr. Hansen became superintendent of the Western division, which office he at present occupies, working under General Superintendent F. W. Brown.

Among his associates Mr. Hansen has the reputation of being a "crank" on schedules, insisting always that his trains get off right on the dot unless strict adherence to the timetable is impossible.

J. CLAIRE TAYLOR

Mr. Taylor was born on a farm in Allegan County, Michigan, in 1881. He started railroading as a motorman on the Grand Rapids, Holland & Chicago electric line, where he made Mr. Hansen's acquaintance and they became warm friends. Mr. Taylor served also as conductor on this line.

In 1910 he was made train dispatcher on the Grand Rapids, Holland & Chicago line, which office he occupied until 1913, when he was promoted to the position of trainmaster. After three years as trainmaster, Mr. Taylor left the service of the railway to accept a position with the United Motor Company of Grand Rapids, remaining with that company until 1918. He then reentered the employ of the interurban and was made train dispatcher on his old division. Two years later he again was appointed trainmaster and served in this capacity until his promotion to the position of superintendent of the Northwestern division, in January, 1923. All of Mr. Taylor's railway experience was acquired on the Grand Rapids, Holland & Chicago Railway, which now is a part of the system he superintends.

CARL P. GERTH

The village of Troy, Ind., was Carl P. Gerth's birthplace and 1893 was the year of his birth. After attending high school and business college he returned to Troy and entered the employ of the Southern Railway as a helper. In 1913 he was promoted to the position of switch clerk on the Southern Railway system and was stationed at Evansville, Ind. From this point his advancement was rapid. In 1914 he was made chief rate clerk for the Southern at Evansville and in 1915 was appointed chief correspondence clerk to the general freight agent of the Southern (Lines West) and was stationed at Cincinnati. In 1916 he left the Southern to become office manager for the Walsh Baking Company at Evansville, Ind. In 1917, however, he again felt the urge to get back into the game and he entered the employ of the Michigan Railway lines as relief agent at various points on the system. Three months after accepting this position Mr. Gerth was made joint freight agent for the Michigan Railway and the Detroit United Railway at Jackson.

In August, 1917, Mr. Gerth enlisted in the engineering corps of the army in the outfit with Mr. Hansen. After being discharged, Mr. Gerth returned to the Michigan Railway lines and was made district freight agent at Grand Rapids, being promoted in July, 1918, to the position of freight agent for the Michigan Railway lines in that city. Mr. Gerth continued in the office of freight agent until January, 1923, when he was made chief of the tariff bureau of the Michigan Railroad.

New Vice-President and Superintendent at Toledo

J. Frank Johnson, who has lately been appointed vice-president and general superintendent of the Community Traction Company, Toledo, is perhaps one of the youngest electric railway executives in the country.

J. Frank Johnson

He was born at Guthrie, Okla., on Aug. 5, 1890, and spent his boyhood there and at Muskogee. Before his college career he worked in all about three years as a conductor and motorman on some of the small properties at home.

Mr. Johnson is a graduate of the "cadet school" of the Doherty organization, having gone to Toledo about July 1, 1916, at the completion of his work at the University of Wisconsin, where he was graduated with the degrees of Bachelor of Science and Electrical Engineer.

From Toledo he went to Durham, N. C., and served as railway engineer with the Doherty traction property there for about a year. He was then transferred to Bartlesville, Okla., where he served as superintendent of railways for a few months. His next promotion took him to the New York offices of Henry L. Doherty & Company, where he worked as assistant railway engineer under R. F. Carbutt for a period of about six months.

In the fall of 1920 he became vice-president and general manager of the Toledo & Western Railroad, an interurban property operating between Toledo and Pioneer, Ohio, and with a branch to Adrian, Mich. When the road was petitioned into receivership on Dec. 31, 1920, he was made one of the receivers, serving through a period of critical operations, involving a strike of platform employees, until his new appointment to head the Toledo properties on April 1.

Mr. Johnson will have almost full charge of the operations of the Community Traction Company, as President Frank R. Coates spends almost all of his time in New York now.

He will rush through a schedule of $500,000 of improvements this summer and will then make preparations for carrying out $1,000,000 of new construction, extensions and betterments, as provided for in the Milner ordinance, to be undertaken in the next two and one-half years.

Dinner Tendered O. H. Simonds

O. H. Simonds, who recently resigned as vice-president and general manager of the Dubuque (Iowa) Electric Company to become connected with the Electric Bond & Share Company, New York, was the guest of honor at a farewell dinner party given by a number of his business and other associates at the Julien Dubuque Hotel. About thirty-five business and professional men attended the dinner party. In addition to Mr. Simonds, the Dubuquers had as their guests his successor, Thomas Parker, and J. Sullivan, representing the owners of the local electric company. At the conclusion of the meal Mr. Simonds was presented with a watch, chain and knife. A number of short talks were then made by the Dubuquers, who expressed their regret at Mr. Simonds' departure. Mr. Sullivan said that the owners of the Dubuque property were, indeed, sorry to lose the services of their Dubuque manager. Mr. Parker, the new manager, also made a short speech. In his remarks he referred to the plans of the company looking toward the matter of keeping abreast with the growth of the city.

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W. Nelson Smith Honored for Research Work

Early in February it was announced that the Engineering Institute of Canada had honored W. Nelson Smith, M.E., consulting electrical engineer of the Winnipeg (Man.) Electric Railway, and Dr. J. W. Shipley of Manitoba University by placing their research paper on the self-corrosion of cast iron at the head of the meritorious papers presented during the year 1921-22.

Now comes the announcement that the council of the Institute had accepted the report of another committee, awarding to Mr. Smith and Dr. Shipley the Plummer Medal, offered each year for the best paper presented to the institute on a metallurgical or chemical subject, by reason of their two papers presented during 1921 and 1922 dealing respectively with the self-corrosion of cast iron and of lead.

The thoroughness of the proof that cast iron and lead pipes are subject to self-corrosion when buried in soils carrying certain salts, without any help from electric railway stray currents, has now been noted by three separate committees of the Engineering Institute of Canada.

W. A. Whitney has been relieved of the duties of purchasing agent of the Utah-Idaho Central Railroad, Ogden, Utah. He will continue as general manager. The duties of purchasing agent are being performed by A. L. Carpenter. F. L. Whitney is traffic manager of the company.

Mrs. Mabel Knight Roberts, secretary to G. J. Kuhrts, general manager of the Los Angeles (Calif.) Railway, recently celebrated her silver anniversary of service with the company and was honored with presents from executives of the railway. Mrs. Roberts has the distinction of having been secretary to every general manager the company has had.

C. D. Smith Made Superintendent of Beaver Valley Local Lines

W. H. Boyce, general manager of the Beaver Valley Traction Company, New Brighton, Pa., has announced the appointment of Clinton D. Smith of Youngstown, Ohio, as superintendent of the local lines. Mr. Smith has entered upon his duties with the Beaver Valley Traction Company and has been assigned offices at the Junction.

Mr. Smith was born in Harrison, N. J., on June 27, 1888. His early education was received in the public schools. Graduating from high school, he matriculated at the Worcester Polytechnic Institute, Worcester, Mass., in the department of electrical engineering, and was graduated in 1912.

Immediately afterward he became associated with the Public Service Railway of New Jersey, pursuing the railway engineering course of that company. Upon completion of the course he engaged in the duties of traffic investigator.

Mr. Smith remained with the Public Service Railway till 1916, when he accepted a position with the Pennsylvania-Ohio Electric Company, Youngstown, Ohio, as superintendent of schedules and traffic. He was promoted to superintendent of transportation in June, 1917, and to general superintendent in January, 1919.

As general superintendent Mr. Smith has been in charge of transportation, including interurban and city electric lines and interurban motor coach operation, traffic and the freight department. In the same capacity Mr. Smith has engaged actively in safety work, the promotion of good public and municipal relations and in cases coming before state utility commissions and the Interstate Commerce Commission.

C. D. Smith

F. H. Richmond has taken on the duties of general manager of the Lawton Railway & Lighting Company, Lawton, Okla., in addition to those of secretary and treasurer. He was formerly vice-president, secretary and treasurer. The position of general manager had previously been held by B. R. Stevens, who was also president and purchasing agent. Mr. Stevens continues in the capacity of president and purchasing agent.

Obituary

Joseph S. Goodwin

Joseph S. Goodwin, general manager Department of Street Railways, City of Detroit, Mich., died of heart disease at his home in that city on April 23. Mr. Goodwin was forty-six years old. Last November he was granted six months' leave of absence by the commission in the hope that the respite from active work would benefit his health, but he failed to improve during the winter months.

The squabbling with the Detroit United Railway forces in the early stages of the effort to establish the first municipal lines bore down heavily upon Mr. Goodwin. He was not built for battle. He was essentially a doer, and the truculent fighting left its mark upon the man. Then came the taking over of the private lines and the myriad of problems and added responsibilities that went with them. Mr. Goodwin had a great physique, but there are strains to which even a man so well endowed physically will succumb. He ignored the first signs of fatigue, only to be later prostrated and compelled temporarily to relinquish his active duties. Gradually, it was borne in upon Mr. Goodwin's friends that it was very unlikely he would ever be able actively to participate in business again; but even to those closest to him it was not suspected that he was fatally ill. Announcement of his death will, therefore, come as a great shock to his many friends.

Mr. Goodwin was engaged to work for the city of Detroit when the plans were being put through for building the original municipal railway system there. The brunt of the planning for this work fell upon him. Later when the arrangements were perfected under which the city took over all the local lines of the Detroit United Railway on May 15, 1922, he was made responsible for operating the entire local system. Some of the trying experiences that went with the work of planning for the construction of the original municipal system in Detroit were reviewed in the course of a personal on Mr. Goodwin in the ELECTRIC RAILWAY JOURNAL for May 20, 1922; but they were in a sense as nothing compared with the task that suddenly came upon him when he took over the lines of the private company. Among these problems was the one of selecting the personnel for the enlarged system of more than 375 miles of track. As a matter of fact, there was a dearth of men of real talent willing to become associated with the municipal enterprise, but Mr. Goodwin and those associated with him finally succeeded in mustering a competent personnel. It was his ambition to make the Detroit municipal system a success measured by the same standards as employed by private companies. He was not prone to follow the usual municipal practice of covering up losses. His plan was to introduce economies that would result in actual success, if such a thing were possible. Hence, few things have been overlooked on the Detroit Municipal Railway that would improve operating efficiency. And whatever measure of success has been attained may be credited largely to him.

Mr. Goodwin started railway work as a motorman back in 1895 on a Massachusetts property. Then he moved to Rhode Island and did the same kind of work. In 1901 he was a motorman with a road in Connecticut. Soon thereafter he became a dispatcher. Later he became manager of the Hartford & Springfield Street Railway at Warehouse Point, Conn. In 1917 he was made manager of the lines of the Connecticut Company in Bridgeport and continued in that capacity up to the time of his appointment to the Detroit post in July, 1920.

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Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

United States Leads in Export of Steel Rails

Since the war the United States has become the largest exporter of steel rails. Before the war Germany was the leading exporter of steel rails and the United Kingdom was second. Since that time the exports from these two countries have been markedly curtailed, leaving the United States in the lead with 71 per cent of its pre-war export tonnage. German productive capacity appears to have been impaired for some time to come, but British exports have been increasing steadily since 1919, while those from the United States have been decreasing, so that it is not impossible that the United Kingdom may soon again forge ahead of the United States as an exporter of rails.

In commenting on the situation the National Bank of Commerce of New York points out that up to about the beginning of the century the United Kingdom was easily the dominating figure in the international rail trade. Until the outbreak of the war, British exports had declined only slightly but those of the United States and Germany had increased, particularly the latter, in the years just before the war. From 1908 to 1913 German exports increased from 331,323 to 500,835 metric tons, or 51 per cent, while United States exports increased only 27 per cent from 1900 to 1913.

Formerly Argentina was Germany's chief customer, although neighboring countries of Europe were important buyers. Since the war the bulk of Germany's rail exports have gone to European countries. North Russia has been a large purchaser, and the great disorganization and destruction of Russian railways indicate that that country may be expected for some time to furnish an extensive market for rails, which Germany is conveniently located to supply.

The destinations of British exports of rails show that India continues to be by far the largest customer and 1922 purchases were in excess of the pre-war average, representing over two-fifths of total British exports as compared with less than a fourth in the pre-war years. Ceylon is the only other country enumerated which showed an increase in 1922 over the pre-war years. Exports to Argentina in 1922 were one-eighth of the pre-war average. British possessions account for the bulk of the rail exports of the country.

Japan has superseded Canada as the chief customer of the rail export trade of the United States, taking in 1922 about half of the total exports of rails. Cuba is the second largest buyer, and Canada third.

These countries are all conveniently located with relation to the United States market. Exports to Japan for the year 1922 were over four times as great as the pre-war average, while those to Canada were only a little over one-quarter and to Cuba a little over four-fifths as great. There has been a very marked falling off in exports to Argentina, Australia, Mexico, Brazil and Chile, and an increasé in exports to Honduras and the United Kingdom.

There has been a change not only in the sources of rail exports since the outbreak of the war but in the chief consuming countries as well. Japan and British India are now the leading import markets. Coupled with the increase in Japanese purchases in the American market has been a marked falling off in Argentine and Australian purchases in the three countries mentioned. Indian purchases were about the same in 1922 as in the pre-war years.

British Electric Locomotives for Japan

In 1921 the Japanese State Railway authorities ordered two 59-ton freight electric locomotives from each of four firms, two American, one Swiss, and one British, the last being the English Electric Company. In June last year a contract was placed with the last-named company to supply thirty-four electric locomotives, these being the whole number required for the electrification program of the Japanese government up to the end of the year 1923. The shipping of the locomotives began in February last and will be completed by August next. This is said to be the largest contract for electric locomotives which has yet been carried out entirely by British manufacturers. The mechanical parts were built by the North British Locomotive Company, Glasgow, and the electric equipments were constructed at the Dick-Kerr Works and the English Electric Company, at Preston. Out of the total number, seventeen are for freight service, nine for local passenger trains, and eight for express passenger service. The two former types are similar except in the gear ratio, which is adjusted to give for the former a maximum speed of 40 m.p.h., and for the latter 53 m.p.h. All are for 3-ft. 6-in. gage track. These machines are of the 0-4-4-0 type and weigh 59 tons each. The trucks are articulated, so that the drawing and buffing stresses do not go through the superstructure. Direct current at 1,500 volts, with overhead wire conductors, is used, and this is taken by four motors per locomotive of 306 h.p. each. The motors are arranged in groups of two in permanent series. The control is of the English Electric Company's electrically operated cam shaft type, which provides series and parallel control and also two field shunting notches. Two or more locomotives can be coupled and worked on the multiple-unit principle. The express locomotives are of the 4-6-6-4 type. Each weighs 96 tons, and has six motors of 306 h.p. each. They are arranged in groups of two in permanent series.

Westinghouse Entertains McGraw-Hill Editors

Realizing the better service technical editors can render to their industries by closer knowledge of manufacturing problems and accomplishments, the Westinghouse Electric & Manufacturing Company entertained a group of McGraw-Hill editors at the East Pittsburgh works on April 23. Arrangements were made to give each editor the opportunity to see those engineers of the company who are handling the work in which he was particularly interested. Special shop visits were also arranged so that the editors could see equipment in course of construction. A luncheon and dinner afforded further opportunity for the editors and company engineers to get better acquainted and discuss problems of mutual interest. One or more editors from each of the fourteen McGraw-Hill papers were present.

First Electrically-Operated Train on Chilean Railway

With President Alessandri of Chile at the controller and the American Ambassador as a passenger, the first electrically-operated train on the Chilean State Railways made a successful trip on April 17 from Santiago to Tiltil and return.

This is the first step in the electrification of the 144 miles of Chile's railway, work on which is in active progress. The order for the apparatus, including thirty-three locomotives and equipment for three substations, was awarded to the Westinghouse Electric & Manufacturing Company in 1921. The contract totaled $7,000,000.

Metal, Coal and Material Prices

Metals—New York	April 24, 1923
Copper, electrolytic, cents per lb	16.75
Copper wire base, cents per lb	19.625
Lead, cents per lb	8.00
Zinc, cents per lb	7.37
Tin, Straits, cents per lb	45.50
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	6.25
Somerset mine run, Boston, net tons	3.175
Pittsburgh mine run, Pittsburgh, net tons	2.00
Franklin, Ill., screenings, Chicago, net tons	1.95
Central, Ill., screenings, Chicago, net tons	1.575
Kansas screenings, Kansas City, net tons	2.625
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft	7.75
Weatherproof wire base, N. Y., cents per lb.	19.50
Cement, Chicago net prices, without bags	$2.20
Linseed oil (5-bbl. lots), N. Y., per gal	$1.20
White lead, (100-lb. keg), N.Y., cents per lb.	13.375
Turpentine, (bbl. lots), N.Y., per gal	$1.46

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Rolling Stock

Elmira, Corning & Waverly Railroad, Waverly, N. Y., suffered by fire the loss of its main carhouse at South Corning on April 23. The loss is approximately fixed at $50,000. One car valued at $12,000 was lost with the repair shop, store room and machine shops.

Terre Haute, Indianapolis & Eastern Traction Company, Terre Haute, Ind., experienced a fire of undetermined origin which destroyed its carhouse at Richmond, Ind., on April 22. Fifteen cars were destroyed. The loss is more than $80,000. The carhouse for the interurban cars a short distance from the city was not damaged. Robert I. Todd, of Indianapolis, president of the company, sent several one-truck cars from the Indianapolis lines to be used temporarily at Richmond. The company recently put into service several new one-man cars at Richmond and was preparing to build others.

Pacific Electric Railway, Los Angeles, Calif., has placed on order for fifty additional multiple-unit cars for use in the Hollywood service. In the March 31 issue of the ELECTRIC RAILWAY JOURNAL, pages 561 and 562, there was a description of the new type of cars recently purchased by this company and placed in service on its Hollywood lines in Los Angeles. The new outlay of equipment will cost $887,000, and will be identical with the type of new equipment recently placed in the Hollywood service. The order, which was placed on April 19, calls for earliest possible delivery. In December, 1922, delivery of fifty new cars for the Hollywood service was completed. These cars have proved so satisfactory and the Hollywood district has been growing so rapidly that the company found it necessary to purchase fifty more cars to improve and maintain the class of service the company is desirous of giving its patrons. With the cars ordered on April 19 it will involve a total expenditure of $1,837,000 for the new equipment to serve the company's Hollywood patrons during the past year. They are equipped with four 50-hp. motors, seat sixty-five passengers, are unusually long and wide, and can be operated either in single units or in two or three-car trains. During the rush hours they are now operated in two-car trains, but upon completion of the company's new Hollywood subway for purposes of giving rapid transit between Los Angeles and Hollywood, it is planned to operate this type of new equipment in three-car trains during the peak hours.

Track and Roadway

Spokane (Wash.) United Railways will rebuild and realign 5,400 ft. of the Rockwood car line to conform to the new grade and improvement of the southeast highway connection.

Union Traction Company of Indiana, Anderson, Ind., announces that it will this summer relay its tracks with concrete on Washington Street in Marion from Fourth Street to the Pennsylvania Railroad. Work will start in a short time. Other improvements will be made by the company later.

Trenton & Mercer County Traction Corporation, Trenton, N. J., may be asked to extend its line on Hamilton Avenue from Olden to Johnston. A petition has been presented to the Mercer County Board of Freeholders asking for this improvement. The board laid the matter over. The proposed line is less than a half mile in length.

San Diego (Calif.) Electric Railway will extend the Mission Beach line from the Santa Fe station to the north end of Mission Beach, a distance of 8.08 miles. Type of construction is as follows:

Track—Double track, using 75-lb. A.S.C.E. rail with continuous joints, tie plates, redwood ties and crushed rock ballast.

Bridges—Two steel through girder bridges, 100 ft. in length, to give overhead crossings over principal highway to Point Loma, known as Tide Street, and across the main line of the Santa Fe Railway. The balance of the bridges to be open-deck pile trestles, using creosoted piling. All bridges designed for Cooper E-50 loading.

Overhead Trolley—Double pole construction from Santa Fe station to mile 3, and center pole from mile 3 to mile 6, double-pole construction from mile 6 to mile 8.08, using wood and tubular steel poles with catenary type of construction for the use of pantograph trolleys.

Distribution System—Feeder line from power station to end of line with booster substation at approximately mile 6 to permit operation of six-car trains with a five-minute headway.

Power Houses, Shops and Buildings

Pacific Electric Railway, Los Angeles, Calif., will shortly begin on the interior alterations of the Pacific Electric Building. The work involves an expenditure of approximately $375,000.

Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind., has disposed of all the machinery, boilers and dynamos in the plant of the old West Indiana Utilities Company, at Brazil, which was taken over by the Terre Haute, Indianapolis & Eastern Traction Company several years ago. The plant is now being converted into a storage house. The company is rebuilding the high-tension line between Brazil and Terre Haute.

Dubuque (Ia.) Electric Company has just completed the construction of an addition 58 ft. x 67 ft. x 68 ft. to its boiler room and has installed two new 776-hp. Heine water-tube boilers with Riley underfeed stokers. The total cost was approximately $250,000. In addition a new concrete chimney has been built having an over-all height of 268 ft. and an inside diameter at the top of 13 ft. and inside diameter at the bottom of 16 ft. This installation has been made necessary by the increasing use of electricity locally and is the first step toward the complete rebuilding of the old boiler room.

United Light & Railways Company, Grand Rapids, Mich., and interests are considering the erection of a new $1,750,000 central station in the "Tri-Cities." A $308,000 turbine of 20,000-kw. capacity has been ordered for this new plant, delivery to be made in March of next year by the Westinghouse company. Condenser equipment to cost approximately $83,000 to be used in the new plant has been ordered of the C. H. Wheeler Company of Philadelphia and delivery in February of next year is expected. Negotiations are now under way for the purchase of $500,000 of additional equipment to serve Davenport, Iowa; Moline, Ill.; and Rock Island, Ill.

Trade Notes

American Copper Products Corporation, New York, N. Y., has removed its general sales offices to the twenty-sixth floor, Woolworth Building, New York.

Dwight P. Robinson & Company, Inc., New York, N. Y., announces the opening of a Philadelphia office. The new office will be under the direction of Carl A. Baer, member American Institute of Electrical Engineers, who was recently with the firm of Baer, Cook & Company, engineers, and a consulting engineer in the design of industrial, textile and power plants.

Aurora, Elgin and Chicago Railroad, Aurora, Ill., has recently placed an order for forty safety car equipments and 7 four-motor equipments for use on light-weight interurban cars. General Electric 264 motors were specified for the safety cars and the interurban equipments will be four General Electric 265 motors. The purchase of the new equipment is in line with the policy of its management to furnish up-to-date service and to take advantage of every plan to reduce operating expenses.

Georgia Railway & Power Company, Atlanta, Ga., has recently placed an order for twenty four-motor car equipments for use on light-weight double-truck cars. This is a duplicate of the order placed about a year ago. The equipment specified consists of General Electric 265 motors with B.C. type control arranged for train operation. This railway company has found train operation successful and this order is to extend that service. The cars will be built in the railway's shops.

M. M. Marcus, E. M. Met. E., has resigned as vice-president and general superintendent of the Rhode Island Malleable Iron Works to become associated with the Gulick-Henderson Company, engineers, metallurgists and chemists, as consulting engineer in charge of their foundry department. His entire time will be devoted to consulting foundry engineering. He will also continue to serve on the committee on molding sand research and the subcommittee on conservation and reclamation of molding and core sand of the National Research Council.

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Parana, Argentine

Universal Service

The low operating cost, modern equipment, and the increased revenue resulting from their more frequent service has resulted in the universal introduction of lightweight Birney Safety Cars. In the United States, Canada, Mexico, Brazil, Argentine, Colombia, Holland, Manchuria and Australia, it is being demonstrated that with the little Birney Safety Cars more service can be furnished to the public at less cost.

Pelotas, Brazil

Petropolis, Brazil

THE J. G. BRILL COMPANY
PHILADELPHIA, PA.
AMERICAN CAR CO. ST. LOUIS MO. — G.C. KUHLMAN CAR CO. CLEVELAND, OHIO. — WASON MANF'G CO. SPRINGFIELD, MASS.

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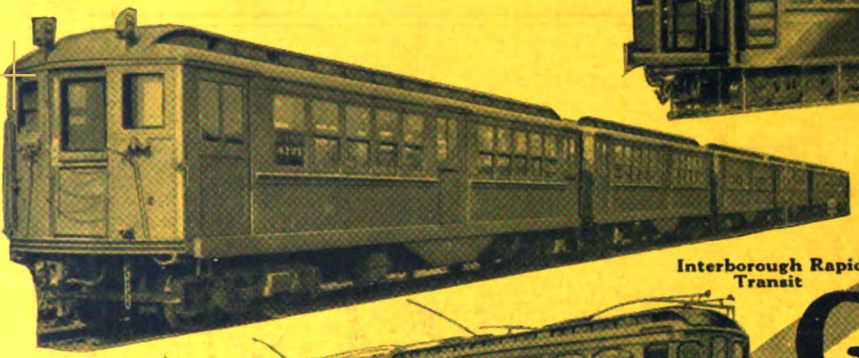
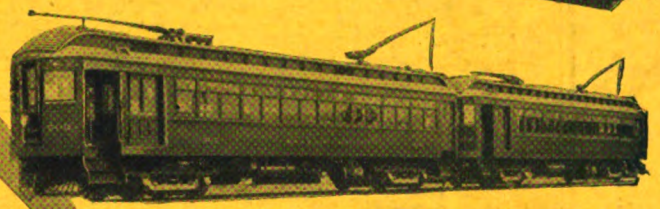
Boston Elevated

Chicago Elevated



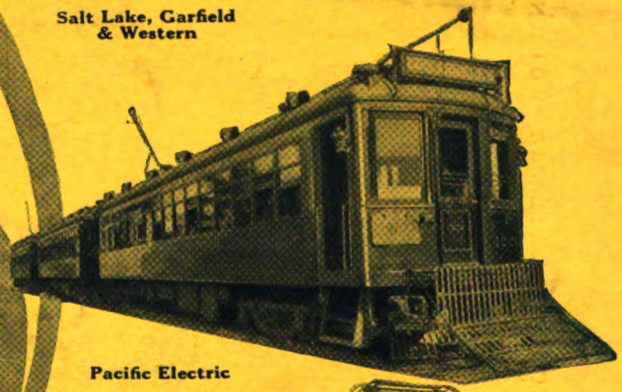
Interborough Rapid Transit

Washington, Baltimore & Annapolis



Salt Lake, Garfield & Western

Hudson & Manhattan



Pacific Electric

Southern Pacific

New York Central

Victorian Rys.

G-E Multiple-Unit Control

Nearly a quarter of a century has passed since the General Electric Company introduced the first multiple-unit control. The new control was designed for rapid-transit elevated and subway service, which could not have become a commercial and operating success without it.

Today G-E multiple-unit control goes far beyond these applications—used in the operation of street cars in two- and three-car trains and in the great suburban electrifications, making possible the handling of densities of traffic undreamed of years ago.

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MEMBER AERA

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ELECTRIC RAILWAY JOURNAL

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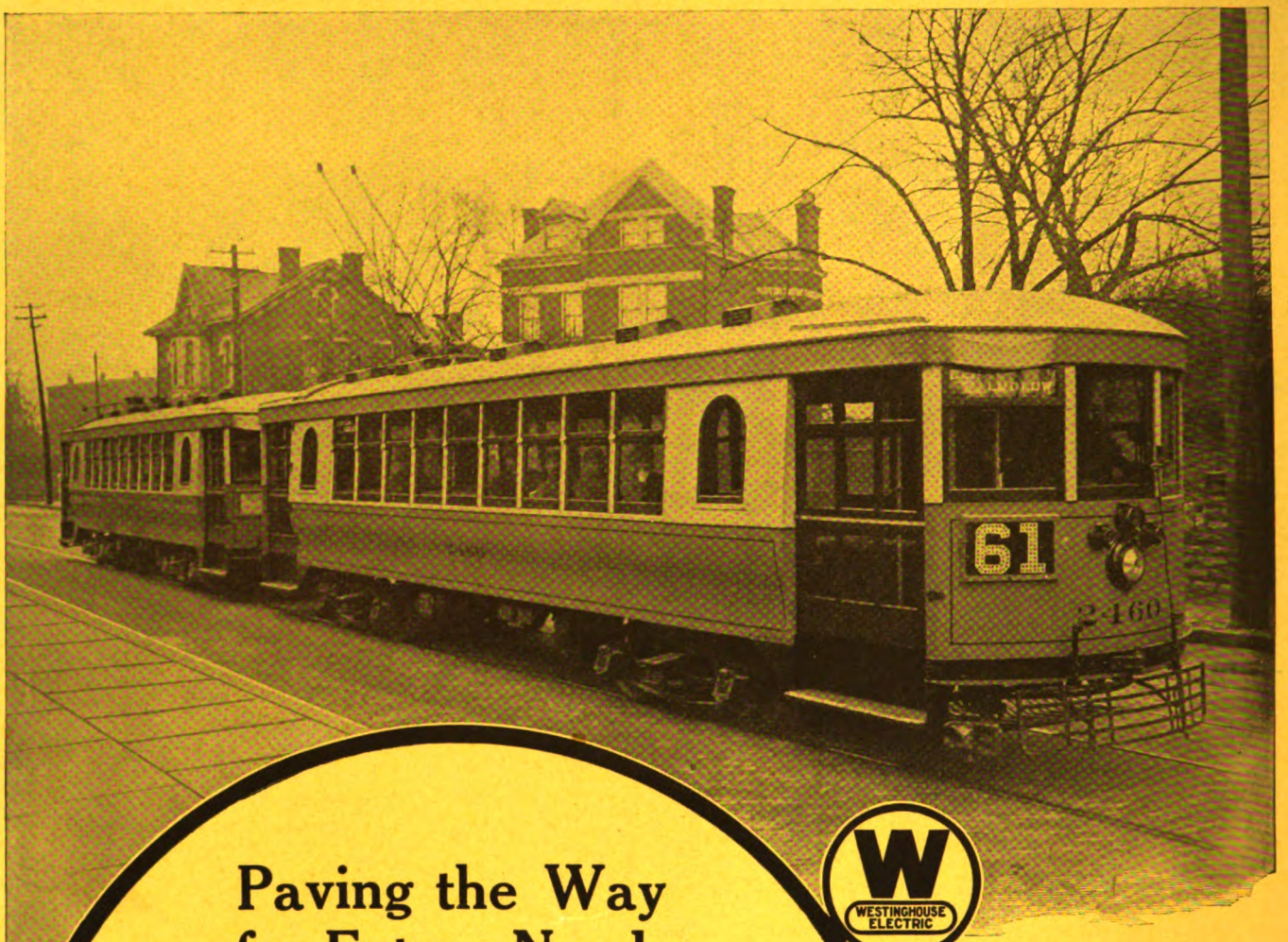

Paving the Way for Future Needs

Track capacity is, primarily, limited by the number of car units and possible headways.

With train control track capacity may be very materially increased without interfering with schedules.

The illustration shows one of the Two-car Trains now being operated by the Cincinnati Traction Company equipped with Westinghouse No. 510 Motors and HL Control.

Westinghouse Electric & Manufacturing Co.
East Pittsburgh, Pa.

W WESTINGHOUSE ELECTRIC

Train Operation in City Service

No, 510, Thirty-five H.P. Motor

MEMBER AMERICAN ELECTRIC RAILWAY ASSOCIATION AERA

Westinghouse

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New York, Saturday, May 5, 1923

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Company, Inc.

HENRY W. BLAKE and HARRY L. BROWN, *Editors*

Volume 61
Number 18

Selling Transportation Is More than a Mere Advertising Slogan

SO MUCH has been said about "selling transportation" that there is some danger lest the practical railway man shall come to regard the idea as a mere advertising catch-phrase. But the experience of the Binghamton Railway, described elsewhere in this issue, proves again that there is a great deal more to the idea than that. By a carefully planned policy of giving the public real service this company has achieved an enviable popularity.

Two main points of their policy stand out. In the first place, bright and attractive looking cars, well heated, well lighted and well ventilated, have encouraged riding. In the second place, the point of view of "How will it affect the passenger?" has served to eliminate many of those little things that keep the public antagonistic.

It seems that some electric railways do not concern themselves with the psychology of the passengers. Cars are delayed at the carhouse while crews are changed or trainmen draw their pay. Cars are pulled in for inspection or minor defects and the passengers forced to change. Stops for collection of second fares occasion annoying delays. Too many "special" cars run by waiting people. While none of these things is particularly important in itself, there is usually no compelling necessity for them, and all together they form a series of irritating "little things" that dispel the friendly feeling engendered by service with dispatch. If the railway hopes for the beneficial results that follow a well-directed campaign of "selling transportation" it must not forget to iron out such little annoyances as these.

Cars Built for Comfort and Convenience

THE London Underground Railway is trying out six sample cars in its tube service which were built by six different manufacturers. While many electric railway operators in the United States will think that the attention given in the design of these cars to luxurious furnishings and provisions for reducing noise was needlessly great, there are nevertheless many features worthy of consideration by American designers, particularly for cars to be used in interurban and rapid transit service where the ride is long and where comfort and attractiveness are important factors in inviting riders.

A brief summary of the details of construction, together with the interior illustrations, given in this issue, show the results that have been accomplished by the various builders. Probably no finer cars of this class have ever been built. The measures taken by the designers to reduce the noise resulting from the operating of steel cars in an inclosed tube are particularly interesting. Wheels have been shrouded with various materials. Windows have been reduced in size and window frames done away with to eliminate rattling and minimize the noise or vibration transmitted through the glass. The car bodies are sound insulated, and this feature has also been extended to the framing of the seats. That much has been accomplished is evident from the comparison of the sound photographs reproduced with the article. It is stated that a marked difference in noise is noticeable by walking from one of the new cars into another on which no special precautions have been taken to reduce noise.

In the material used the large amount of rolled sections is particularly noticeable. The seating is longitudinal throughout, but special barriers are provided at the entrances so as to shield passengers from drafts. Various lighting arrangements have also been tried and the lighting fixtures embody attractive designs.

Some of the British designers consider that the industry has been standing still for years in respect to rolling stock and that improvement in design and construction is now essential.

Electrification Gets a New Impetus in Virginian Railway Project

THE announcement of the Virginian Railway this week that it has let contracts for the electrification of 213 miles of track in the Blue Ridge mountains may be considered an epoch in heavy transportation. This railroad, in its brief existence of fourteen years, has developed a traffic in heavy freight equaled by few roads. In order to move this immense volume trainloads of 5,500 tons have been hauled at speeds of about 7 m.p.h. by three of the heaviest Mallet locomotives. Even this has been insufficient to care for the growth of the business, and electrification has been resorted to as the only solution, for by it the trainloads can be increased to 9,000 tons, and the speed to 14 m.p.h. Indeed, it is anticipated that the trains can be as great as 12,000 tons when the system is fully equipped.

Full details have not yet been worked out, but the system will be operated with a single-phase trolley at 11,000 volts. This is to be stepped down by transformers along the route from an 88,000-volt transmission line. Power will be supplied by a 90,000-hp. generating plant to be erected on the New River. The decision to employ single-phase trolley on such an important project as this is significant, if considered from the viewpoint of a possible trend toward standardization of the trolley system. With agreement of engineering opinion on no more than this one thing, electrification work would go forward on a much more sound basis, as motive power could then be operated on any line regardless of the kind of equipment used on any particular locomotive.

The paper presented at the spring convention of the American Institute of Electrical Engineers by A. H.

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Babcock of the Southern Pacific Railroad gives another phase of the electrification problem. Tests made on oil-burning engines on this road indicate a higher fuel economy than is accredited to steam locomotives by some electrification proponents. Mr. Babcock's deductions from these tests were criticised in the discussion. But there can be no issue with his major proposition that electrification may be desirable for many other reasons than economy. No better proof of this could be cited than the decision of the Virginian to spend $15,000,000 for its Blue Ridge project, which is primarily for the purpose of increasing the capacity of the road.

Why Are Anti-Friction Bearings Not Used on More Electric Cars?

AS A PIECE of machinery containing many bearings, the electric car has been carefully studied for a long time by bearing experts with a view to providing it with the best possible bearings. The ordinary sleeve bearings used on the motors and air compressors, and the journal bearings are satisfactory from considerations of simplicity and cost, but they have their limitations in regard to friction and durability. Hence, from the early days of the electric railway attempts have been made to produce anti-friction bearings which would not only cut down energy consumption but would increase bearing life. Bearings of a high degree of mechanical perfection have been produced for this purpose, but so far hardly a start has been made in convincing electric railways that they are successful in this field. However, the success of anti-friction bearings in the automobile and manufacturing fields indicates that they ought to have great possibilities on electric railway cars.

As far as friction reduction is concerned, there is no question as to the ability of the anti-friction bearing to cut costs. The article in the issue of this paper for April 21, giving results of tests made on electric car roller bearings in England, demonstrates this clearly. Such additional proof, however, is hardly necessary because the same thing has been shown time and time again by tests made in this country. Why, then, if ball and roller bearings are so nearly frictionless, have they not made more headway in the electric railway industry?

The first handicap which the anti-friction bearing has had to overcome is that of high first cost. By its very nature such a bearing must be made of excellent material by highly skilled mechanics. A cheaply made bearing is sure to fail. Offsetting this high cost is, of course, the capitalized value of energy and maintenance savings. If there is a convincing difference in favor of the more expensive bearing, this type will ultimately be used. It takes time, however, to "sell" the electric railway industry on any proposition that involves large capital investment. The industry has been short of money and has felt it necessary to spend this money on changes in practice which gave promise of greater return on the investment than did anti-friction bearings.

Involved intimately with the matter of cost is that of durability. A ball or roller bearing must have a life of several years to compete with the ordinary "friction" bearing. As endurance tests must be continued so long, it is very difficult to prove the success of any particular design. If accelerated tests could be devised which would be acceptable to electric railway managers, this handicap might be overcome. The fact is that anti-friction axle bearings as made in the past have not had sufficient capacity to enable them to withstand the shocks of railway service. Manufacturers, of course, realize this and are taking steps to increase the strength.

Another handicap of the anti-friction bearing is its complexity as compared with the ordinary bearing. Master mechanics strongly favor simple devices. They particularly object to the necessity of pressing a bearing off an axle as contrasted with the simplicity of removal of a plain journal bearing. Further, the accurate adjustments which have in general been necessary with the anti-friction bearing have been objectionable in view of the small degree of skill often available in shops. As a result, while the admirable qualities of frictionless, wearless bearings appeal to the master mechanics, their practical difficulties prejudice them against the theoretically better bearing.

The bearing ought to be pushed for interurban service first. There it can demonstrate best its capacity for saving energy, whereas in city service bearing friction plays a less important part relatively because more energy is used in starting and stopping. If it were well established in the interurban field, the bearing could then more easily invade the city.

Unique Features of the Frankford "L" Signaling

THE account of the signaling system of the Frankford Elevated Railway in Philadelphia, given by J. N. Dodd in articles in this and the last issue of the ELECTRIC RAILWAY JOURNAL, covers one of the most important installations of recent years. Among many features the plan used for controlling the speed of trains at certain points by allowing a definite minimum time between signals is of special interest. Again, the provision of push-buttons on standards to permit the depressing of track trips from the motorman's cab window is worthy of notice. The trainmen were desirous of having a door at the front of the car as a means of exit, particularly for the purpose of lowering the trips. This was considered impracticable by the car designers, but the push-button standard was accepted as a substitute for the desired door. Excellent, also, is the mechanical arrangement of the air distribution system and the electric circuits, which were worked out with special care amply justified by the results. The availability of air for operating track tools is a by-product of the signal installation which should simplify maintenance work.

The design of the Frankford Elevated signaling was slightly complicated by the fact that the trips on the Philadelphia Rapid Transit cars and those of the Frankford "L" are differently located and the system had, therefore, to provide for both types of cars. It was in details like this, as well as in the larger matters such as expediting traffic at the junction of the new line with the Market Street subway-elevated line, that the installation is noteworthy.

Signaling is one of the phases of electric railway work that suffered acutely from the depressed condition of the industry during war time. The situation is now improving somewhat, as is indicated by work like that on the Frankford line, although operators are not yet fully reawakened to consideration of the possibilities of a good signal system in increasing safety, speeding up schedules and permitting full use to be made of track.

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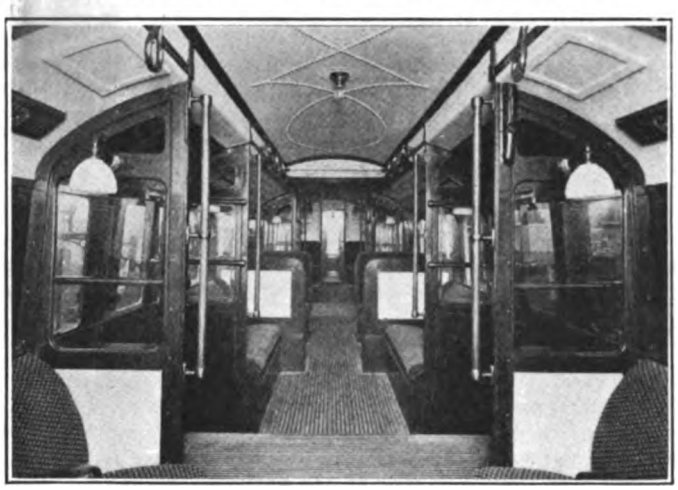
New Cars for London Underground Railways

The Cars Are Particularly Luxurious in Their Furnishings—Considerable Attention Has Been Given to Reducing Noise and Vibration—Wheels Are Shrouded and Window Openings Reduced in Size

ON FEB. 3 there was a demonstration run on the Great Northern Piccadilly & Brompton Railway of a train including six new experimental trail cars. The London underground electric railways are being extended, and it is the desire of the management to introduce improved rolling stock, especially for the longer journeys which will soon be possible. Some time ago Lord Ashfield, chairman of the companies, instituted a competition among five car manufacturers for the construction of the best type of electric car to suit the conditions. Orders were placed with six firms for the production of one car each, namely, the Birmingham Railway Carriage & Wagon Company, Cammell, Laird & Company, the Gloucester Railway Carriage & Wagon Company, the Leeds Forge Company, the Metropolitan Carriage, Wagon & Finance Company, and the Gloucester Company.



Car 720—Designed by the Underground Engineering Staff

Car 820—The Color Scheme Is Light Blue

General essential features were specified, but otherwise the builders were given a free hand. An important point specified was that the door dimensions of all the cars should be similar. The arrangement is different from that of the original rolling stock. Some of the existing cars have both end doors and center doors, and some only end doors. The new cars have no end doors nor center doors, but are provided with two double sliding doors on each side, each pair being about one-third of the distance from the end of the train. On starting from a station, all the doors have to be shut before an automatic signal can be given to the operator to start.

Several arrangements have been adopted to reduce noise, which is very pronounced in "tube" tunnels. The wheels have been shrouded by a covering, and the size of the windows has been reduced. It was found that the larger the windows the more the noise. A reduction in sound has also been effected by ventilating the cars from the roof instead of from the windows. The result is that passengers can converse without unduly raising their voices. Graphs were obtained comparing the intensity and fluctuation of noise in an ordinary tube railway car and in one of the new ones, and specimens of these are produced herewith.

The new cars are of steel, and in external appearance and size are similar to the old. Each seats forty-eight passengers. Internally, however, they vary in finish according to the ideas of the builders. The seats, upholstered in moquette, are luxuriously comfortable. The decorations include gray, blue and gold, blue and gray, green and brown, mahogany and maple, and brown and white. The metal fittings are in oxidized silver finish, aluminum, and oxidized copper. In one case the floor, instead of having narrow wood slats, is covered with a non-flammable rubber composition fabric.

The scheme of vertical rods from floor to ceiling for the use of standing passengers—tried on a number of previous cars—has been abandoned, and a reversion is made to straps to which standing passengers can hold. Most of these loop straps are, however, much improved, so as to be more comfortable to the hand. Concealed lighting is adopted in one car, but as usual in such a case more lamps are required. The new cars are being subjected to severe tests, and these will decide what is to be the new standard car, of which probably about 200 will be required. Some of the essentials of construction of the various cars are as follows:

Car No. 823—Birmingham Railway Carriage & Wagon Company, Ltd.

The body is built of U-section pressed-steel pillars and angle section rails, securely framed together and paneled with cold-rolled close-annealed plates riveted to the framing. The roof is of clerestory type and consists of mild steel plates riveted to light angle carlines, and the whole is secured to cant rails. Frameless win-

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dows contain balancing devices and drop 6 in. Ventilation is by a series of air scoops fitted in the roof; air passes into a channel formed by the clerestory rail and inside panel and is controlled by ornamental grids inside the car. The body of the car is sound insulated by sheet cork secured to the inside panels, while the roof has a double layer of insulating cork. One layer is secured to the roof plates and the other layer to the top of the ceiling panel. The floor consists of successive layers of slag wool, asbestos and cork, with wood slats above. Over the trucks a further layer of asbestos insulation is secured. To overcome the "drum" effect caused by the longitudinal seats which also form wheel boxes, thick "Wadnit" sound insulation is used, secured to the seat plates. The wheels are fitted with wood blocks between spokes to reduce the metallic ring when in motion.

Seats are of Woods' patent wire-woven type, of special light construction, suitably upholstered and covered with moquette. The car interior is decorated with polished mahogany moldings, panels being painted French gray and further relieved on the end and door pocket panels by ornamental festoons. Ceiling panels are of Agasote, with "Adams" treatment in decoration, and painted white. Doors are of a double sliding type, electrically and pneumatically controlled. All main pipe fittings for the door system are located in two of the longitudinal seat boxes.

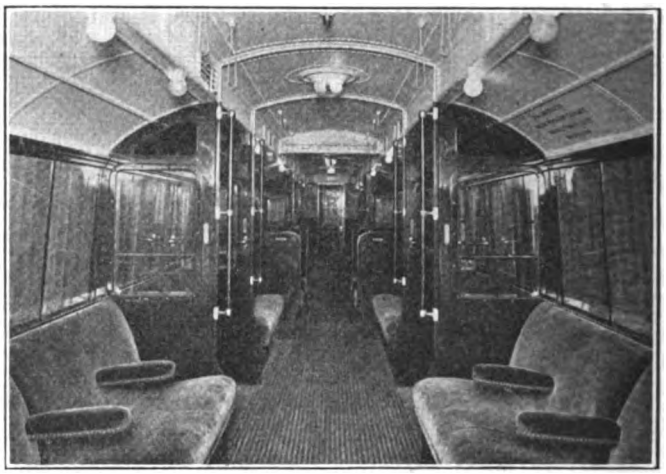
The underframe is of light rolled sections for solebars and longitudinals, bolsters and headstocks being pressings. Truck frames are of mild steel plates and angles, and bolsters and spring planks of pressings. Bolster springs are of double elliptic type, and side-bearing springs of a laminated type with auxiliary springs of rubber. The truck brake rigging is arranged for all wheels to be braked on both sides, and the type of rigging permits of automatic slack adjusters being used, and for the brakeshoes to be worn out without the necessity of hand adjustment. Exteriors are painted in vermillion, black and cream, in accordance with the specification as in the case of the other vehicles. All fittings have oxidized silver finish.

CAR NO. 824—CAMMALL LAIRD & COMPANY, LTD.

Only marketable materials are used, but the advisability of using high tensile steel in future is considered further to lighten the structure. Truck wheel bases have been increased from 5 ft. to 6 ft., giving steadier running. There are three systems of springs between axle truck boxes and car body; anti-vibration packings are inserted between bolsters and truck center bearings. To obtain noiseless running all play in moving parts has been reduced, and "Ferodo" wearing surfaces have been introduced in the brake rigging and elsewhere. The floor consists of steel dovetail sheeting, with an upper layer of floorboards, the space between being filled with a granulated cork composition. The sides and roof are insulated with three-ply "Salamander" hair felt between inside and outside linings. This insulation is rendered fire-resisting. Canvas is applied to the inside paneling and seat plates to prevent "drumming." Each truck is shrouded in a leather covering reaching down to within a few inches of the rail.

Structural work is of the lightest possible description consistent with strength. Unit principles in design have been adopted to avoid multiplicity of details and fittings. The center roof plates are flanged on the outer edges to avoid the necessity for roof purlins. Aluminum is used wherever practicable for the construction and for interior fittings. Panel plates are flanged on their edges to obtain stiffness without the need for providing additional stiffeners. Outside moldings and joints have been avoided wherever possible. The framing and paneling of side doors is entirely of aluminum.

Car 821—Bowl Fittings Are Used for Lighting and Aluminum Trim Is Employed Quite Extensively



Car 822—Upholstery Is in Blue and Paneling Is Mahogany and Maple

Seats and seat backs are fitted with coil spring cushions. The ventilation includes balanced-side sliding windows, sliding glass panels in end doors, and louver type ventilators in the clerestory, operated by cam action. Outside ventilators of special type, combining intake and exhaust action in either direction of travel, are used. This type of outside ventilator has not previously been employed, but has been the subject of exhaustive tests and trials. Doors have soft rubber flexible edges to give the required resiliency and to obtain a weather joint, while at the same time preventing risk of injury should a passenger's hand or a portion of his clothing be trapped between the two doors when closing. To maintain the door tracks free from obstruction, a track cleaner is fitted to each side door.

Diffused lighting is a feature of this car. The main lights are placed in troughs, housed inside the deck rails and glazed on the underside with semi-transparent glass mounted in hinged frames. These troughs are utilized as longitudinal roof members. The underframe

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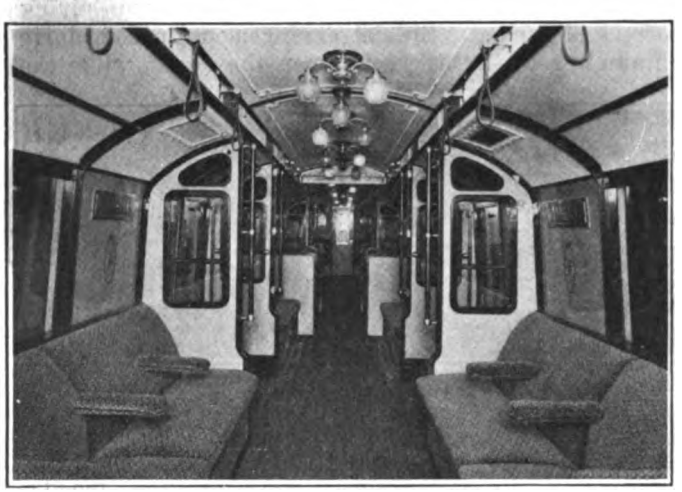
embodies two strong central girders, which take up the principal draw and buffing shocks and form the load-carrying members, so that the side doorway openings do not cut into the main underframe members, as would be the case if the solebars carried the load. Floor and side loads are transmitted to center girders by braced crossbars. Over the truck the seat front plates serve as the central girders. The interior decoration is in blue with gold finish.

CAR NO. 820—GLOUCESTER RAILWAY CARRIAGE & WAGON COMPANY, LTD.

Trucks are of Gibbins' spring frame type, giving easy riding, as the load is taken direct on the springs from the main frame; the weight of the body is taken on roller side bearings, and not on the center bearing, thus eliminating side roll, while the fact that there is no clearance between axle boxes and bolster to be taken up, as on the ordinary truck, gives smooth starting and stopping. The weight is also considerably reduced.

The car body is insulated by "Wadnit" rammed between exterior and interior panels, the former being lined with canvas. Windows are of frameless type, fitted with spring balances and arranged to fall 6 in. Spring roller curtains can be fitted to all windows if required, one being supplied. The curtain roller is out of sight, being attached to the top light mold and easily removed. Twelve ventilators are fitted in the monitor, of pivoted vane type, exhausting the air automatically in both directions. Hit-and-miss covers are provided to regulate the exhaust.



Car 823—Seats Are of Special Light Construction Covered with Moquette

Car 824—Diffused Lighting Is Used and Decoration Is in Blue and Gold

Seats are of "Peters" type, covered in moquette. One cross seat has been fitted with "Woods" woven wire for comparison. The double side doors are of mahogany, sheathed with aluminum and operated by air engines. All doors are fitted with rubber edges, forming a flexible and watertight joint. The interior finish is of Agasote panels. No cornice moldings are used, and the molds employed are of light and plain type so as not to harbor dust. Hand grips of special type in polished mahogany are suspended from the roof. The color scheme is light blue. Metallic fittings are silver oxidized.

CAR NO 821—LEEDS FORGE COMPANY, LTD.

Truck frames are of pressed steel, giving ample strength without excessive weight. The bolster suspension is designed to prevent excessive lateral movement on curves. The springing is arranged to reduce unsprung weight, to obtain resilience without undue vertical movement, and to absorb rail shocks near the point of origin. Shrouding plates are of steel, covered on the inner and outer surfaces with canvas, and with hinged side plates for examination. The end shrouding is sloped to deflect sound onto the roadbed.

The underframe is of pressed steel construction, and in so far as load carrying is concerned, is incorporated as a unit with the body. The headstocks, together with the end top plates, form a rigid structure for transmission of buffing shocks, and at the same time care for racking stresses. Both mid-longitudinals and crossbars run through, the latter being under the former and connected by means of rack plates.

In the buffing and drawgear "Ferodo" bushes have been used for the sector bar pins, and also for the platform plate plungers. The design of the body was prepared with a view to ease and quickness of production. there being no unwieldy portions to obtain or handle. Sides, ends and roofs are built in jigs as units to secure complete interchangeability, all parts being drilled to templets. The construction is all steel, aluminum or alloy only being used for doors, fittings and interior moldings.

Timber is used only for floor slats, window capping, end door posts, windscreen parts, handrails and on ends of seats. The sides are constructed with pressed-steel pillars, sheeted on the outside with steel plates, there being no expensive window or other pressings. Horizontal moldings, cant rails, crib rails, inside waist rails, and door pocket members are of rolled-steel sections. The interior sides and ends are of steel sheets secured to the framing. Aluminum molding is secured by means of wood screws into fiber blocks. The ceiling is of Agasote, secured to the roof framing in the same manner.

The side sliding doors are of one-piece aluminum castings sheeted on both sides with aluminum plates. They have standard rollers at the bottom with the exception that an eccentric pin is pivoted to lift or lower the doors when the very limited clearances allowable make it necessary. A "Crittall" runner is fitted, and is provided with springs which allow the door to ride over any obstruction, and also to prevent rattle. A "Crittall" runner has also been fitted at the rear of the sliding door for connecting to the air motor arm. The sliding doors are fitted on the closing sides with sponge

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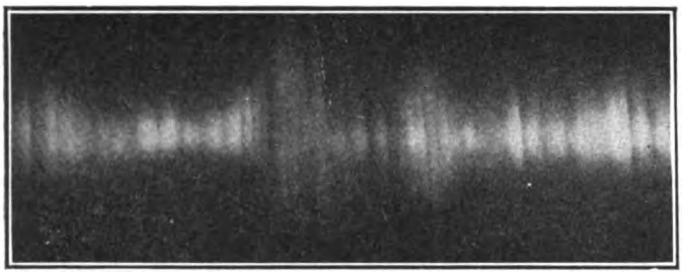
rubber safety edges, molded to fit one slightly into the other, and are of such soft nature as to provide, with the compression of the air motor springs, a complete watertight joint. They also effectively prevent injury to a limb, and allow clothing, etc., to be very easily withdrawn when the doors are closed and the coach is in motion.

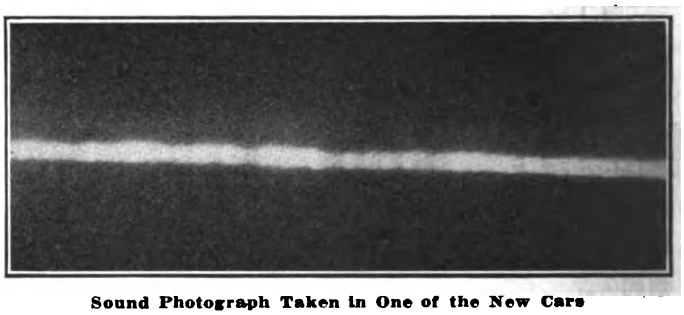
Windows are provided with zinc water pockets, and the lifting gear is made as one unit. Seats are of Vi-Spring pattern, made by the Marshall Patent Mattress Company. Longitudinal seats are constructed individually, to permit easy access to the door operating gear, and for economy in repairs.

Ventilation is by extraction. There are twenty-eight extractor ventilators in all, twenty of which ventilate the interior of the car. The remaining eight ventilate the air space between the outer and inner walls of the body. Electric lamps, inclosed in Holophane bowl fittings, are installed at the lower clerestory and the center ceiling. Emergency lights are fitted into two of the bowl fittings, making it unnecessary to break up the ceiling by further fittings. Two extra bulbs are provided for an illuminated sign.

Noise insulation includes canvas attached to the inside of the outer sheeting of sides, ends and roof and between all metal-to-metal joints, and use of hair felt. The floor is of key section steel, the trough being filled with cork. A layer of cork covers the whole of the key flooring, and on this are laid the wood slats. The interior is designed to avoid dust-collecting ledges. Bright surfaces requiring cleaning have also been avoided. The interior decoration is in green and brown. Fittings are of aluminum. Straps are attached to sockets suspended from the roof.



Sound Photograph Taken in Ordinary Tube Car



Sound Photograph Taken in One of the New Cars

CAR NO. 822—METROPOLITAN CARRIAGE, WAGON & FINANCE COMPANY, LTD.

Among the special features of this car are that nickel steel has been used for the undergear; that the flooring is of corrugated steel with a thickness of non-inflammable wood and a fluted covering of fire-resisting rubber; that white-metal sheets are used for paneling; that natural non-inflammable material is used for seat rests, etc., and that sliding doors are of self-centering construction.

To reduce noise the wheels are filled in with teak segments, sound-insulating materials are freely used, and even the painting scheme includes the use of Docker "loaded" paint, having qualities by which it assists to deaden sound vibration. The trucks are completely shrouded with pulped wood sheeting, with flapdoors for inspection. The ends are streamlined.

Trucks have 2-ft. 8-in. wheels and laminated side bearings fitted with Spencer's auxiliary rubber springs, double elliptical bolster springs are provided, and "Metro" patent ball-bearing center plates and roller side bearings are fitted to reduce friction. The underframe includes bulb angle section solebars, and pressed-steel headstocks, bolsters, crossbars and longitudinals, and has reinforced end construction. "Ferodo" strips and washers are used extensively for trucks and underframe and elsewhere to prevent noise.

The body consists of light steel pressings for pillars, and angle sections for bracings, longitudinals, side members and roof. Side and end plates are of aluminum and copper alloy. Windows each consist of two complete steel pressings. Spaces between the inner and outer sheeting of walls and ceilings are sectionalized by small wood packings, to reduce "drumming," the spaces being filled with eel grass quilting, a material useful both for sound and heat insulation.

Sliding doors include aluminum plates, light steel channels and wood linings, spaces being filled with eel grass quilting. A ball-bearing attachment between the door-operating air-motor and the door minimizes sliding friction. A new type of door roller is employed, enabling the door to be removed readily without disturbing the runner track, while V-rollers provide for self-centering. There are also twin ball races giving correct alignment. Special arrangements are made to obtain weather-tightness between the doors, while the meeting edges are fitted with rubber joints which enable a passenger (or his clothing) who may be trapped to withdraw.

Windows have drop lights apparently frameless, provision being made for easy cleaning, adjustment and withdrawal, to avoid rattle, and for draining rainwater. Ventilators in the clerestory are of "M. & M." pattern, with staggered air openings. Air scoops are also fitted. Half the seats have small closely-nested springs, with spiral springs for the backs; the others have seats and backs of woven wire with supplementary spiral springs. All seats are in self-contained frames, these and the backs being removable. Seat risers and top plates are heavily shrouded to reduce noise. Strap-hangers are of light gray rubber with strong canvas inserted.

Electric lamps are sunk in flush with the spherical bulb, the lights themselves being opalescent or frosted glass. Dust-collecting ledges, etc., are avoided. Ceilings are of Agasote fire-resisting millboard, with light upper decoration. Fittings are of bronze. Upholstery is in blue, and the interior of the car has mahogany and maple paneling.

CAR NO. 720—UNDERGROUND COMPANIES' DESIGN

(Constructed by the Gloucester Carriage & Wagon Company)

The interior decoration is in brown with white paneling; fittings are in oxidized copper. The lighting is entirely by side brackets, except for two emergency lamps in the center. The seats are of "Nesta" all-metal design, covered with moquette, and the arm rests with

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leather. Straps include Bakelite handles on swivel joints attached to the clerestory rail. The ceiling is white, decorated in the "Adams" style.

To reduce noise the roof and body are insulated by sheet cork and "Wadnit" asbestos, the flooring, which is otherwise to the usual "Underground" standards, being similarly insulated, but having different thicknesses of material. The trucks are of an improved design not hitherto used. They are provided with shrouding of "Wadnit" asbestos secured to underframes of wheel boxes, "Sundela" board panels being used on sides and ends of bogies. The exterior body panels are of steel, the interior panelling being of asbestos millboard. Doors have wood frames covered on either side with aluminum plates. Special attention is given to weather tightness, while a drainage system is provided to deal with rainwater. The side sliding doors have rubber edges to prevent injury to a passenger who might be trapped or his clothing caught, as in the case of the other cars.

Cost Accounting in the Engineering Department

An Account of the Present Practice of the Montreal Tramways by Which the Capital and Other Cost Data Are Maintained Continuously and Promptly—Exact Specification of Clerical Duties Is a Factor

By R. B. Genest

Chief Clerk Engineering Department, Montreal Tramways

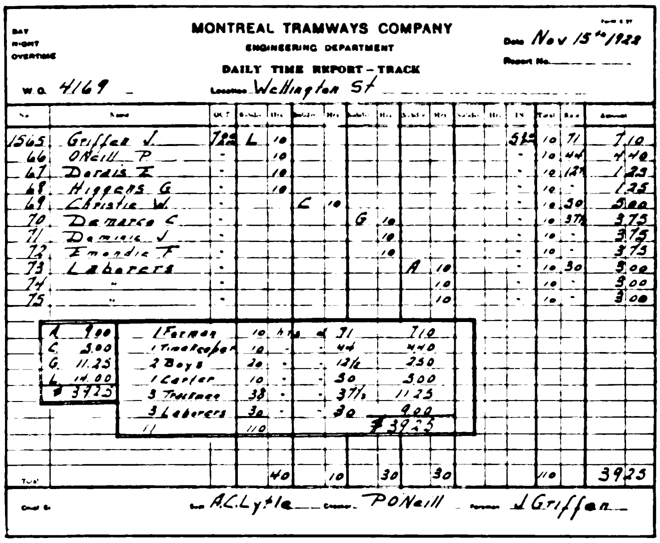
ABOUT four years ago the engineering department of the Montreal Tramways found it desirable to revise the system of cost accounting previously in use. This came about on account of the rapid expansion of the department due to increase in track mileage, construction of new and improvement of old buildings, standardization of track construction, etc.

To this end the filing and record systems were revamped and other general improvements made, as will be detailed in a later article.

The objective was to secure the cumulative cost records without the tiresome and time-wasting summarizing of figures and reports usually following the completion of a job of track or other work. To accomplish this, several forms are filled in by the checkers or inspectors who are constantly on hand at the job. These forms for securing the original data are as follows:

Daily Time Reports. Fig. 1—This form is used to cover time made on all work executed by the engineering department forces, with the exception of snow removal. It was originally intended for trackwork only, but was found to be applicable also to the work of the departments of bridges and buildings, tools and machinery, and bonding, welding and grinding. The alphabetical subdivisions of the labor distribution are shown on a sheet in a summary.

This form is made in triplicate. One sheet is forwarded to the accounting department for auditing purposes, one is retained by the engineering department, and the third remains in the timekeeper's possession.


MONTREAL TRAMWAYS COMPANY
ENGINEERING DEPARTMENT
DAILY TIME REPORT—TRACK
Date Nov 15th/1922
W.O. 4169 Location Wellington St

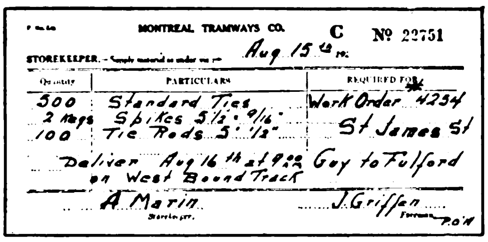
No.	Name	Out	L	C	G	A	In	Total	Rate	Amount
1565	Griffen J.	7.30	10				5.30	10	71	7.10
66	O'Neill P.	-	10				-	10	44	4.40
67	Dorais E.	-	10				-	10	12½	1.25
68	Higgens G.	-	10				-	10	-	1.25
69	Christie W.	-		10			-	10	30	3.00
70	Demarco C.	-			10		-	10	37½	3.75
71	Demicie J.	-			10		-	10	-	3.75
72	Emondie F.	-			10		-	10	-	3.75
73	Laborers	-				10	-	10	30	3.00
74	"	-				10	-	10	-	3.00
75	"	-				10	-	10	-	3.00
Total			40	10	30	30		110		39.25

A 9.00, C 3.00, G 11.25, L 14.00, $39.25

1 Forman	10 hrs	at	71	7.10
1 Timekeeper	10	"	44	4.40
2 Boys	20	"	12½	2.50
1 Carter	10	"	30	3.00
3 Trackmen	38	"	37½	11.25
3 Laborers	30	"	30	9.00
11	110			$39.25

A. C. Lytle, P. O'Neill, J. Griffen

Fig. 1—Daily Time Report Form


MONTREAL TRAMWAYS CO. C № 22751
STOREKEEPER.—Supply material as under Aug 15th 19

Quantity	Particulars	Required for
500	Standard Ties	Work Order 4254
2 Kegs	Spikes 5½ • 9/16	St James St
100	Tie Rods 5' ½"	

Deliver Aug 16th at 9.00 Guy to Fulford on West Bound Track

A Marin, Storekeeper. J. Griffen, Foreman P.O'N

Fig. 2—Requisition Form

Forms for Requisitioning and Transferring Material. Figs. 2 and 3.—The delivery, return or transfer of material is covered by the forms shown in these illustrations. Fig. 2 is the form used for requisitioning or ordering material. It is made in triplicate, distributed as above. No material can be transferred or returned unless the shipments are accompanied by three copies of the form shown in Fig. 3. This serves the manifold purpose of a transfer slip, a credit note, a receipt, and a shipping bill. A fourth copy is signed by the material car conductor and is held by the checker.

Daily Report of Track Construction. Fig. 4.—This form is used on all trackwork with the exception of section gang maintenance. It indicates work progress by means of the rough diagram and legend, furnishing at the same time a summary of material received daily and memoranda on working forces and cost of labor.

Section Foreman's Daily Report. Fig. 5.—The sample which is reproduced shows clearly the purpose and use of this form which is used to cover the operation of section gangs on maintenance work.

Daily Working Force Report. Fig. 6.—In order that

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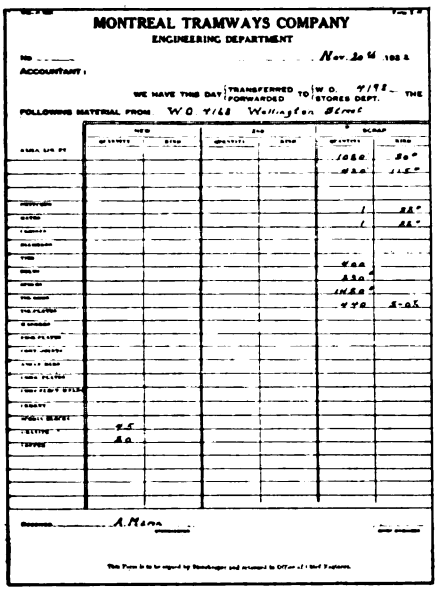
MONTREAL TRAMWAYS COMPANY
ENGINEERING DEPARTMENT

Fig. 3—Form for Use in Transferring Material

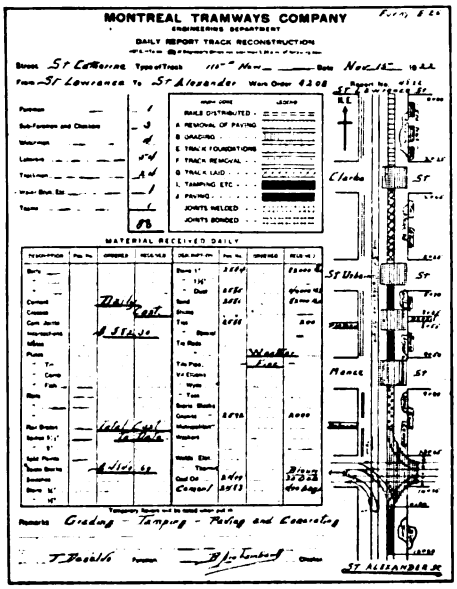
MONTREAL TRAMWAYS COMPANY
ENGINEERING DEPARTMENT
DAILY REPORT TRACK RECONSTRUCTION

Fig. 4—Daily Track Construction Report Form

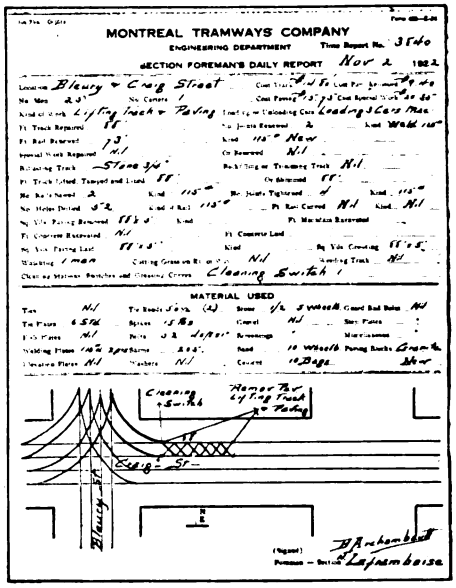
MONTREAL TRAMWAYS COMPANY
ENGINEERING DEPARTMENT
SECTION FOREMAN'S DAILY REPORT

Fig. 5—Section Foreman's Daily Report Form

the head office may be informed of the total number of men employed daily on trackwork, the form shown in Fig. 6 was designed. Information for use in filling in this form is telephoned or forwarded by messenger to the head timekeeper's office before 9 a.m. from the different locations and is summarized as shown. The printed names on the left side of this form under the heading of "West Division" and "East Division" indicate the section gang.

Movement and Time of Work Cars. Figs. 7 and 8.—The movements of construction and material cars and the time allotted to them are checked and audited by the use of the forms shown in Figs. 7 and 8. Two forms were necessary because the crews of construction and material cars are paid by the operating department and the running time is charged to the engineering department. It was therefore found expedient to evolve some simple method of auditing these charges.

THE EVOLUTION OF A WORK ORDER

To illustrate the way in which information for cost accounting is gathered, the following summary of the principal parts in the execution of a track job will serve to show the procedure from the inception to the termination of a piece of work.

Assuming that it has been decided to renew or extend the track at a specified location, the first steps are the compilation of an estimate of the cost, the drawing up of material lists and specifications, the preparation of working drawings and application for a work order showing the cost and the charges to capital or renewal. This is forwarded to the proper authority for visé, and as soon as official sanction for the work has been given, permitting the use of an appropriation for the purpose indicated, a numbered work order is issued by the accounting department, and under this order number all actual cost charges are accumulated.

In the meantime, official notice is forwarded to the heads of the municipal department and a permit is obtained to carry out the work on the city streets. Notifications are also issued to the heads of other company departments concerned.

Next, a foreman and a checker are appointed for the job, the construction car is instructed to pick up tools, stock material, shanties for the checkers, etc., from the stores, the gang is organized and the job under way.

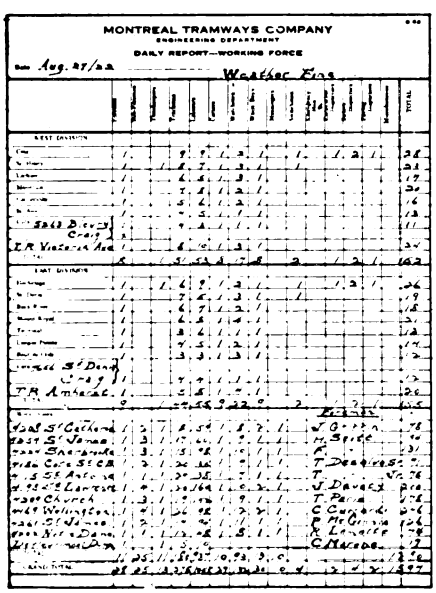
MONTREAL TRAMWAYS COMPANY
ENGINEERING DEPARTMENT
DAILY REPORT—WORKING FORCE

Fig. 6—Daily Working Force Report Form

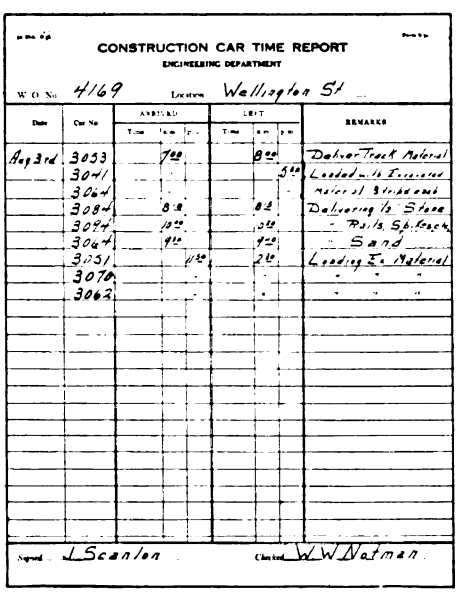
CONSTRUCTION CAR TIME REPORT
ENGINEERING DEPARTMENT

Fig. 7—Form for Recording Movement of Work Cars

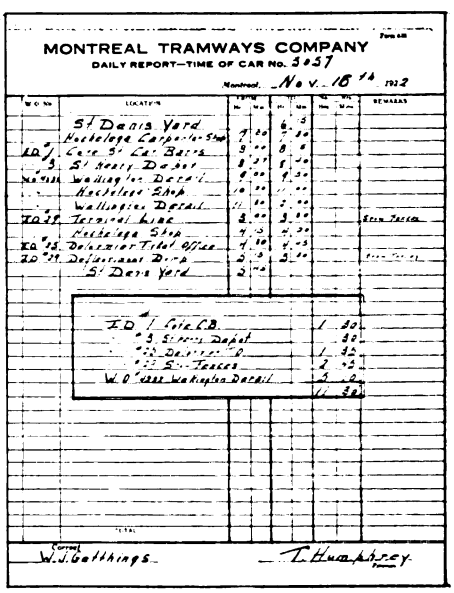
MONTREAL TRAMWAYS COMPANY
DAILY REPORT—TIME OF CAR No. 3057

Fig. 8—Work Car Time Record Form

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When the job is completed, the checker fills in the form shown in Fig. 9, the final report on track construction, and forwards it to the head timekeeper's office, together with a rough sketch showing a general layout of the work as actually just done.

The checker also turns in his field ledger, containing the summarized detail of labor charges, and also details of material received, transferred or returned. This field ledger is closely examined and audited; the labor charges are checked against the original time sheet (Fig. 1); the material records are balanced against the original requisition (Fig. 2), and checked against the storage department delivery sheet and freight way bill.

This preliminary audit of cost records holds back the final report for two or three days, but the delay is advantageous as the cost checking of the records of the stores and engineering departments reduces to a minimum the possibility of error. The final report, ledger sheet and sketch are then clipped and fastened together, placed in a file folder, labeled and numbered and sent to the chief clerk for inspection. After this they are turned over to the estimating engineer for record and comparison with the original estimate.

Dissecting and Classifying the Cost Records—The Track Record Card System

With the data of a new job in hand, it remains only to incorporate these with the existing records in order to bring the cost records up to date. The information for track and special trackwork is kept on cards which are revised as explained below. (See Fig. 10.)

Taking up first straight track, the situation is complicated somewhat by the fact that there are still in existence on the Montreal Tramways system several different kinds of old straight-track construction. A record of each type is maintained on a separate card, with the result that there may be three or four cards to record the work between any two points of intersection. When a complete renewal of a piece of track between any two points of intersection is made, a new type of track construction is installed, which we know as 115-CG. This symbol indicates that the rail used is 115 lb. and that the track has concrete foundation, with slab and granite block paving. When the new work is installed, one card is substituted for the three or four previously used, which are destroyed, the history of the replaced types of construction being inscribed on the new cards.

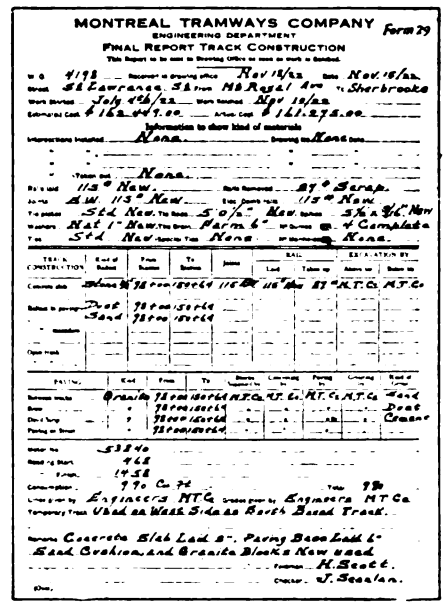
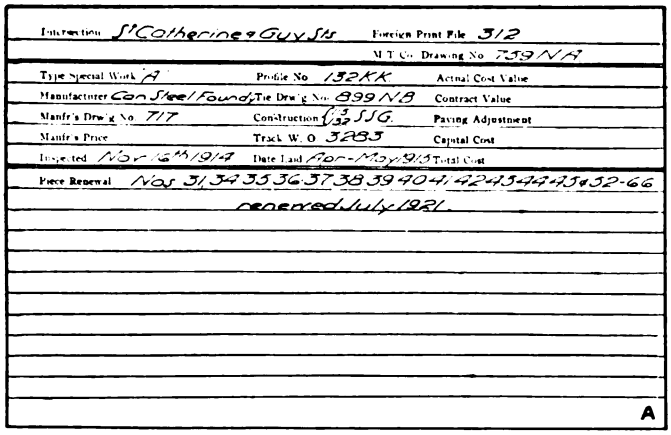
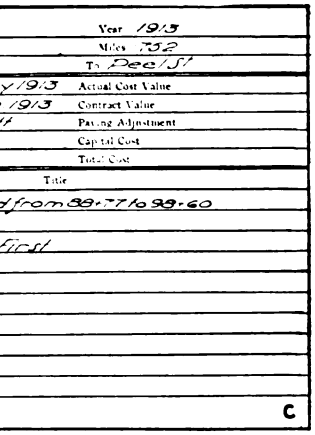

MONTREAL TRAMWAYS COMPANY Form 29
ENGINEERING DEPARTMENT
FINAL REPORT TRACK CONSTRUCTION

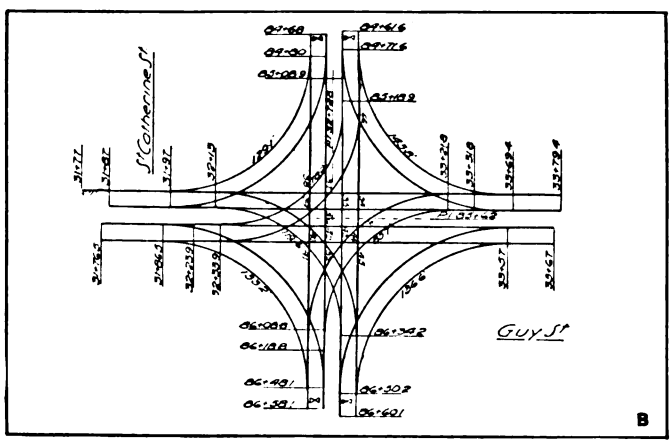
Fig. 9—Final Report on Track Construction

One side of the card is devoted to the history of the track, and here are given the location, year of installation, number of miles of single track, work order number, types of new and old construction, starting and finishing dates of the work, and name of the foreman under whose direct supervision the work was done.

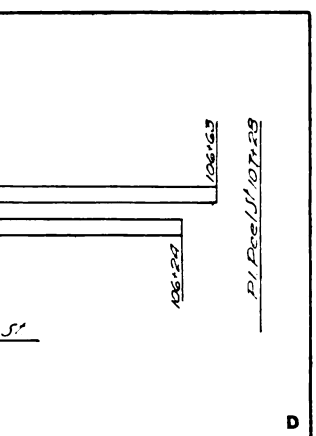
The total cost of the work is then compiled and split up under the following headings: Actual cost value,


Intersection St Catherine & Guy Sts. Foreign Print File 312
M T Co. Drawing No 739 NA
Type Special Work A — Profile No 132 KK — Actual Cost Value
Manufacturer Can Steel Found'y — Tie Drwg No 899 NB — Contract Value
Manf'r's Drwg No 717 — Construction 115 SSG. — Paving Adjustment
Manf'r's Price — Track W. O 3283 — Capital Cost
Inspected Nov 6th 1914 — Date Laid Apr-May 1913 — Total Cost
Piece Renewal Nos 31 34 35 36 37 38 39 40 41 42 43 44 45 32-66
renewed July 1921.
A


Track St Catherine St — Year 1913
Miles 732
From Guy St — To Peel St
Track W. O 2633 — Work Started May 1913 — Actual Cost Value
Construction 115 CG. — Work Finished Aug 1913 — Contract Value
Replacing 96 # E — Foreman F Scott — Paving Adjustment
Capital Cost
Total Cost
Number | Drawing | Title
Relined & Regraded from 88-77 to 88-60
July 1921 W O 4033
106 KK | Profile Victoria to First
C



B



D

Fig. 10—A, Face of Special Trackwork Record Card. B, Back of Same. C, Face of Straight Track Record Card. D, Back of Same

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contract value, paving adjustment, capital cost and total cost. At the bottom of the card space is reserved for the profile drawing numbers, etc.

The reverse of the card is devoted to a diagram of the piece of track. This is made in color and shows the section of rail used, the chainages, the beginning and end of the work and the points of intersection.

Recording Special Trackwork

All intersections, turnouts, crossovers and guarded curves are classified as special trackwork. Each piece of special trackwork is recorded on a separate card. On the back of the card is given a drawing showing the number and length of curves, chainages to switch points, end of combination rails, sections of rail used and total length of single track through the intersection. The different types and weights of rail section are illustrated by different colors of ink.

On the face of the card for special trackwork are

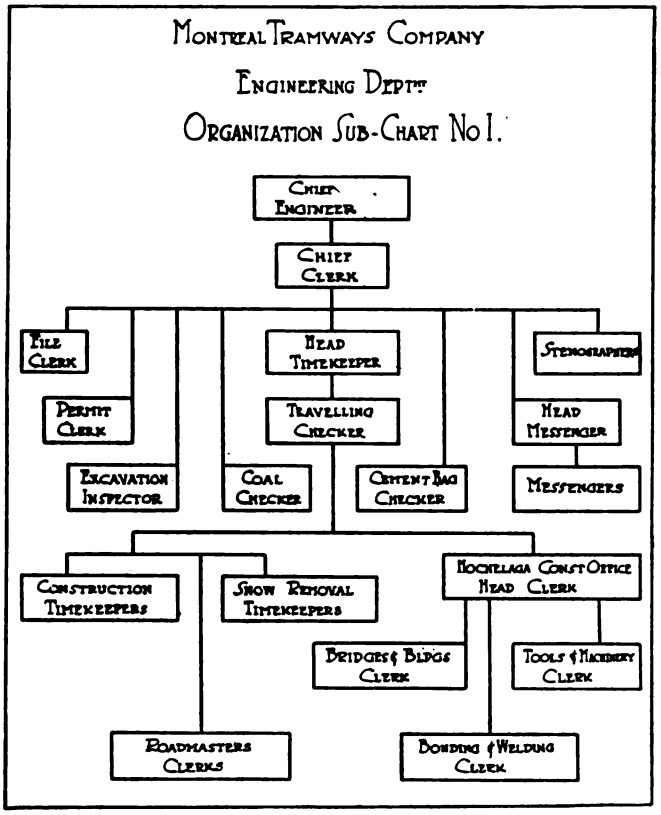

Fig. 11—Organization Chart for Record Section of Engineering Department

noted the point of intersection, the foreign print number or manufacturer's drawing number, the Montreal Tramways' drawing number, the type of special trackwork used, the name of the manufacturer, the price and the date of inspection. There are also noted the city of Montreal's profile drawing numbers, the tie diagram numbers, the work order number and the date of installation of the intersection.

A space is reserved at the bottom of the card for memoranda of piece renewals. If at any time it is necessary to renew a switch, mate or crossing, notation is made under the heading "Piece Renewal," giving the number of pieces renewed, the section of rail used and the installation date. There is also a column reserved to show the intersection installation cost and analysis thereof.

In this connection it is important to note that in 1917 a complete valuation was made of the Montreal Tramways system. This gives a starting point for the cumulative cost records. Thus, as each work order is completed and the cost data are audited and turned in, an adjustment of the contract valuation is made, either increasing or decreasing the capital, as the case may require. This facilitates an easy and accurate valuation of track and roadbed throughout the system at any time.

If an intersection is completely renewed, a new card showing the new work is substituted for the old card.

From what has been said it is apparent that the maintenance of this card record system is not a difficult matter and it furnishes a very complete record of track.

Track Maintenance Costs

The costs of track maintenance are compiled in practically the same manner as the costs on work orders, with the exception that final reports are not made up. The information required on labor and material distribution is contained in semi-monthly reports. The renewal or replacement of special trackwork pieces, however, is covered by special reports, giving detailed information to the superintendent of tracks.

The system is divided into two divisions, east and west, under the direct supervision of division roadmasters, who are assisted by a clerk and a traveling timekeeper.

Records of Sub-Departments

The records described above refer to track and these are kept at the main office. It happens that the clerical staff and foremen connected with the sub-departments of bridges and buildings, tools and machinery, and bonding, welding and grinding are housed in a separate building located about 2 miles from the head office, which is in a central part of the city. The records of these sub-departments are maintained separately in this building, so as to keep these records in close relation with the actual work, for under the same roof are also contained the machine shops, carpenter shops, storeroom, and bonding, welding and grinding plant and outfit.

The instructions to the clerical staff quoted on page 759 indicate the method of record keeping and the routine followed in these sub-departments.

Organization

Fig. 11 shows a chart of the organization force which carries out the work described in the preceding pages, including some items not mentioned specifically. The titles given will, however, indicate the duties of the men in charge of these items.

During the course of the construction season it is necessary to utilize the services of several temporary timekeepers in addition to the permanent staff, who are also employed on snow-removal work during the winter.

Timekeepers are broken in on the work gradually. A green timekeeper is given a copy of the "blue book," or instructions to checkers, together with a list of the names and titles of officials and other members of the staff and a telephone list showing office locations. He is first thoroughly drilled in a correct interpretation of the instructions. The final destination of all reports and the process of checking and auditing are demonstrated to him. He is then taken out on the work and introduced to all other timekeepers, foremen or members of the staff with whom he will come in contact and obtains a general idea of the location of shops,

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The Duties of Each Clerk Are Systematized

DUTIES OF CLERK IN CHARGE BRIDGES AND BUILDINGS

1. Material requisitions for carpenters, plumbers, bricklayers, painters (B. & B. department).
2. Posting material requisitions in ledger for cost distribution and reference for final reports.
3. Pricing above mentioned material.
4. Compiling lumber records in ledger.
5. Keeping price book up to date.
6. Compiling final reports for B. & B. department.
7. Compiling fortnightly statement for B & B. department.
8. Compiling daily time reports for B. & B. department.
9. Posting daily time reports in ledger for cost distribution.
10. Checking distribution record for B. & B. department with stores department record.
11. Daily working force report (gang location).
12. Stationery room records.

DUTIES OF CLERK IN CHARGE TOOLS AND MACHINERY

1. Material requisitions for tools and machinery.
2. Posting material requisitions in ledger for cost distribution and final reports.
3. Pricing above-mentioned material.
4. Keeping price book up to date.
5. Keeping T. & M. ledger.
6. Compiling final reports for T. & M.
7. Compiling fortnightly statement.
8. Making out daily time reports.
9. Posting daily time reports in ledger.
10. Checking up requisitions for T. & M. against stores department records.
11. Posting tool ledger account.
12. Field work—water meter reading, Western Division.

DUTIES OF CLERK IN CHARGE BONDING, WELDING AND GRINDING

1. Material requisitions for bonders, welders and grinders.
2. Posting material requisitions in ledger for cost distribution and final reports.
3. Pricing above-mentioned material.
4. Keeping price book up to date.
5. Compiling final reports for bonders, welders and grinders.
6. Compiling fortnightly statement.
7. Making out daily time reports.
8. Posting daily time reports in ledger for cost distribution.
9. Reports of work done by bonders, welders and grinders.
10. Compiling electric weld joint record (ledger).
11. Compiling record of oxygen and acetylene consumption.
12. Field work—water meter reading, Eastern Division.

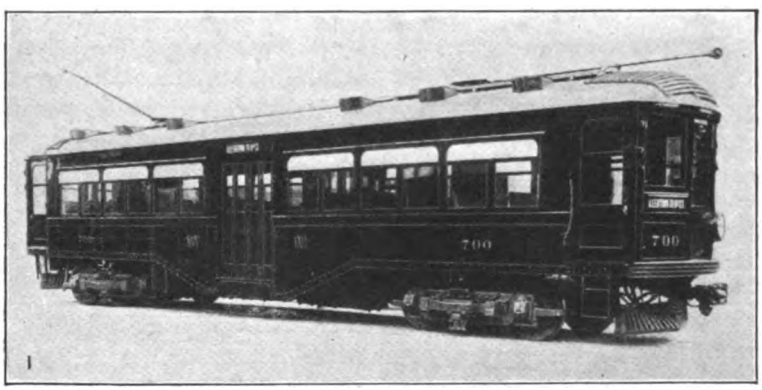
storerooms, etc. A few days as an understudy to an experienced timekeeper enables him to pick up a practical knowledge of labor distribution and field routine, after which he is detailed to cover a work order. Timekeepers are continually in touch with the head office by telephone, messenger and through the medium of the chief clerk, traveling checker and cement bag checker who cover the outside work at frequent intervals.

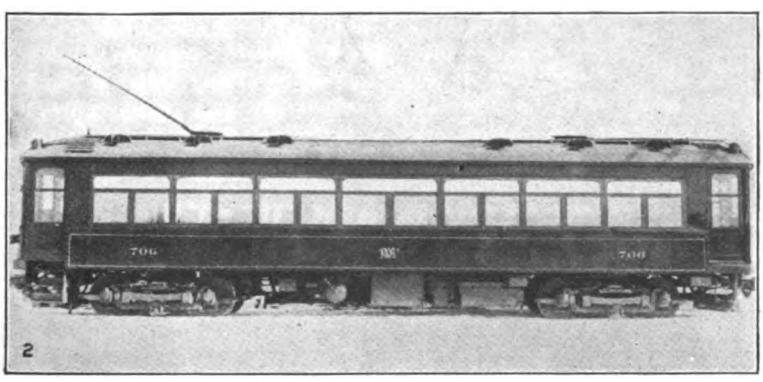
Montreal Tramways timekeepers and material checkers cover also, when required, the inspection of stations and platforms, cattleguards, fencing and culverts. During heavy weather they are frequently called in from the field to cross check the delivery of material against the records of the stores department. The distribution of coal during the winter months to switch and hillmen's shanties is covered by a checker. As a high percentage of trackwork is carried on at night, checkers are subject to call for night work.

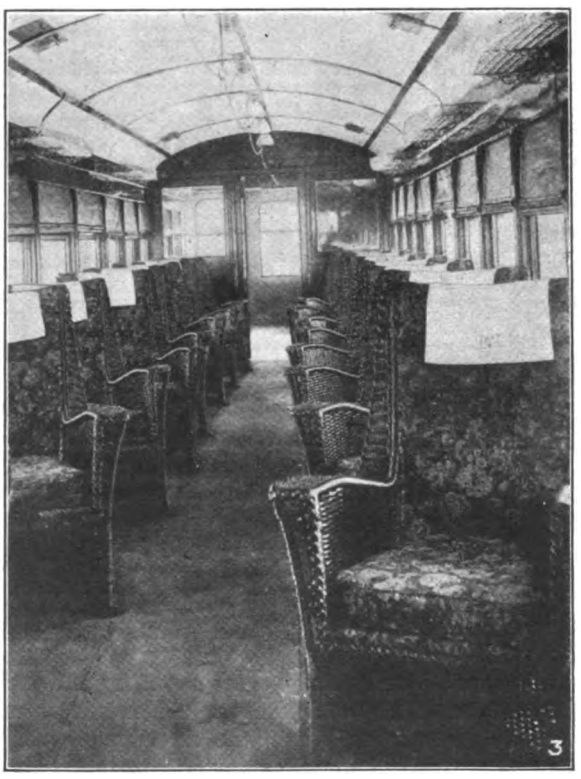
The necessary overtime for night work is distributed evenly as far as possible with due consideration to the ability and experience of the checker.

Liberty Bell Route Inaugurates Chair Car Service

A PLEASING improvement in the Philadelphia service of the Lehigh Valley Transit Company, operating over the Liberty Bell route, consists of giving chair-car service on two of the round trips daily. The company operates a limited service every hour between Allentown and Philadelphia. The run is made in one hour and fifty-seven minutes, which is quicker than competing steam roads. The one-way fare is $1.66, and an extra charge of 50 cents is made for a seat in the chair cars.







No. 1—Type 700 Car Before Remodeling. No. 2—Exterior of Remodeled Chair Car. No. 3—Interior of Chair Car Compartment

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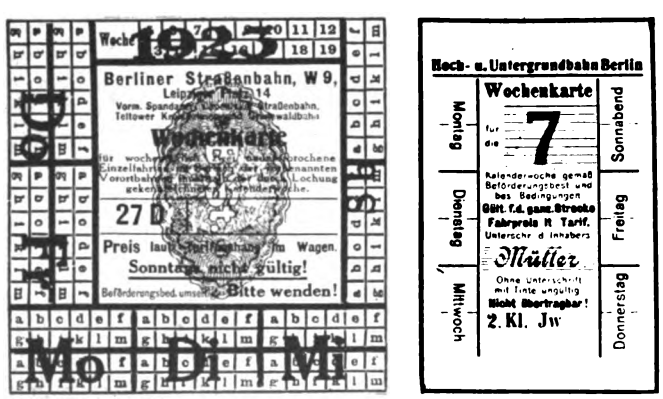
In order to provide the additional cars necessary for this service some of the company's type 700 center-entrance cars were remodeled. Accompanying illustrations show these cars before and after the work of reconstruction took place. The work of remodeling consisted of cutting out the well in the center part of the car, but leaving the ramp and center sills to form a truss. The side sills were straightened out and an angle iron was added for a support. The floor in the car was relaid to make it level. Side panels were filled in where the center doors originally were, and two additional windows were added in the center. Steps and trapdoors were installed at diagonally opposite ends of the car, and a glass partition was placed between the smoker and parlor compartments. In general, the electrical equipment underneath the car was not relocated but was blocked up during reconstruction and until proper supports were provided.

This reconstruction gives an all-steel car of 50 ft. over all with a width of 8 ft. 9 in., weighing 69,180 lb. The chairs used are of special design, being willow upholstered with spring seats. There are eighteen chairs in the passenger compartment and five in the smoking compartment. A mouse-colored rug is used over the entire floor in the parlor compartment, and the platform has been arranged to provide an observation compartment in the smoker.

The officials of the railway report that the service has proved quite popular, and that there has been a considerable increase in passenger traffic due to its inauguration.

Zone Fares and Transferable Short-Ride Weekly Cards for Berlin

THE Berlin (Germany) Street Railways has always been an exception to the European rule of graduated fares for large cities, although the Berlin rapid transit lines are on a basis of short-haul and long-haul fares as well as two classes of fares. No longer ago than October, 1922, in a signed article, De Leonhard



Weekly Passes Used on Surface and Elevated Lines in Berlin. They Are Good for Only Two Rides a Day for Six Weekdays

Adler, manager of the system, wrote that Berlin conditions did not seem to encourage the use of a graduated fare. He said that the average surface car haul was only 3.9 km. (2.4 miles), whereas fare collection difficulties would not permit a lesser short-haul ride than 2.5 to 3 km. (1.8 to 1.9 miles). An extensive zone fare would drive the public to the cheaper Stadtbahn (the Prussian Government's belt lines).

However, the skyrocket increases in Berlin city fares have had such disastrous influence on traffic that the city-owned street railways are prepared to try at least a short-haul fare and to add also a modification of the old-time weekly card. For example: In the spring of 1922 the surface cars carried 2,000,000 riders a day, but by October, 1922, the traffic had gone down to 1,050,000.

It is almost useless to state fares except as ratios to explain the innovations. On Jan. 30, 1923, the standard fare was advanced to 150 marks, or 1,500 times the pre-war rate! A ticket, including transfer to either surface or elevated lines, cost 220 marks. Unlimited-ride monthly cards of non-transferable type cost 9,000 marks if good on one line only, 12,000 marks when good on three lines and 24,000 marks on the system. Monthly cards for students cost 2,800 marks. Approximately half rates (80 marks) for single trips apply to children between the ages of six and fourteen years, students and apprentices between the ages of fourteen and seventeen years and crippled veterans.

New Zone Fares and Weekly Card for Short Riders

The foregoing kinds of fares are of the types formerly standard. To these was added on Jan. 8 a system of zone fares for trial on Routes 9, 16 and 116. The routes are divided into sections averaging 3 km. (1.9 miles) and the fare first charged was 50 marks. This was raised to 100 marks on Jan. 30, but this sum is of course less than the standard fare. Although there is an extraordinary proportion of overlapping routes in Berlin, the zone fares do not apply to other cars on the same streets.

The second innovation, made on Jan. 8, may be described as a short-haul weekly card, differing from the season tickets or passes in being transferable and in being valid for only a limited number of rides. The purpose of this card is to encourage short rides in the business sections. The test is being made with 1.5 km. (0.93 mile) sections on all routes radiating from Alexanderplatz and Potsdamerplatz respectively. These cards were placed on sale for 420 marks, or 35 marks for each of the twelve weekly rides possible—a reduction from the 70 marks standard fare and the 50 marks single short-haul fare, then in force. The cards are not valid on Sundays, but may be used on weekday holidays, thereby assuring twelve rides if wanted. There is no rebate for rides not taken. Cards are for sale on the Saturday before week of use. The punch made by the conductor on the first ride determines the section on which the card may be used the rest of the week. One of these cards is reproduced, together with the corresponding weekly card used on the Berlin Elevated.

On the surface weekly ticket the numbers 5 to 19 at the top of the ticket, overprinted with 1923, indicate the week covered by the ticket, as explained in a schedule on the back of the ticket. The letters "a" to "m" refer to the twelve routes on which the ticket may be used. The large letters at the bottom and sides of the ticket, "Mo," "Di," etc., refer to the days of the week, Monday, Tuesday and so on.

The elevated weekly ticket is much simpler as there is only one route. It, however, is non-transferable and the purchaser must sign his name in the lower ruled space in the center space on the card. The "7" in the upper space indicates the seventh week of 1923.

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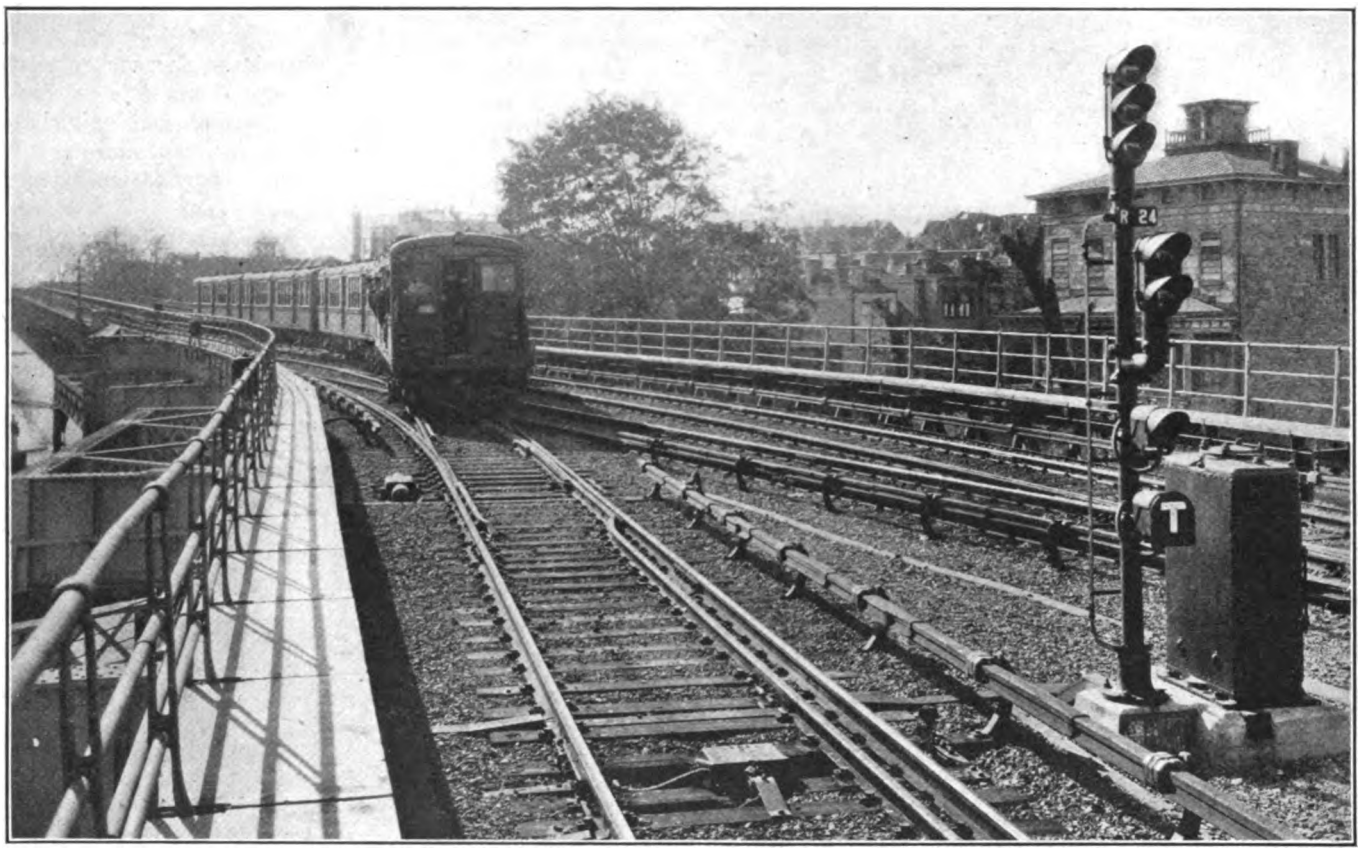
Signaling on the Frankford Elevated—II

The Interlocking Features Are Taken Up in This Article, as Well as the Speed Control Signals Which Form a Special Feature of the Installation—Junction with Market Street Line Involved Unusual Problems

By J. N. Dodd
Consulting Engineer, New York City,
Recently with the Department of City Transit, Philadelphia, Pa.



Automatic Train Stop, Color Light Signals, and Switch and Lock Movement, Electro-Pneumatic Interlocking, on Frankford Elevated

IN THE issue of this paper for April 28, 1923, page 711, the writer explained the layout of the signal system of the Frankford Elevated line, in Philadelphia. He left the subject with an account of the air supply system. There remained to be covered the switch interlocking arrangements and the special problems involved in the connection at Front and Market Streets with the Market Street subway-elevated line of the Philadelphia Rapid Transit Company.

The interlocking plants govern the switches, the "dwarfs," the home signals and, except where the signal is next to the station, they also govern the approach signals. Where a cross-over is adjacent to a station the interlocking governs the approach signal on the side away from the station. The valves controlling the air supply to the switches are of the cut-off type and when the movement is completed they cut off the supply of air to the pistons and thus eliminate the loss of air experienced when the pistons are kept charged at full pressure. Because of restricted space these valves are mounted on a special bracket fastened outside of the bench walk.

Signals for operation in the normal direction controlled by the interlocking plant are of the semi-automatic type; that is, they may be thrown to indicate "stop," but when thrown to the reverse position they act as automatic signals and permit a train to proceed only when track conditions are favorable. Each is equipped with an illuminated dial 7 in. in diameter, bearing the letter T in white on a dark background. The operating rules forbid passing a tower-controlled signal displaying a red light without a special call from the towerman. Accordingly, mounted on the mast is a permissive or "call-on" signal, consisting of a yellow light 5 in. in diameter. "Permissives" and "dwarfs" are non-automatic. They are manually controlled and give a proceed sign only when their controller is operated. Their range is 500 ft. as against 1,000 ft. for the signals for normal operation.

The interlocking machines are 110-volt, a.c., electro-pneumatic. Each machine is inclosed in a steel case having separate, removable doors for each section, to give access to the interior. Signal and switch levers are painted red and black respectively, and project in opposite directions. Levers are equipped with latches to prevent accidental movement, and there is the usual mechanical interlocking between levers. This locking makes it impossible to move a lever until other levers

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interlocked with it have been thrown to the correct position. Movement of a lever immediately locks the other levers in position before energy can be applied to the unit controlled, and release of other levers cannot be effected until the lever has been thrown to the end of its travel. This locking prevents the throwing of a switch until the signals governing passage over it indicate danger, and in the same way it prevents giving a proceed signal over a switch until the switch has been locked in the proper position and all opposing signals have been thrown to the "stop" position.

For each spare lever, and where space is left for the future installation of a lever, room is left in the locking bed for one cross-locking bar and one longitudinal bar for the full length of the machine.

ELECTRIC LOCK FOR SWITCHES AND SIGNALS

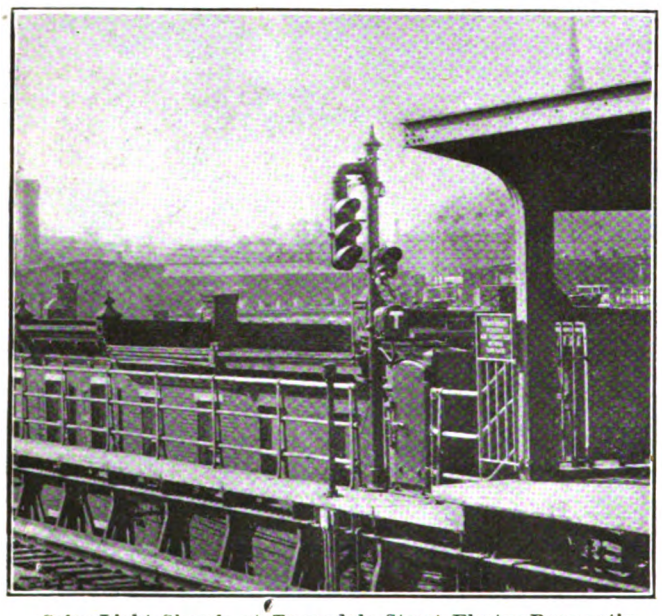
Sectional route locking is provided by equipping each switch lever with an electric lock which prevents the moving of the switch as long as any part of the train is on the section. It is also provided with an indication lock, circuit controlled, so that when the lever is thrown the movement cannot be completed, and thus the mechanical locking affecting other levers be released, until the switch has been moved to and locked in the position corresponding to the position of the lever. Each signal lever is equipped with a similar lock, circuit controlled, so that when the lever is thrown toward normal the movement cannot be completed until the controlling relays for all signals, including permissive, directly controlled and indirectly controlled, have assumed their most restrictive position. The circuits for the signals, as distinguished from the circuits for their levers or relays, are also controlled through relays that positively repeat the position of the switch.

Permissive signals are controlled by a button mounted on the front of the machine and placed directly below the lever for the semi-automatic signal on which the "permissive" is mounted. This button is so interlocked with the lever that the circuit of the "permissive" cannot be completed through its controller until the lever has been reversed. The button also depresses the trip.

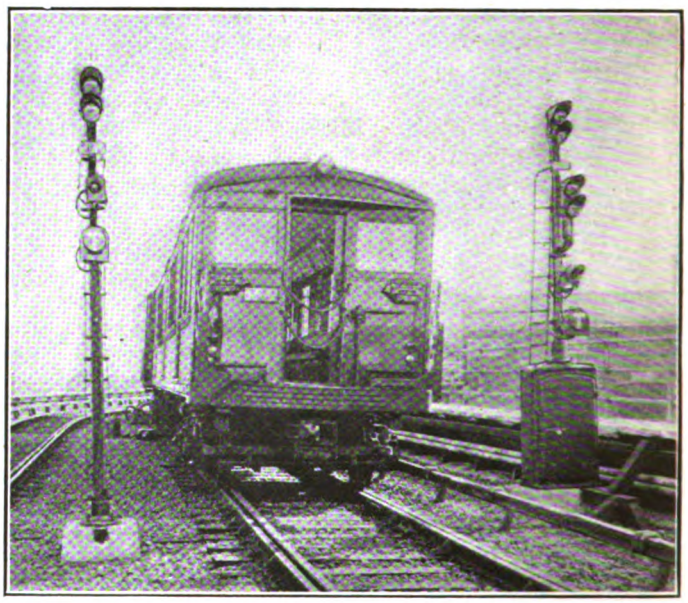
Electric locking is also provided to prevent taking away or changing a route after a train has entered the approach sections and the motorman has been given a proceed signal. Under certain restrictions the approach locking can be cut out. The release is by a clockwork mechanism which permits throwing the switch only after the lapse of a predetermined period. This period is adjustable, but the time is made sufficiently long to insure that the train will be brought to a stop before the switch can be moved. Locking which performs the same function is provided in connection with all "dwarfs" and with certain semi-automatic signals for which approach locking is not provided. This, however, is always effective, and is not dependent on the presence of a train in the approach section. This locking has automatic time release.

There is a sealed clockwork release for each electric lock on switch levers. This makes it possible to throw a switch when a car is on the section, but only after the seal has been broken, and it is impossible to give any proceed signal other than a permissive over a switch unlocked in this way.

Under each switch lever is a visual indicator of the electric-light type, which indicates by a green light that the track circuit controlling the lever is unoccupied and that the lever may be moved. Under each signal lever controlling a semi-automatic signal is a similar indicator which shows by a green light that the track circuit controlling the semi-automatic signal is unoccupied. It is also provided with a red light. When the lever is thrown this light indicates by a flash that the relay controlling the signal has responded. Incidentally if a train is on the section and the signal therefor indicates "stop," although the lever has been reversed, this light will give a continuous indication.



Color-Light Signals at Torresdale Street Electro-Pneumatic Interlocking



Another Installation of Color-Light Signal at Interlocking on the Frankford Elevated

PROVIDING FOR REVERSE-DIRECTION TRAFFIC

There are four traffic levers on each machine. Each lever in conjunction with a similar lever in an adjacent tower permits the establishment of a reverse direction of traffic on a track between the two towers, but only when the levers controlling the signals at the entrance to the controlled territory are normal and the signals indicate stop and at the same time the controlled territory is unoccupied. They are provided with locking which does not restrict non-conflicting train movements, but permits following trains in the established direction

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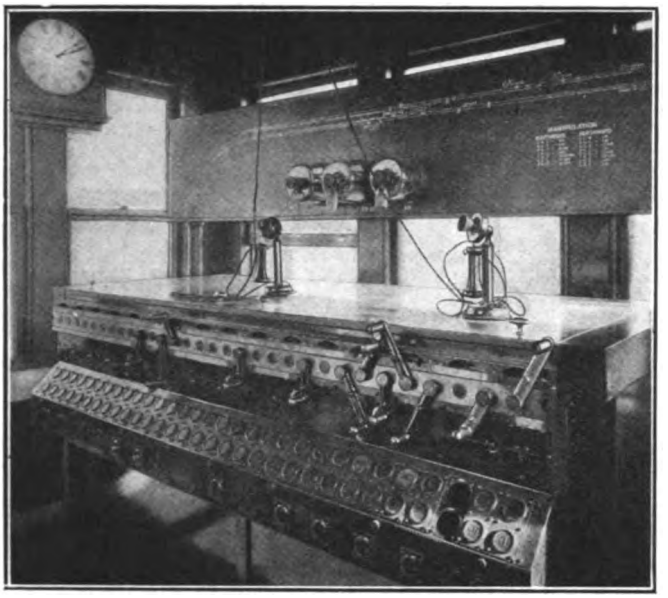
at close intervals. Under each traffic lever is a visual indicator which shows by a green light when conditions are proper for change in direction of traffic, and the lever may be reversed.

Mounted on an angle iron frame directly above each machine is an illuminated model showing tracks, track sections, signals, and other features of the interlocked section. Each track circuit on the model is colored sufficiently distinctive to differentiate adjacent sections. It is also indicated by a round spotlight located approximately at the middle of the section it repeats and which burns only when the track section is unoccupied. The model has one light for each track section within interlocking limits, one for each of the approach blocks and one for the receding track territory controlling the home signal at the entrance to the switch.

Near each machine is a switch panel carrying the following instruments: one voltmeter for the 110-volt mains, one air gage, two ground detectors and one switch for tower lighting.



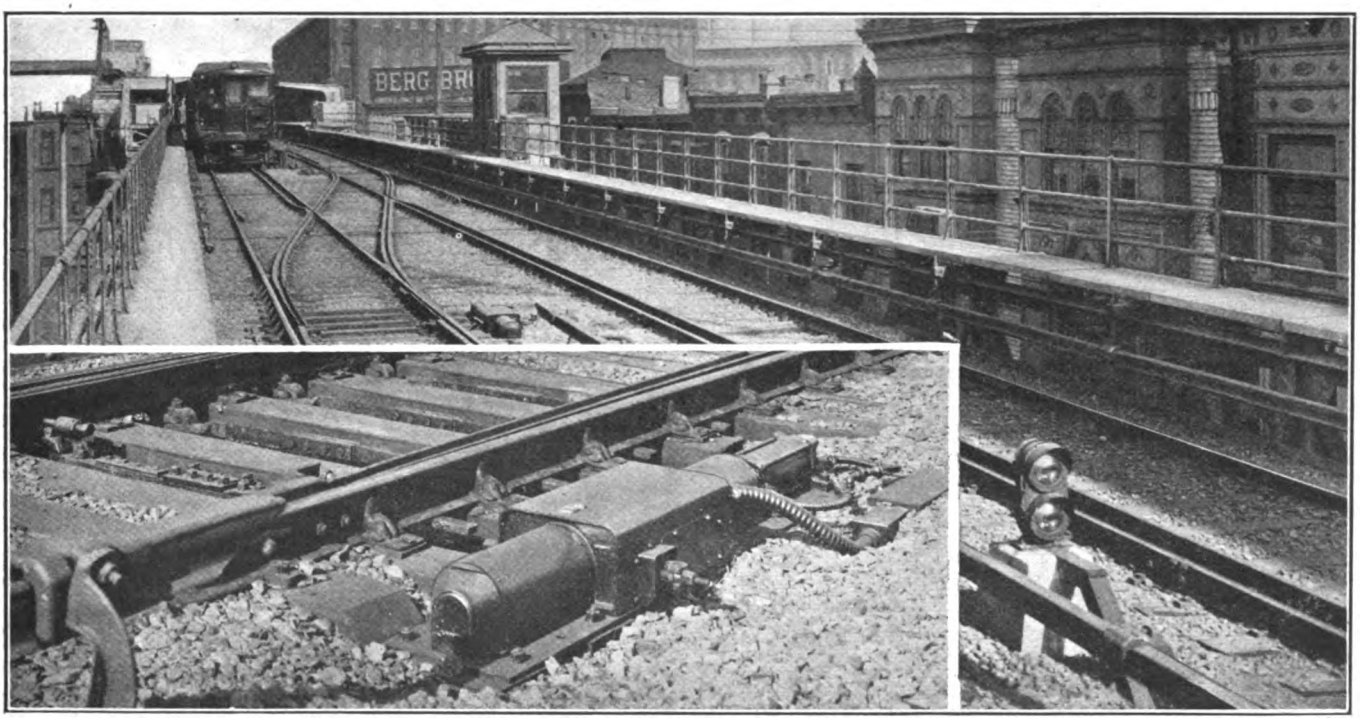
Electro-Pneumatic Interlocking Machine, with Lever Light Indicators and Illuminated Track Model and Clockwork Time Releases

SPECIAL PROBLEM AT FRONT AND ARCH JUNCTION

Special treatment was found necessary for the junction at Front and Arch Streets, between the line from Frankford and that from the ferries. At a junction point the signal layout must be such as to insure a specially high track capacity. It is true that, except for interference between trains running in opposite directions, if trains are run to schedule there will be no more congestion at a junction point than at other points of the line operating the same schedule, but it is also true that on a rapid-transit line trains cannot be run exactly to schedule. One train will stop at a station for say ten seconds, while the following train may easily be held for as long as ninety seconds. By proper dispatching at a number of points these differences may to a certain extent be smoothed out.

However, the junction at Front and Arch Streets is next to the Market Street station, which is served by the ferries of the shore lines of the Pennsylvania and Reading Railroads. During the summer these roads operate a frequent ferry service and most of their passengers take the elevated cars. It frequently happens that when a train enters a station there will be waiting on the platform the passenger loads from three ferry boats, and while these are loading on the train a fourth boat arrives and delays the train even further. When the next train arrives the platform is empty. Delays of trains approaching junction points are unavoidable, and if the signals cannot handle the trains as they arrive from the two lines there will be congestion.

The necessity for capacity at the Front and Arch Streets junction is accentuated by the fact that there will be interference between trains going in opposite directions. The tracks for Frankford and those from the ferries cross each other at grade. This interference delays the service on one line and, therefore, of all cars in each direction that pass the junction. The signal installation must be such as to handle, without delay, trains running at very close intervals.



Electro-Pneumatic Interlocking, with Switch and Lock Movement, and Color Light Signals at Dauphin Street, on Frankford Elevated. Inset, Close-Up View of Switch and Lock Movement on Frankford Elevated

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The grade and alignment of the road at this point make it difficult to signal the line for high capacity. Rules for laying out signals call for rear-end protection not less than the distance necessary to stop a train running at the highest attainable speed. A line where the stations are at the tops of grades is easy to signal for close traffic. On the down grades from the stations the block lengths must be long but the speeds are high so that heavy traffic can pass. On the up grades into the stations the speeds are low but the block lengths are short. Either of these combinations permits close running.

However, when the stations are at the bottoms of grades it is difficult to signal for high capacity. The trains can reach a high speed on the down grade, so that with the ordinary methods of signaling very long block lengths are necessary. Practically, on a steep down grade terminated by a station, the trains actually run at a very low speed as the motorman is afraid to let his train out of control. The combination of low speed and long blocks prevents close running.

The grade and alignment at this point are such as to present to the trains from Frankford a danger condition which does not exist to the same extent for the trains from the ferries. As the ferry trains start from Market Street station they immediately encounter a curve of 140 ft. radius, with a total angle of 180 deg. by which the road reaches Arch Street. This curve terminates in a 5 per cent down grade leading into the subway. At the lower end of this grade is a curve of 200 ft. radius, with a total angle of 90 deg. at the end of which is the station. While these conditions are extreme, no accident has occurred here in the fifteen years of operation. The curve of 140 ft. radius is within full sight of the motorman as he starts from Market Street and he will not accelerate rapidly to it or run fast around it. Before the rear of his train is off the curve he is well down the grade and close to the 200-ft. radius curve. The layout itself guards against excessive speed on the grade.

For the trains from Frankford a different condition is presented. The grade terminates a long straight run. At the beginning of the grade is a 2.35 per cent slope; then there is one of 4.6 per cent which leads into the 5 per cent slope, at the lower end of which is the curve into the station. Except for the curve at the foot there are no natural obstacles to high-speed running and it would be easy for a motorman to attain a speed on the grade from which it would be impossible to brake to a speed safe for the curve. The blocks on the curve should be long to avoid rear-end collisions. On the other hand, the trains must run slow to avoid disaster on the curve. With the usual signal layout the track capacity would be low, whereas, as has previously been pointed out, a high capacity is essential. Moreover the usual signal layout does not prevent high speeds. A signal system was necessary which would guarantee safety and capacity.

Speed Control Signals Solve the Difficulty

The solution determined upon was to provide double overlap so as to space the trains closer and to install "speed control" signals. These are signals which normally display a danger indication, but are equipped with a time element which causes them to display a proceed signal a certain number of seconds after the time element has been energized. This time element is essentially a constant-speed motor.

High and Dwarf Color-Light Signals and Automatic Train Stops at Entrance to Market Street Subway, Junction of P. R. T. and Frankford Lines

The type of speed control usually installed is two-position, and has a single control. This is energized when the approaching train enters the block, immediately in advance of the signal. It is entirely effective in limiting the speed, but it is open to the objection that it keeps the speed of the trains to too low a value and makes it impossible to get the traffic over the line. The motorman, seeing the danger signal ahead, takes no chances of being tripped but runs at such a low speed that the signal clears well ahead of him. Experience shows that the average speed of trains over a line equipped with this type of speed control is only about half the permissible speed, and this reduction in speed cuts into the capacity in about the same proportion.

The speed control signals decided on for this installation are three-position with two controls. The time element becomes energized when the front of the approaching train enters the second block in advance of the signal, and the yellow proceed signal is displayed a certain number of seconds thereafter unless before this time has elapsed the front of the train has entered the block immediately preceding the signal. If it has en-

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tered this block the signal under consideration will continue to display red and its trip will continue raised until a predetermined period of time has passed, after the train has entered this last-named block. These two periods of time are independently adjustable.

Experience in New York, where this type of speed control signal was developed, show that where it is installed the speed of the trains is very close to the limit for which the signals are set. Trains usually pass the signals just at the instant they flash from yellow to green and the one ahead changes from red to yellow. If the train runs too fast and passes a signal before it changes to green, the motorman checks the speed only slightly and the next signal is reached just after it changes from red to yellow and from that to green. It is almost as if the motorman accepts the signals as a sporting challenge to run the train at the speed for which the signals are set.

A criticism against this type of signals is that they do not make high speeds impossible. Theoretically this criticism is true. If the motorman is running at the correct speed the nearest raised trip is always the second one in advance. It is possible for him to accelerate over this space at the maximum rate and to attain a high speed before he is tripped. However, this criticism is more academic than real. The signals normally indicate danger at all times of the day and in all conditions of traffic. The motormen come to accept them as part of the existing conditions just as they accept the stops at stations. It is as difficult to conceive of a motorman throwing on full power and running into a signal which he knows always indicates danger as it is for him instead of stopping at a station to rush through it at full speed when he sees a train stopping just beyond it.

To sum up, the speed control signals are such as to cause the motorman to run no faster than the predetermined speed but to encourage him to run close to it, and in this way to obtain full capacity for the grade.

It will be noticed that these special precautions cover the safe operation down the grade of trains running at close headway. They do not cover safety at the grade crossing. The precautions to this end are simple. The crossing movement is between trains from the ferries and trains to Frankford. Safety for this movement is insured by mechanical locking in the lever machine so that the switch cannot be thrown for the train to Frankford if the position of the switch on the other track permits the passage of a train from the ferries. Before the route can be set up for the west-bound train from the ferries, the switch on the east-bound track must first be thrown and locked so that the only east-bound movement possible is to the ferries and a crossing is impossible.

As was mentioned at the end of the preceding article the contractor for the signal system of the Frankford Elevated was the Union Switch & Signal Company. This applies to the features covered in the concluding article as well as those described earlier.

During the four days of the Easter holiday this year the railway, omnibus and tramway lines forming the "Underground Group" in London carried more than 16,000,000 passengers. On one day the number was 5,000,000. In 1922, as stated earlier in this paper, the tramway cars of the London County Council carried 726,000,000 passengers, a record for traffic and 36,000,000 more passengers than in 1921.

Galvanizing vs. Painting of Exposed Steel Structures

THE editors of the *Electrical World* have recently conducted a canvass regarding the relative merits of painting and galvanizing steel used in structures exposed to the weather. While no definite conclusions were drawn, a summary of advantages and disadvantages of both practices was prepared. This is given in substance below:

Galvanizing—Advantages

1. Where parts of the structure are not readily accessible or dangerous to life—for example, near live wires—galvanizing has advantages.
2. Where the structures are widely scattered and the cost of a careful inspection would be heavy, galvanizing is also advantageous.
3. Where a permanent installation of sufficient magnitude to warrant a company doing its own galvanizing is made, the cost of galvanizing adds only 20 to 30 per cent to the cost of the steel.
4. In fabricated structures where bolts are used galvanized parts have a longer life.
5. In some structures it is possible to use lighter steel if it is galvanized than if paint is used.
6. The length of life of the galvanizing is from eight to fifteen years as compared with two to four years for paint.

Galvanizing—Disadvantages

1. First cost is high—reports give figures varying from 30 per cent greater to nine times the cost of painting.
2. The quality of galvanizing varies, necessitating rigid specifications.
3. In certain locations—for example, in a damp, salty atmosphere and in a sulphur-laden atmosphere—galvanizing has a very short life, so that its application is somewhat limited.

Painting—Advantages

1. It is cheaper than galvanizing, and this makes it particularly advantageous for new installations in which the capital charge must be kept low until the load grows.
2. It costs little to have painting done by the normal line crew during odd moments.
3. Paint of different qualities can be found suited to peculiarities of the location of each structure as regards weather conditions, air conditions and a changeable environment.

Painting—Disadvantages

1. It is difficult to obtain paint of the proper quality for each application.
2. Two or more kinds of paint must be used to obtain good results.
3. Repainting must occur in from two to four years, and in many cases this is a very costly operation, particularly if structures are brushed or scraped before repainting.
4. Repainting of live structures is hazardous and it is difficult to "kill" substations or lines.

17 per Cent Increase in Railway Competition

RECENT compilations of the National Automobile Chamber of Commerce show that in 1922 there were 12,239,114 motor vehicles registered, as against 10,464,005 in 1921, an increase of 17 per cent. The production of new motor vehicles in 1922 reached the startling total of 2,659,064, which passed the previous high mark of 1920 by 22 per cent. It was an increase of 60 per cent over the 1921 production.

The accompanying table giving the record of passenger car and motor truck production and the record of registration is something to contemplate. Where is the saturation point in the registration figures?

Indications for 1923, so far, are that production may exceed that of 1922. During April, 364,000 vehicles were manufactured and shipped, which is 66 per cent greater than April last year.

	Passenger Cars		Motor Trucks		Total Motor Vehicle
Year	Number	Wholesale Value	Number	Wholesale Value	Registration
1911.....	199,319	$240,770,000	10,655	$22,292,321	639,514
1912.....	356,000	335,000,000	22,000	43,000,000	944,000
1913.....	416,500	399,902,000	23,500	44,000,000	1,287,000
1914.....	534,679	413,859,379	25,375	45,098,464	1,711,339
1915.....	818,618	565,978,950	74,000	125,800,000	2,445,664
1916.....	1,493,617	797,469,353	90,000	157,500,000	3,512,996
1917.....	1,740,792	1,053,505,781	128,157	220,982,668	5,104,321
1918.....	926,388	801,937,925	227,250	434,168,992	6,146,617
1919.....	1,657,652	1,461,785,925	316,364	423,326,621	7,530,105
1920.....	1,883,158	1,809,170,963	322,039	423,756,715	9,177,129
1921.....	1,514,000	1,093,918,000	147,550	166,082,000	10,464,005
1922.....	2,406,396	1,567,003,041	252,668	222,635,324	12,239,114

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Why One-Man Operation Is Popular in Binghamton

Better Service, Clean and Well-Painted Cars and Relatively Fewer Accidents Please the Public—The Passenger Revenue Increased 3 per Cent in 1922—Trainmen Prefer to Operate One-Man Cars

THE operation of one-man cars in many localities has not met with entire public approval, and the success of the Binghamton (N.Y.) Railway in avoiding the difficulties which have sometimes made such operation unpopular elsewhere is, therefore, worthy of note. All of the local service of this company, comprising nearly 90 per cent of the total daily number of trips, is now operated with one-man cars. These are, in the main, converted two-man cars, but on only one interurban line are two-man cars now used. Moreover, the public is well pleased with the service and has shown its approval by increased riding.

Several factors have contributed to produce this

Double Door Permits Simultaneous Loading and Unloading

situation. In the first place, one-man cars were inaugurated without any advance publicity. The management took pains to make no promises beforehand concerning improvement in the service, thus avoiding the risk of consequent dissatisfaction if it did not materialize. No opportunity was given to prejudiced persons to condemn the new cars without a trial. When they were ready the railway simply commenced operation of one-man cars, and left it to the public to judge them by actual performance.

Special care was taken that there should be no slowing up of service, as it was realized that such a thing would soon make the change very unpopular. Efforts to maintain speed have been so successful that with the same schedule for both types of operation the one-man cars are late less often than the two-man cars. At the same time particular attention has been given to the subject of maintenance, so that the service is reliable and the cars always present an attractive appearance inside and out, and every reasonable provision is made for the comfort of the passengers. The public has come to realize that it is getting a high-class service at a comparatively low rate of fare (6 cents).

The fact that there are no railroad crossings at grade is one feature that has been helpful in making one-man operation a success, as is also the fact that there is only one multiple-fare line. This goes to Endicott and uses two-man cars entirely. Another favorable circumstance is that no routes terminate in the congested district, all running through from one side of the town to the other, or in some cases looping near the center of the city. For that reason the problem of quickly changing ends at busy points with only one man to do the work has not arisen.

On the other hand, there are a number of local circumstances which tend to increase the difficulties of the operator of a one-man car. For example, all signals are thrown by hand. Many of the lines in Binghamton are single track after leaving the business section of the city, and the manipulation of the signals, therefore, makes considerable work. There are at the present time no electric switches, and hence switches, too, must be thrown by hand except at the intersection of Court and Chenango Streets, where a switchman is located during the rush hours. It is planned, however, in the near future to install an electric switch at this point.

No change whatever was made in the schedule speed when two-man cars were replaced by the one-man type. The present schedule varies from a little more than 8 m.p.h. on the slowest line to 11 m.p.h. on the fastest. All lines are checked during the entire period of operation by inspectors stationed at Court and State Streets. A summary of these checks showed that on twenty-two week days chosen at random and representing all sorts of conditions, the one-man cars were late less frequently than were the two-man cars.

In these checks one and a half minutes variation from schedule was the maximum allowed, and all cars two minutes late were so recorded. On that basis the one-man cars made a performance well over 99 per cent, while the two-man cars were only about 98 per cent on time. The average layover at the outer ends of the various lines was between two and three minutes, and it has been found that this time is sufficient for the operator of a one-man car to change ends. To facilitate this work all such cars have been equipped with fenders or life guards at both ends. A change of schedule was therefore unnecessary, and experience has proved that the one-man car can be operated at the same speed as the two-man, or even a little faster.

Pay-as-you-enter operation prevails on all lines, and the railway has installed a number of devices to increase speed. A large number prominently displayed and illuminated at night indicates at a distance what route a car is following, and all front entrance cars are plainly marked, as can be seen in the accompanying picture. The single-truck cars, although equipped with standard safety devices, are not the typical safety car, but are

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of somewhat heavier construction and have a doorway of double width. This permits simultaneous loading and unloading and makes for more rapid service. On all cars except those of the 500 type, however, the controller and doors are interlocked and the latter manually operated. It is claimed that a quicker get-away can be obtained by leaving the controller handle on the first point and starting the car by closing the door than is possible when the door closing, brake release and power application have to be done successively.

There has been a reduction in the relative number of accidents since the inauguration of one-man service in Binghamton. Comparing the years 1920 and 1922, there has been a gain in the number of motor vehicles licensed in Broome County from about 7,000 to 16,000, or nearly 130 per cent. At the same time the number of collisions between street cars and automobiles has increased only 19 per cent. Moreover, there has been a reduction in the number of boarding and alighting accidents so that the net result is that, in spite of the tremendous growth of automobile traffic, accidents in 1922 were only 17 per cent more than in 1920. The relatively smaller number of accidents at the present time is attributed by the company to the door interlocking devices and the fact that on and off movement of passengers is directly under the eye of the motorman.

A large part of the success of the one-man cars is no doubt due to the attitude of the trainmen, who prefer them to the older type cars. Platform wages are 5 cents an hour higher in order to compensate for the slightly greater amount of work to be done. Johnson fare boxes are used with overhead registers. The fare being six cents, the operator must be prepared to make change and must grind down the box and ring the register. Tokens are not used to any great extent because they are sold without reduction in price.

In addition to the work already mentioned, the operator of a one-man car must record on his daily report card the register reading at the end of each half-trip, and upon the completion of his run the beginning and ending numbers of fare box and register, and the number of transfers, free riders, etc. He must also fill out a memorandum of any mechanical defects found and a report of the number of trips made with the car. This latter is for use of the shop department in figuring mileage for inspection and overhauling. It appears from the foregoing, therefore, that the keeping of necessary records has not been sacrified to make the cars popular with the trainmen.

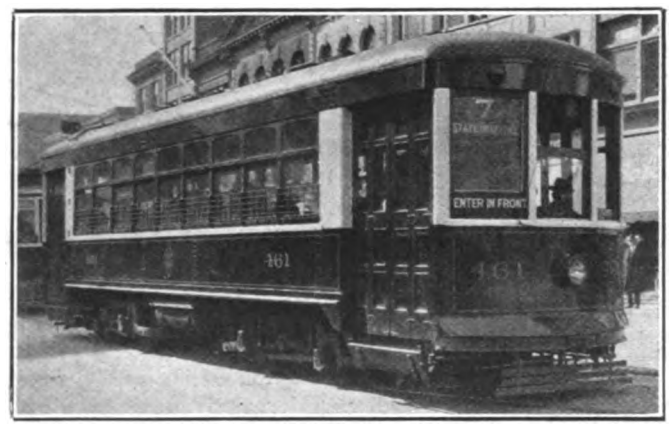
The popularity of the one-man operation with the public is not due directly to the cars themselves, but to the fact that the saving in operating costs has made possible an unusually high standard of maintenance. Every car is cleaned before it is sent out of the barn in the morning. The interior is swept and sprayed with West's disinfectant. The exterior is dry wiped every night and treated with Brooks renovator every sixty days.

Forty-three new cars have been purchased by the Binghamton Railway since 1916. A portion of these are single-truck cars, resembling the Birney car in design but of heavier construction, and with the wider doors described above. This car has a 9-ft. 6-in. wheelbase, weighs 19,000 lb. and seats twenty-eight people. It is claimed that the more sturdy construction saves maintenance costs, and permits carrying larger loads.

The non-rush time-table calls for forty-two cars on the road, and twenty-one additional trippers are sent out in the late afternoon. Even with this amount of service it is important to carry as many passengers per car as can be done without undue crowding. The single-truck cars of the 500 type can easily accommodate seventy-five persons.

More recently, however, the company has purchased double-truck equipment. The latest design, of which seven additional units have lately been acquired, is a steel car built by the Cincinnati Car Company, weighing 32,500 lb. and seating thirty-eight. It has been found that these cars carry about the same number of passengers when operated by one man as when operated by two men. The explanation of this lies in the fact that passengers tend to gather around the entrance whether at the front or at the back, and in either case some will move into the body of the car when urged to do so and some will not. Accordingly, the carrying capacity of the car does not vary greatly, no matter which way it is used.

All cars are equipped with electric heaters and thermostats. Center lighting is used with 94-watt lamps and an emergency storage battery to supply current to the red lights in the rear in case the trolley leaves the wire. Cars are inspected every 1,000 miles, and overhauled every 50,000 miles. Painting is done



Cars of This Type Are Used Successfully for One-Man Operation

regularly every second year, even though the car retains a fairly presentable appearance. Pratt & Lambert's standard Tuscan red is used.

The fact that the cars are clean, well heated, well lighted, well ventilated and bright and attractive looking has appealed to the people of Binghamton and stimulated the riding habit. Passenger revenue increased about 3 per cent in 1922 over the preceding year, and bus competition has been forestalled.

Traffic Congestion in Shanghai

SHANGHAI (China) claims to have the world's largest number of passengers carried annually per mile of track, 7,000,000. The total number increased from 11,000,000 in 1908 to 126,000,000 (21,750,000 first class) in 1922, with practically no increase in track mileage. The number of cars, however, increased from sixty-five to 194. The track mileage to day is only 2.43 per 100,000 population. In the period mentioned the annual car-mileage has trebled, i.e., increased from 2,000,000 to 6,000,000.

In the foreign settlement in Shanghai there are 15,000 public and private 'rickshas, 14,000 wheelbarrows, 3,000 motor cars and 2,164 hand carts.

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Connection Triples Freight Business

THE Buffalo & Lake Erie Traction Company operates freight service between the cities of Buffalo, N. Y., and Erie, Pa., connecting with the Jamestown, Westfield & Northwestern Railroad at Westfield, N. Y. Until the latter part of last year, however, the two roads crossed, but had no connecting curve from one to the other. Through freight from points on one railway to destinations on the other had to be unloaded at the depot of the first road in Westfield, carted across town and reloaded onto the cars of the other road at the latter's depot. Whenever suggestions were made that a physical connection should be installed the authorities of Westfield raised the objection that it would make a freight yard of their town.

An agreement was finally reached, however, between the town authorities and the railway officials whereby the connecting curve was to be installed and if, after a fair trial, it was found to be a nuisance the companies practically promised to remove it. The connection was made on Nov. 6, 1922, and as a matter of fact there have been since that time fewer cars standing in the streets than formerly stood there, because through operation without the necessity of trans-shipping at Westfield is now possible.

The town authorities seem entirely satisfied with the new arrangement and the freight business has increased in a most gratifying way. Under the old conditions that part of the traffic handled by the Buffalo & Lake Erie Traction Company amounted to about $10,000 annually. At the present rate the business done in 1923 will be well over $30,000, and it is estimated that it will eventually develop to about $75,000 a year.

California Railway Situation Improving

IN ITS REPORT recently issued for the year ending June 30, 1922, the Railroad Commission of California sums up the electric railway situation there as follows:

"The street railways of the entire country, during the last number of years, have gone through a trying and difficult period. Costs and wages have shown a disproportionate increase compared with the increase in traffic, and the lack of normal traffic increase was due largely to the competition of the private and public automobile. Even a substantial increase in fares failed to keep some of the weaker companies in operation.

"It seems as though in California, at least, this critical period has come to an end. With the fall in costs and with the private automobile competition apparently close to the 'saturation point,' the interrupted normal curve of traffic increase appears to have returned to its original and upward tendency. This has had the effect of improving street and electric railway service during the last year; with proper operating economies a number of requested rate increases proved unnecessary in the commission's opinion; and in general, the street and electric railways are in a healthier condition than they have been for a considerable period of years.

"The installation of the one-man safety car has proved a distinct benefit from the standpoint of service and cost of operation in several communities. Experiments with new forms of tickets and commutation rates have proved satisfactory in several instances and there has been a further effort on the part of the commission in all rate cases to do away with unjustifiable discrimination between classes of service and communities."

The Readers' Forum

Not Practicable to Manufacture Left-Hand Thread Lamps

THE ARROW ELECTRIC COMPANY
HARTFORD, CONN., April 25, 1923.

To the Editors:

We have read the communication on the theft of lamps shown on page 650. Of course the left-hand screw thread on receptacles and the left-hand threading on lamps could not prevent the removal of lamps; it would simply make the lamps useless, and perhaps that fact might not be recognized in time to prevent the actual theft but would be found out afterward and the lamp destroyed.

There are several socket manufacturers making lock sockets. The type manufactured by P. & S., the H. T. Paiste Company, Bryant Electric Company, G. E. Company and ourselves is a positive lock. In other words, the lamp cannot be removed without the use of a special appliance, in our case a key. It also prevents lamps jarring or vibrating out of the sockets or receptacles, which we should think would be an added advantage as far as trains or electric cars are concerned.

A locking arrangement of this kind which prevents the removal of the lamp would, it seems to us, be a better proposition than an arrangement which would make it possible to remove the lamp but make the lamp useless. There would be a considerable amount of theft before it was discovered that these were useless.

Another point is the fact that we have had some experience with left-hand screw threads with the result that we will not handle sockets or receptacles using such a thread. They become mixed in manufacture and cause endless trouble in the field. It is almost impossible to keep them separate from standard parts, so regardless of the merits of the left-hand threading as against the positive lock, our company for one would not care to take on a proposition to manufacture sockets or receptacles with left-hand screw threads. We think this would also be the opinion of other manufacturers in our line. H. C. POND, Sales Manager.

Bayonet Sockets Would Prevent Lamp Thefts

THE DENVER TRAMWAY COMPANY
DENVER, COL., April 23, 1923.

To the Editors:

Referring to the letters published in your issues of March 24 and April 14 on the question of how to stop the theft of lamps on electric railway properties, I would be glad to give my idea on the subject. I might mention that my opinion is the result of thirteen years of continuous service in the lighting department of this company as foreman.

The lock sockets on series circuits are out of the question, as the additional time consumed in trouble shooting would cost more than the lamps by far. On multiple circuits sockets are twisted loose with added trouble for the maintenance man. The left-hand thread, as well as any over or under standard size sockets, would very likely have some effect in avoiding theft. This would necessitate a change in manufacture of lamp sockets, including the replacement of present installa-

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tions. Furthermore, you will find a lot of different makes of sockets on the system that would make it hard to replace the screw portion only as the cost of tools for the makers to manufacture to fit these old types would prohibit this. The cost to change them alone would cost more than new sockets.

I would suggest the so-called double-contact bayonet socket and lamps of a size that would permit the socket manufacturers to use some of the dies and molds of present sockets for porcelain parts. This type would aid the trouble shooter in locating the bad lamp in a series circuit, as a change can be made faster than with the screw base. It would do away with the loose lamp trouble, which is a common thing on cars and poles, or any chattering condition. The destruction of sockets due to the arc drawn at the contact when connection is broken on a series burning lamp will be avoided.

The loss of time on the part of carhouse men when using pit lamps with extension cords is often due to a loose lamp in the circuit. The fire hazard of a series burning lamp circuit will be overcome, too, as loose lamps may ignite the installation of wires and result in a bad fire, in the event that the burning insulation drops in shavings or inflammable material. The safety in this respect alone would warrant the cost of gradual change on a whole system to the bayonet type, in addition to the gains in other respects.

Can any better solution be found?

W. C. WEFEL, Foreman.

Preventing Pavement Heaving Outside the Track Area

THE TOLEDO & WESTERN RAILROAD COMPANY
SYLVANIA, OHIO, April 26, 1923.

To the Editors:

I note on page 677 of the April 21 issue of the ELECTRIC RAILWAY JOURNAL an article relating to a design of pavement and substructure for street and interurban railways that overcomes the heaving of the pavement outside the track strip.

The general idea of this type of structure is not new. We do not claim that we originated it, although we built something over 1,000 ft. of track in the village of Metamora, Ohio, about 1915, designed in this same general way. Our track, however, was laid upon a 10-in. bed of concrete and a retaining curb of concrete 6 in. thick was built to the top surface of the paving. On the outside of this retaining curb we placed a ¾-in. premolded expansion joint the full length of the job. Transversely across the track we placed a ¾-in. expansion joint every 30 ft. In this trough of concrete we placed 2 in. of stone ballast, on top of which we laid our ties and rails to true grade. The crushed stone ballast was carried half way up the side of the tie and on top of this we then laid our concrete paving, which was reinforced with ⅛ in. steel mesh wire, with openings about 1 in. square.

This paving today is in very good shape, and the adjoining paving outside the track, which was of reinforced concrete, shows practically no heaving at any point. The only place where the paving is failing at all is at the rail joints, where all that is necessary is to tighten the bolts and perhaps put in some new bolts.

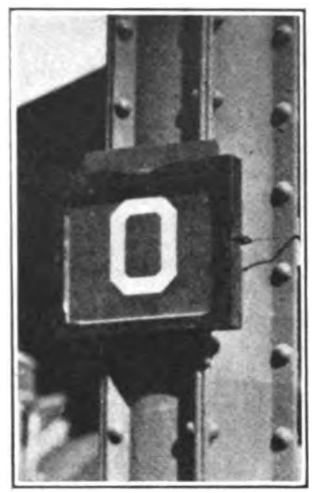
Our experience has shown us that this type of construction is very satisfactory, and it has been used to a great extent in Toledo, Ohio, on the tracks of the Community Traction Company.

We hope that your article will be carefully considered by other railways, for it surely is a design which will, we believe, be more satisfactory to municipal engineers, as well as to railway engineers themselves, than that type which makes the track structure an integral part of the street paving.

A. SWARTZ,
Manager for Receivers.

Heat Signs in Brooklyn

THE cars in Brooklyn are equipped with electric heaters with coils connected so that three intensities of heat can be obtained. The regulation of the heat is controlled from the main offices of the company. When the temperature is between 30 and 40 deg. one point of heat is used; between 20 and 30 deg. two points and below 20 deg. three points.



Heat Signs in Brooklyn

At all depots, switch towers, principal terminals, and other important points, signs similar to the one shown in the illustration are installed to indicate the proper amount of heat to be turned on. The readings of a number of thermometers at various points on the system are telephoned in to the main office, the proper amount of heat to be used is decided upon and notice is sent to the men in charge at the points where the signs are displayed. The card showing the proper number of points of heat—0, 1, 2 or 3—is then slipped into the frame. The trainmen are expected to observe these signs as their cars pass and make any necessary changes in the position of the heater switches that may be indicated by the signs.

Where the signs cannot be seen readily at night they are illuminated.

A Consolidated Delay Report

ONE of the steps recently taken by the Chicago Surface Lines to remove the cause of delays to its service has been to establish a single department where every delay to cars, no matter from what cause, is promptly reported, with the length of delay, cause, etc. As notices of these delays are received a record is made of them, and the record for each day is submitted to the management on the following day. At present this record is made up to 7 p.m. at night, but within the next few weeks, when the company has moved to its new offices, there will be a night service by which all delays which occur up to midnight on any day will be typewritten and manifolded for submission to the proper officials when they reach their desks early the next morning. The classifications used are as follows:

Time of delay (hour of the day).
Line.
Place of delay to service.
Run number.
Car number.
Direction.
Cause of delay to service.
Time cars were delayed: —— hours —— minutes.
Action taken to maintain or restore service.

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Association News & Discussions

Fuel Determinations on Southern Pacific Steam Locomotives*

Road Tests on Oil-Burning Engines Set Standard for Comparison with Electric Locomotives—Discussion Shows Variation in Performance Computations

By A. H. Babcock
Electrical Engineer, Southern Pacific Railroad, San Francisco, Calif.

WHENEVER electrification of steam railways on a large scale is advocated one of the principal arguments advanced is the large saving in fuel sure to result therefrom; in fact, this was the initial point of attack in the early days of the art, long before overtime of train and engine crews had become the very real expense in train operation it is today.

Fuel consumption of steam locomotives using coal cannot be analyzed as can that of electric locomotives, because it is impossible to obtain accurate measurements. When fuel oil is used, much more precise determinations are possible.

Engine No. 3,614 was selected because the records of the fuel bureau showed it to be an "average performer" in through freight service. It is of the 2-10-2 type, having cylinders 27½-in. long x 32-in. stroke. The weight on drivers is 273,000 lb., on the leading truck 29,000 lb. and on the trailing truck 46,000 lb. The rated tractive power is 63,300 lb. The tender is of the cylindrical type. It weighs empty 64,900 lb. and has a capacity of 3,120 gal. of fuel oil and 10,030 gal. of water. The weight of the tender loaded is 173,460 lb.

On every run a different engine crew handled the train while making the tests, the selection being by the usual "first in, first out" method standard on the railway. A trained observer rode the engine and made all the readings. The train weights, taken from the yardmaster's reports at the initial points, were corrected, during the runs, for fuel and water consumed.

It was found during the test runs that all engineers handled the trains very much alike, changing throttle or cutoff at or near the flags that had been placed at the reference points given in Fig. 1. Meter readings and times were recorded at all such points and at all starts and stops. In the final analysis all fuel measurements were reduced to 60 deg. F. Approximate correction factors on the train tonnage for water and fuel were made. The train tonnage, then, is the gross weight of the train, everything included.

The result is a complete record of fuel consumption. In the ordinary system of fuel records all fuel consumed in firing up, standing in the engine house and on the outgoing track

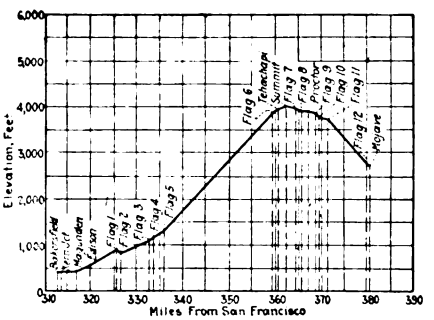

Fig. 1—Profile, Bakersfield to Mojave

up to the time the engineer assumes responsibility, i.e., thirty minutes before he is called to leave the terminal, is charged to engine house service; all consumed from that time until the engine is placed on the incoming track at the end of the run is charged to road service.

The fuel consumption may be divided into three groups:

1. Variation of fuel used in firing up, i.e., losses independent of the manner in which the engine is used after steam is raised.

2. Fuel burned in holding the engine under steam at terminals or on the road; i.e., losses dependent upon operating staff efficiency, and independent of speed.

3. Fuel consumption while moving; accelerating, running, entering and leaving sidings, etc., all of which depend largely upon tonnage and speed.

Group 1—For this determination the boiler was filled to ½-gage glass, with water at 120 deg. F. Steam for oil atomizer and blower was taken from the house steam lines until the boiler pressure reached 70 lb. gage. Fig. 2 shows fuel with respect to boiler water temperature and steam gage pressure. A second curve shows fuel consumption with time.

From other tests it has been determined that the atomizer and blower add 14 per cent to the fuel consumption. Therefore, if 14 per cent of the 84 gal. used up to the time when the boiler furnished its own steam for these purposes be added to the 119 gal. to bring the boiler pressure up to 200 lb. gage, we have 131 gal. total fuel used to raise steam with feed water at 120 deg. F.

Assuming that the fuel consumption is proportional to the rise in temperature, the fuel per degree rise is 0.522 gal.; from which then can be determined the value of storing the heat from boilers being blown down for washing, to use in firing up other engines for the road. Thus, to fire up with feed water from the hydrant at 60 deg. takes 167 gal. of oil; similarly for feed water at 180 deg., from a hot water boiler washing and filling plant, 96 gal. With fuel oil at $1.50 per bbl., the 71 gal. saved per engine fired up amounts to $2.54, but the saving is even more, because the time of turning an engine washed and filled with hot water is, by record, three and one-half hours less than the seven and one-half to eight hours required when cold water is used. Heavy power represents an investment worth at least $4 per hour. Hence the time saved adds $14 per engine turned to the fuel saved, and the total economy then is $16.54 per engine turned.

Group 2—The upward branch of the time-oil curve, Fig. 2, shows the fuel required to hold an engine under steam while standing in the engine house where these tests were made to be 17.4 gal. per hour, with no auxiliaries running. During the tests, placing this engine in the open yard, oil used averaged 36.6 gal. per hour. Air temperatures during this period ranged roughly from 20 deg. to 50 deg. F. Therefore, 19.2 gal. is the excess fuel consumed per engine-hour when standing in the open in ordinary weather.

Similarly, the fuel cost of standing on sidings with full tonnage train is found to be 42.8 gal. per hour. Since no steam was used for heating in either case, 6.2 gal. is the fuel cost per hour of maintaining air pressure in the train line, ready for service.

Group 3—To obtain results for the third group a more rigid treatment is necessary. R. S. Twogood, assistant engineer Southern Pacific Company, is responsible for the details of the test and the analysis of the results. In the reductions of the observations, the fuel oil density is taken at 0.96; the heat content, 18,000 B.t.u. per lb. The time, fuel meter reading, fuel temperature and location of train were recorded at

*Abstract of paper presented at the spring convention of the American Institute of Electrical Engineers, Pittsburgh, Pa., April 25, 1923.

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every start, grade change or other important point, and stop. The speeds were determined by counting engine driver revolutions. All grade changes at other than station points were marked by white flags (see Fig. 1). Grade compensation for curvature is applied at 0.04 per cent grade per degree of curvature.

Total train resistance was based on Schmidt's tables, the value for level tangent track being taken at 7 lb. per ton. The average thermal efficiency was determined from the total horsepower-hours and the fuel burned when moving over sections where the total resistance was positive.

The average gallons of fuel per thousand ton-miles, in both directions, for every section of track, but not corrected for variations in speed within a section, are shown in Fig. 3 plotted against equivalent grade, wherein the curve as drawn has been adjusted to give fuel requirements for constant speed. Thus is shown the fuel cost of acceleration, and how, in the stop, provided the brakes are not used, a large proportion of the work done in acceleration is made useful in moving the train over the track. This is indicated by points on the left of the curve; points on the right show increase in fuel consumptions during acceleration.

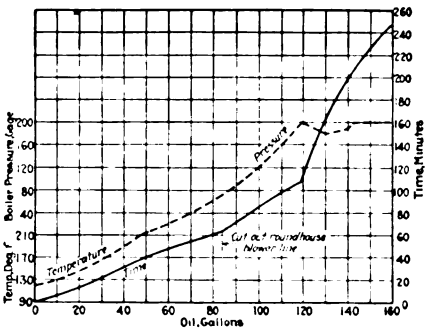

Fig 2—Fuel and Time Required for Firing Locomotive

The dotted part of the curve, for grades less than 0.5 per cent, either positive or negative, should not be depended on for accurate results, because there is no section of level track between Bakersfield and Mojave.

A locomotive of lower thermal efficiency would burn more fuel for any given grade than that shown on the curve. The result would be a flatter curve. On the other hand a locomotive of higher thermal efficiency would burn less fuel than shown and the curve would be steeper. It is, therefore, apparent that the slope of the curve is a function of the efficiency, and the steeper the curve the higher the efficiency.

From the curve, the fuel required per 1,000 ton-miles on a 2 per cent grade equals 38.0 gal., and for a 1 per cent grade equals 23.3 gal. The difference, 14.7 gal., represents the fuel burned moving a 1,000-ton train 1 mile over a 1 per cent grade without friction because both figures are for grade resistance plus train friction. The train friction being the same in each case, the difference is for a grade resistance of 1 per cent. A 1 per cent grade resistance is 20 lb. per ton. Then the work done in moving the given train 1 mile over a 1 per cent grade without friction equals 105,600,000 ft.-lb. This required 14.7 gal. of fuel or 1,647,082,080 ft.-lb. The thermal efficiency equals 6.41 per cent. This method of determining engine thermal efficiency is independent of train resistance at driver tires, which, at best, is difficult to determine accurately, and it should be very nearly correct.

The fuel burned on a 1 per cent grade for grade and train resistance is 23.3 gal., from which the train resistance equals 11.7 lb. per ton.

Locomotive Friction Is Large Item

This does not check with the assumed 7 lb. per ton, because the 7 lb. covers only rolling friction, and the 11.7 lb. is for rolling friction plus locomotive internal friction, such as pistons, valves and other engine parts. If Schmidt's 7 lb. is correct for the rolling friction, then the difference, 4.7, is the locomotive internal friction. For the given train of 1,000 tons this is equal to a drawbar pull of 4,700 lb., or about 9.0 per cent of the total drawbar pull on the maximum grade of 2.31 per cent from Flag No. 5 to Flag No. 6.

As the negative grade increases, the fuel consumption is reduced until the negative grade resistance is numerically equal to the total frictional resistance of train and engine. The minimum fuel consumption of 2.5 gal. per mile as shown on the curve represents standby losses and should be about equal to the fuel burned standing on a siding with the train. For heavy negative grades the fuel consumption is again increased, for pumping air for braking purposes.

The over-all efficiency determined by this test, 5.57 per cent, is the ratio of the integrated foot-pounds of work done by the engine whenever the drawbar pull was positive to the total energy in the fuel used over the same time. Apparently it is constant for all grades greater than 0.5 per cent.

While drifting saves fuel, it is seldom possible to drift to rest except on positive grades. Fig. 4 gives a measure of the saving that may be made. The kinetic energy in terms of fuel in a 1,000-ton train moving at 50 miles per hour equals 27.74 gal. If the engineer makes a sudden stop by heavy braking the greater part of this is lost in heat at the brake shoes. If his train schedule will permit him to drift down to 25 m.p.h. before applying brakes the fuel equivalent for kinetic energy is 6.93 gal., and 20.81 gal. of fuel will be saved. Drifting to one-half normal running speed before applying brakes saves 75 per cent of the fuel equivalent for kinetic energy. The fuel burned in actual train movements depends upon the efficiency of the locomotive and the skill of the engineer, while that burned for miscellaneous purposes depends upon traffic conditions and the general efficiency of the division organization in handling traffic. In this discussion the ratio between the fuel burned moving the train and the total fuel charged to road service is called "operating efficiency, fuel." Such a ratio is a measure of the operating efficiency of the division organization. The high value determined by this test, 92.5 per cent, indicates a co-operation between dispatchers and train crews not often realized. It indicates also a very small margin of possible gain between steam locomotives, well handled, and the theoretical limit of the electric locomotive, 100 per cent less engine auxiliaries.

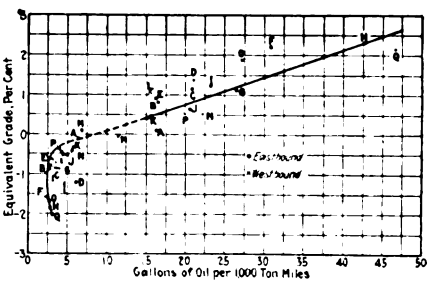

Fig. 3—Unit Fuel Consumption on Various Grades

Though the locomotive used for this test is one of the well known types for heavy mountain service, and was tested under its most economical load, yet the average thermal efficiency is less than 6 per cent; hence a slight numerical increase in this efficiency would result in a tremendous saving in fuel. The superpower survey showed an expected fuel saving of 67 per cent in freight service, which means a thermal efficiency of about 8.5 per cent. In making such comparisons it is necessary

TABLE I—GRADE AND CURVATURE—TEHACHAPI EASTBOUND

Points in Fig. 3	Location From	Location To	Distance, Miles	Rise, Feet	Total Curvature, Degrees
A	Kern Jct.	Magunden	3.4	17.8	.....
B	Magunden	Edison	3.1	135.7	.....
C	Edison	Flag 1	5.6	342.9	17.5
D	Flag 1	Flag 2	1.0	—68.9	99.3
E	Flag 2	Flag 3	6.2	268.9	589.5
F	Flag 3	Flag 4	0.9	89.0	376.3
G	Flag 4	Flag 5	2.2	115.0	417.5
H	Flag 5	Flag 6	23.4	2,575.0	6,751.0
I	Flag 6	Tehachapi	1.2	79.5	17.6
J	Tehachapi	Summit	1.8	58.5	.....
K	Summit	Flag 7	2.1	—46.0	.....
L	Flag 7	Flag 8	1.1	—65.0	13.6
M	Flag 8	Proctor	1.5	5.5	46.4
N	Proctor	Flag 9	1.5	—39.5	.....
O	Flag 9	Flag 10	0.9	—80.0	98.3
P	Flag 10	Flag 11	1.9	—50.0	27.9
Q	Flag 11	Flag 12	8.6	—960.0	547.7
	Total distance		67.8		

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to take account of the ratio, revenue freight weight to total train weight. In this study it was 0.743. In electric service it may be very different. The efficiency determined during this test is lower than many published values, but, as a rule, such tests are made with picked locomotives, especially adjusted and operated by the best crews.

It is not desired to give the impression that the values of factors given as the result of this investigation are absolute and applicable to all conditions. It is believed that this method of testing attacks the problem from an entirely different angle, from which it is possible to make, of certain factors, analysis in detail that has not been possible by other methods.

Discussion

Dr. Cary T. Hutchinson, in a written discussion, stated that the paper is the most noteworthy yet published on the subject, and that probably no one ever has attempted fuel determinations of similar accuracy. It is, however, not general in scope, being limited to conditions of service on this particular section of the Southern Pacific. No drawbar pull measurements were made, hence figures for efficiency are based on calculations of work done from the profile, under the author's assumptions.

Using the data presented, Dr. Hutchinson says he is led to certain results at variance with the author's. By a mathematical analysis it is shown that the straight part of the curve in Fig. 3 should be concave toward the axis of abscissas. From another series of equations it is deduced that for 53 lb. per ton resistance, the maximum value found in the tests, the oil burned was 0.4 gal. and the efficiency 5.93 per cent. The author's maximum thermal efficiency of 6.41 per cent is declared to be erroneous. The actual maximum thermal efficiency, as based on the author's curves, is thus 0.5 per cent less than the figure he gives. Referred to the drawbar the efficiency is reduced still further to 4.45 per cent.

The author says the over-all efficiency determined by this test was 5.57 per cent, and apparently was constant for all grades greater than 0.5 per cent. The derivation of this figure is not given, but it may be taken to represent the average thermal efficiency when the engine is doing work, based on the oil used during those periods, and eliminating all oil used at terminals or when the tractive force is negative. This efficiency is referred to the rim of the driver and not the drawbar. Using the given values, the following is found:

	Eastbound	Westbound	Both
Total oil, for positive tractive force	1,550	547	2,097
Total oil, stand-by and negative tractive force	291	409	700
Total oil for the run	1,841	956	2,797

The thermal efficiency, based on total oil used referred to the drivers, is 4.17 per cent. But the only "efficiency" that is significant in comparison with any other form of motive power is that referred to the drawbar. From the data given, the weight with the tender about two-thirds loaded is 250 tons for engine and tender, with 750 tons trailing. The average efficiency at the drawbar is then 3.12 per cent, while the maximum, likewise referred to the drawbar, is 4.45 per cent. In a word, assuming the author's fundamental result, "5.57 per cent over-all efficiency," the correct statement is an over-all thermal efficiency at the drawbar of 3.12 per cent, with a maximum of 4.45 per cent.

Several minor errors in the paper are pointed out.

Dr. Hutchinson states that the electric drive to replace this steam service would be a four-axle, 110-ton electric locomotive for 750 tons trailing weight; at 15 m.p.h. on the limiting grade the input would be less than 2,000 kw. Taking the efficiency from power house to drivers at 63 per cent (the author assumes 70 per cent in an earlier paper), the ratio of power at drawbar to that at power house will be 0.55. This section is ideal for regeneration. Under such conditions the comparative figures for energy used are given in the following tables:

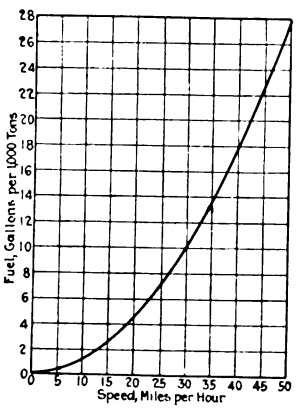

Fig. 4—Fuel Required to Accelerate 1,000 Tons

TABLE II—WORK DONE AT DRIVERS, STEAM DRIVE

	Eastbound	Westbound
Weight of train, tons	1,000	1,000
Work at drivers, kw.-hr.:		
(a) Grade	2,760	985
(b) Curve	250	25
(c) Track	690	240
Total	3,700	1,250
Available for regeneration (a)—(b+c)	1,820	720
Deliverable to contact system (75 per cent)	1,365	540
Deliverable at driver (80 per cent)	1,090	430
At driver as per cent of total work	29.4 per cent	34.4 per cent
Same, for round trip, same tonnage both ways	30.6 per cent	

TABLE III—RELATIVE HEAT REQUIREMENTS STEAM AND ELECTRIC FOR SAME SERVICE

	Steam	Electric
Weight of train, tons	1,000	860
Energy at driver, total kw.-hr.	4,950	4,250
Energy at driver, from oil, kw.-hr.	4,950	2,970
Energy at driver, from oil, per cent	100	60
Heat required at drawbar per kw.-hr., B.t.u.	109,000	45,500
Total heat required, 10⁶ B.t.u.	540	135
Total heat required, per cent	100	25

This means that in comparison with the author's test result, electric drive would reduce the fuel required by 75 per cent, a ratio of steam to electric of four. If allowance be made for the difference between test and service conditions this ratio will be even greater. These results are in practical agreement with the estimates of the superpower report.

N. W. Storer commended the completeness of the test made, but said that 7 lb. per ton was too high a train resistance for a whole run, so the work calculated was more than would be the case. He also questioned the accuracy of the determination of locomotive resistance.

W. J. Davis pointed out that the results were better than could be expected from a coal-fired locomotive, stating that the cinder loss varied from 10 per cent to 18 per cent in coal-fired locomotives with the rate of coal burning varying from 100 lb. per square foot per hour to 125 lb. per square foot per hour.

Mr. Davis's principal point was that even though there were fuel savings, the fixed charges of electrification might easily offset them, but that the chief reason for electrification still existed in the advantages in conducting transportation. He cited increased capacity of tracks, reduction of overtime, very great savings in locomotives, repairs per locomotive and reduction of number of locomotives, because the average steam locomotive was available for service only 25 per cent of the time, whereas the average electric was available 95 per cent. Mr. Davis concluded that because of greater serviceability and because electrics could be made larger, one electric might actually replace four to five steam locomotives. Thus, said Mr. Davis, even with the fuel saving counterbalanced by fixed charges the saving in maintenance of locomotives, in maintenance of ways and structures, and the saving in wages, total transportation economies of 25 to 50 per cent might be realized.

Mr. Twogood, in replying for Mr. Babcock, said that they had tried all sorts of mathematical analyses, especially for the derivation of the curve of Fig. 3, and while that was an average curve drawn through the points, they could come to no other conclusion than the one given. He admitted that fuel was not the determining factor. He pointed out that operating officials were interested in the weight of the locomotive as well as of the train because eventually it was net revenue freight which paid the bill.

C. E. T. A. to Meet in Detroit

THE Central Electric Traffic Association will meet at the Wolverine Hotel, Detroit, Mich., on Wednesday and Thursday, May 16 and 17. The first session will be called at 10 a.m., Eastern standard time, and will be in the nature of a round-table discussion. Committee reports and other business will occupy the remaining sessions.

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American Welding Society Annual Meeting

A Four-Day Meeting Was Filled with Many Reports of Committees Which Indicated that the Art of Welding Is Progressing Rapidly

THE annual meeting of the American Welding Society was held in the Engineering Societies Building, New York, N. Y., April 24 to 27. Reports of committees showed that much valuable work has been done by the society during the past year. At the business session on Wednesday morning a review was presented of the progress made during the past year in electric arc, gas, thermit and resistance welding. W. L. Warner, assistant to the chairman of the electric arc welding committee, covered the recent developments in the arc-welding field. He outlined the results accomplished in the direction of standardizing tests for welds, referring to the differences in details of procedure which have caused such widely divergent results. A set of standards submitted by the committee marks the starting point of standardization in this line.

An important work accomplished was that in connection with welding-wire specifications, on which a report was published last December. It included specifications for iron and steel bare electrodes and iron and steel gas welding rods. Recommended standards for coated or covered electrodes and gas welding rods for welding high-carbon steel and non-ferrous metals were also included.

Another work of standardization accomplished was in connection with standard definitions. A list of these, together with a classification of apparatus and an outline of the information required to be furnished by both the supplier and purchaser of arc-welding apparatus, was included in a report of this committee.

A report on welded rail joints showed that welding is being used extensively by electric railways for rail joints and that trouble has been experienced in all types through breakage. In order to secure information of various processes, a questionnaire was sent out by the committee, and a critical summary of these replies was compiled. The A.E.R.A. standard girder rail is being welded generally but the prevailing opinion seemed to be that a T-section is welded more readily than a girder section.

Practical data were given for joint plates, filler rods, electrodes, fluxes, protective accessories, methods of preparation of weld and preheating. The general opinion was that joint plates should be of low-carbon steel, possessing a fair ductility, and that the filling material should be of the same nature.

The high points of development in the oxyacetylene processes of welding were given by G. O. Carter, consulting engineer Linde Air Products Company. The welding of pipes in long stretches was considered as the outstanding feature of last year's work in this field.

A considerable extension of oxyacetylene welding to maintenance and repair work has resulted during the past year. Engineering investigations have been conducted to determine causes of failure, and recommendations of improved practices for handling similar problems in the future have resulted. Oxyacetylene cutting is being used more extensively than ever.

Developments in thermit welding were outlined by J. H. Deppeler, chairman of the research committee on thermit welding. Mr. Deppeler said that the particular advances were in connection with more economical use of thermit. Considerable study has been given to the construction of molds so as to reduce the quantity of material necessary, and also to provide a construction which will permit the "washing" of the welded joints by the thermit metal so as to require less material. Improvements in the construction of molds for welded rail joints have been described in previous issues of the ELECTRIC RAILWAY JOURNAL.

A report on resistance welding was given by Hermann Lemp, chairman of the resistance welding committee. Special effort has been devoted during the past year to the technical problems and to the processes which will undoubtedly aid in extension of the work.

Two inspection trips were arranged for the members attending the convention. Wednesday afternoon was spent at the shops of the Third Avenue Railway and Friday afternoon at the plant of the Oxweld Company in Newark, N. J. A large delegation witnessed numerous electric railway welding operations in the shops of the Third Avenue Railway. This included welding truck side frames, motor cases and broken truck parts, together with the building up of bearing fits and other wearing parts. The second annual dinner of the society was held at the Park Avenue Hotel on Wednesday evening.

The program of the technical session held on Thursday evening included a paper by Prof. H. L. Whittemore, chairman of the pressure-vessel welding committee, on the work done by this committee during the year. A review showing what the course of training of welding operators will include was given by J. C. Wright, director of the Federal Board of Vocational Education. It is expected that this course will prove the best so far prepared and its adoption is predicted for all the training schools in welding.

The new officers elected for the society were T. F. Barton, president; A. V. Thompson, vice-president of the Pacific Coast division; C. L. Jones, vice-president of the Southern division, and the following directors at large for a term of three years: C. A. Adams, H. S. Smith, A. M. Candy and C. J. Holslag.

A.S.T.M. Issues Provisional Program

As usual, the annual convention of the American Society for Testing Materials will be held at Atlantic City. The headquarters will be the Chalfonte-Haddon Hall, and the dates Monday, June 25, to Friday, June 29. A synopsis of the tentative program follows:

MONDAY
Morning and afternoon, committee meetings.
Evening, non-ferrous metals and alloys.

TUESDAY
Morning, corrosion, fatigue of metals and magnetic analysis.
Afternoon, wrought and cast iron, coal and coke, and heat treatment.
Evening, presidential address, informal dance and smoker.

WEDNESDAY
Morning, steels and methods of testing—reports of administrative committees.
Afternoon, committee meetings.
Evening, symposium on consistency—testing of glue.

THURSDAY
Morning, road materials, waterproofing and thermometers.
Afternoon, timber, rubber and textiles.
Evening, preservative coatings, cement, lime, gypsum and nomenclature.

FRIDAY
Morning, petroleum products, electrical insulating materials, slate and concrete.
Afternoon, golf and tennis tournaments.
Evening, symposium on the properties of, and methods of making concrete which require further investigation.

Safety Promoted in Massachusetts

A VERY successful congress of the Massachusetts Safety Council was held in Boston this week. Edward Dana, general manager Boston Elevated Railway, presided. Elton S. Wilde, vice-president and general manager Union Street Railway, New Bedford, Mass., made an address on "Collisions as the Motormen See Them."

Canadians Will Meet in Toronto

JUNE 27 to 30 will be the period of the 1923 convention of the Canadian Electric Railway Association, which will be held in Toronto. Headquarters will be at the King Edward Hotel and Charles L. Wilson, Toronto & York Radial Railway, is chairman of the convention committee. Details of the program will be announced shortly.

New Yorkers to Meet at Bluff Point

THE forty-first annual meeting of the New York Electric Railway Association will be held on Saturday, June 23, at the Hotel Champlain, Bluff Point, Lake Champlain, N. Y. The program will be announced later.

Educational Meeting at Providence

THE New England Street Railway Club will meet with the local section of the A.E.R.A. at the Biltmore Hotel, Providence, R. I., on May 10. Dinner will be served at 6:30 and the program will follow. Prof. W. H. Timbie, Massachusetts Institute of Technology, will speak on the educational work for employees of the Boston Elevated Railway.

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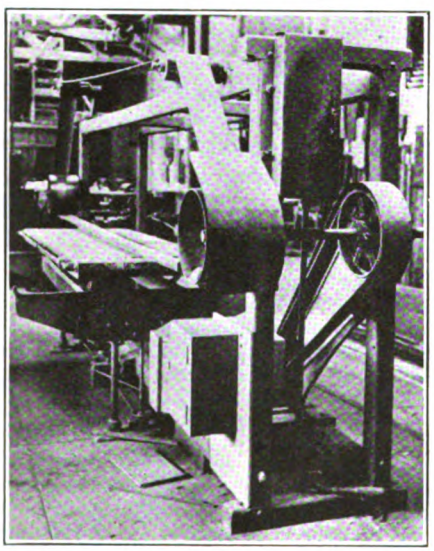
Maintenance of Equipment

Home-Made Sander

THE accompanying illustration shows a home-made sander which has been constructed in the shops of the Lehigh Valley Transit Company, Allentown, Pa. The sanding belt is driven by a small motor. The motor is located on a framework near the floor and has a housing to protect it from the dust of the shop. The driving shaft has two 12-in. pulleys, one of which is used by the belt from the motor and the other for driving the sanding belt. The pulleys have sheet-iron guards for the safety of employees.



Home-Made Machine in the Shop of the Lehigh Valley Transit Company

The sanding belt passes from the driving pulley around a similar pulley at the opposite end of the table, then up to a smaller diameter pulley mounted on a lever with a spring attachment to keep the sanding belt tight. A similar small stationary pulley is used at the opposite end above the driving pulley. The pulleys and necessary shaftings are mounted on a substantial wooden framework.

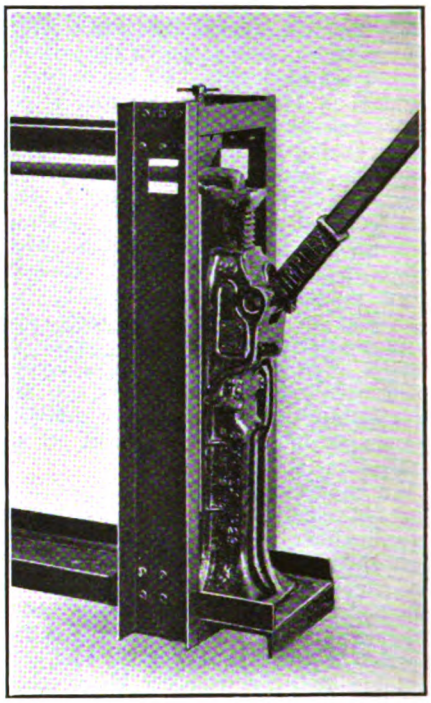
The table of the sander is made of 2-in. x 2-in. strips held in place by sheet-iron bands. The front edge of the table is provided with a long handle for moving the table back and forth as the sanding operation progresses. The table is mounted on rollers which operate on a track supported by sheet-iron plates at either end of the table. These tracks are bent upward at the ends to provide stops, so that the table cannot be pulled off the track.

The height of the table is adjusted by moving the sheet-iron plates which support the track up or down as desired. The vertical shafts attached to the plates have screw threads, and beveled gears cause these to rotate so as to raise or lower the table. The two screws at the end are connected through beveled gears at the center, so that they work in unison by turning a hand wheel at the center underneath the table.

Testing the Lifting Power of Jacks

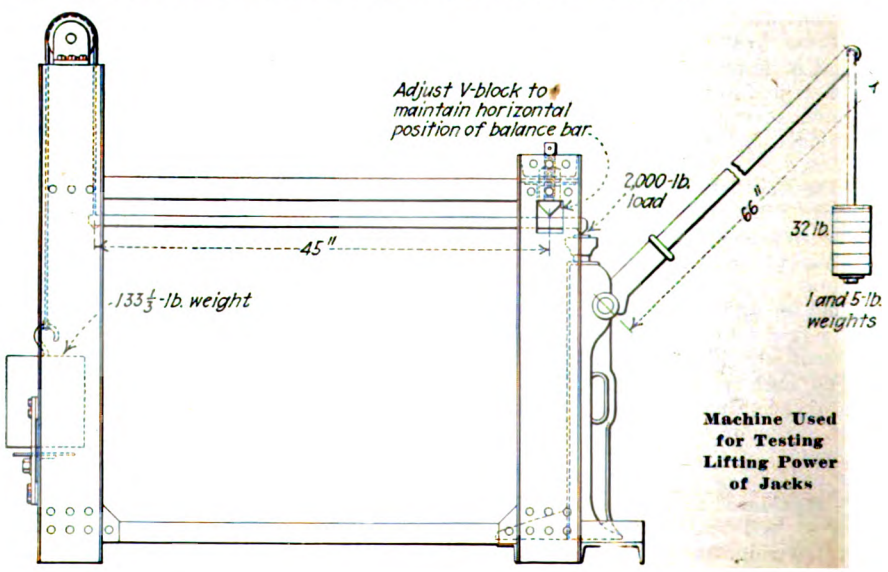
FOR the purpose of testing the lifting power of Simplex jacks, which they manufacture, Templeton, Kenly & Company, Ltd., Chicago, Ill., have devised and used the machine shown in the accompanying illustrations. This machine measures accurately the force which must be applied to the jack lever to lift any given load, that is, it shows the "man power" of the jack. The drawing shows the set up for testing a jack under 1 ton load. The jack shown has a capacity of 15 tons.

The apparatus consists simply of a lever, of which the fulcrum is a hardened knife edge placed 45 in. from one end and 3 in. from a second knife edge at the other end. This is mounted in a substantial frame. Force applied upward by the jack at the right-hand end in the drawing is resisted by the pull on a cord passing over a pulley and carrying a weight which, in this case, is 3/45 or 1/15 of a ton.



Close-Up View of Jack in Position for Testing

For convenience in testing, a lever 66 in. long is used, and the test is made with the lever in the starting position, as in this position the max-



Machine Used for Testing Lifting Power of Jacks

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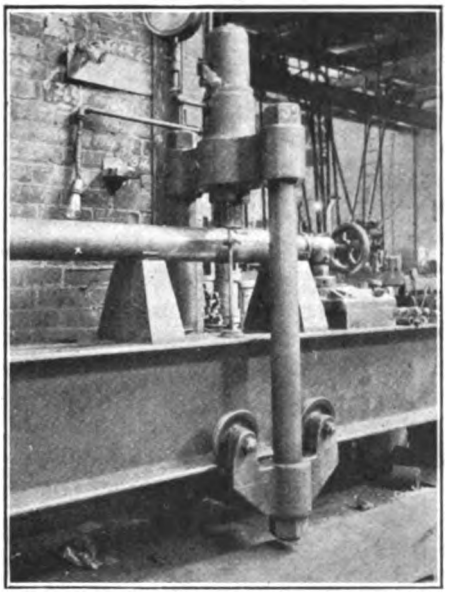
imum effort is required and the number of men required for the stroke is determined.

In the No. 29 jack, which is largely used by electric railways, the pawl center is 3¾ in. distant from the fulcrum center. When a lining bar weighing 25 lb. and having a length of 66 in. is used as the operating lever, 32 lb. force is required to lift 1 ton.

Testing Axles for Flaws by Hydraulic Pressure

GREAT care in the testing of axles is exercised by the United Electric Railways, Providence, R. I. For this purpose the Watson-Stillman hydraulic straightening press shown in the accompanying illustration is used. The axle is carried on the machine by means of centers



Hydraulic Axle-Straightening Machine Used for Testing Axles for Flaws

mounted as in the tailstock of a lathe. Hydraulic pressure is applied to the axle from point to point, by means of a plunger forced against its upper side by pressure in a cylinder cast in a yoke, this forming the upper part of a traveling carriage. This carriage is moved from point to point by means of flanged wheels which roll on the lower flange, of heavy I-beams forming the bed of the testing machine.

During a test the axle is supported on two pillow blocks, one about 2 ft. on each side of the point of application of the force. The axles are cleaned of all surplus oil and dirt. When pressure is applied oil will show on the axle where there are any cracks. Inspection is made at all shoulder reductions and keyways.

Good Motor Record Through Hard Winter

NOTWITHSTANDING the fact that an unusual quantity of snow fell in Binghamton during the past winter, amounting to about 60.7 in. altogether, the railway had comparatively few motor failures. The total car-miles operated during the winter months was 565,993 and the total number of motor failures was twenty, or approximately 3.53 per 100,000 car-miles. In this respect the modern ventilated motors made a better record than the older type non-ventilated motors, there being 2.32 failures per 100,000 car-miles with the former and 7.1 with the latter.

The ventilated motors in service on the Binghamton Railway are of two types: Thirty-two Westinghouse 506-A are used on sixteen single-truck two-motor cars weighing 20,000 lb. Six armatures were grounded due to overexertion in snow, and four fields were grounded, one being an interpole field and three being main field coils grounded by water. Sixty-eight Westinghouse 323-V motors are used for twenty two-motor cars equipped with maximum traction trucks and weighing 32,500 lb. and for seven four-motor cars weighing 36,700 lb. With the 323-V motors three armatures were grounded due to exertion in snow and five fields were grounded, four being interpole and one main field coil.

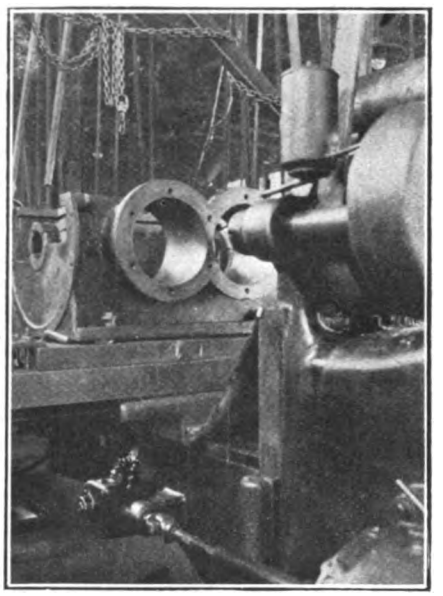
The total number of non-ventilated motors in operation is seventy, of which thirty-two are GE-80, sixteen GE-67 and twenty-two GE-1,000. All the General Electric motors have the top and bottom motor covers off the year around. The GE-1,000 motors are on two-motor single-truck cars weighing 20,000 lb. and used only as trippers. There were no failures of this type motor during the past winter. The GE-67 motors are used on single-truck cars weighing 26,000 lb. and on some two-motor double-truck cars weighing 35,000 lb. Two armatures grounded on account of exertion in snow were the only failures with this type motor.

All of the GE-80 motors are used on double-truck cars, some being 32,000-lb. cars equipped with maximum traction trucks and the remainder being 35,000-lb. cars with Brill 27-G trucks. These motors had during the winter four grounded armatures and four field coils grounded on account of water. The fact that the non-ventilated motors are all of older design than the ventilated motors accounts to a considerable extent for the relatively greater number of failures of the former.

A factor that has made it particularly important to prevent motor failures is the very small number of spare cars available. The Binghamton Railway ordinarily has 95 per cent of its rolling stock on the road in the afternoon rush hours. In order to do this an unusually large supply of spare parts is kept on hand, and whenever inspection shows a part to be worn, it is replaced rather than risk a failure by attempting to get additional service.

Milling Machine for Boring Compressor Cylinders

THE United Electric Railways, Providence, R. I., had in its shops a milling machine that was not working at 100 per cent output. The best routine job for it seemed to be the boring out of compressor cylinders, and the machine is now continuously at work on this job. The accompanying picture shows the cylinder casting of a compressor bolted to a cast-iron platen suitably drilled to receive the different types of compressor cylinders. The platen, in turn, is bolted to the table of the



Compressor Casting on Carriage of Milling Machine Ready for Reboring of Cylinders

milling machine, while the latter does the duty of a boring mill.

While undoubtedly in many cases it would be profitable to purchase a two-spindle boring mill for this job, in this case the milling machine was available and it turns out a fine piece of work.

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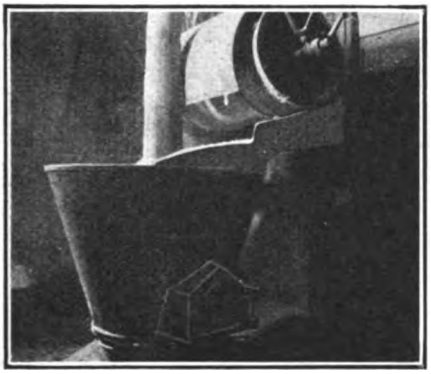
Simple Combined Screen and Sand Drier

THE accompanying illustration shows the plan used in the carhouse of the Eastern Massachusetts Street Railway at Fall River for screening and drying sand.

The drier consists of a stove surrounded by a conical hopper. Below the hopper is a conical spreader or deflector on which the sand flows out as it dries. This addition was



Combined Screen and Sand Drier Used at Fall River

placed at the bottom to spread sand and to prevent it from going through before thoroughly drying.

Above the drier is a motor-driven, cylindrical screen covered by a piece of sheet iron to guide the sand from going anywhere but into the screen. The bottom part is shaped so that it guides the sand into the drier. The stones or any foreign material other than the fine, screened sand roll toward the rear of the screen into a pipe and are carried through the wall to the outside of the building.

Soft coal is used for heating purposes. The motor is one taken from an air compressor removed from an obsolete car. As workmen or the watchman pass through the sand room in the course of their work they throw a few shovelfuls of sand into the screen and in that way assure an ample supply.

Maintaining Electrolytic Lightning Arresters

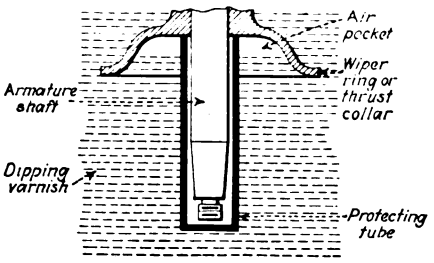
THE Lehigh Valley Transit Company, Allentown, Pa., was one of the first electric railways to use the electrolytic type of lightning arrester and has been obtaining very satisfactory results. All arresters are installed inside the cars so that it is unnecessary to remove them during the winter months. In most cases space has been found for the arresters in the headlining or sides of the vestibule platform. In a few cases where there was not room for these on the platform they have been installed inside the passenger portion of the car body by providing a wooden box for holding the arresters. This box is painted and varnished to correspond to adjacent woodwork. The wiring to the arresters is run in either conduit or in circular loom. Particular attention is given to make the lead from the trolley base to the arresters as short as possible.

In the spring, before the lightning season starts, all arresters are inspected and are filled up with solution. From that time on to the end of the season they are inspected each time the car is in for repairs or inspection.

Convenient Tackle Aids in Dipping Armatures

By JOHN S. DEAN
Renewal Parts Engineering, Westinghouse Electric & Manufacturing Company

IN CONNECTION with the dipping and baking of armatures to increase the life of the windings, experience has shown that it is essential to dip them with the commutator end up. This keeps the varnish from getting inside of the commutator, where it is likely to cause trouble, as it is difficult to dry it out thoroughly during the baking process. One master mechanic has devised a very simple and effective clamping device for holding armatures in a vertical position, with the commutator end up, while dipping them, and which is also arranged to receive the hook from the chain hoist used in handling, as shown in one of the accompanying illustrations. The two



Tube Over Armature Shaft During Dipping Operation

swinging side arms of this clamp are bent over at the lower end to engage the pinion end coil support extension or the end bell. The top of each of these two arms is provided with a number of holes, making the clamp adjustable to take armatures of different sizes without danger to the winding or the commutator.

In connection with this operation, the question of keeping the varnish from the pinion end of the armature shaft has been given considerable thought. One method employing a tube over the shaft was described in the ELECTRIC RAILWAY JOURNAL for April 21, 1922, and a similar sleeve method is used by the same master mechanic who designed and built the above clamping device. After dipping several of his armatures he noted that the portion of the shaft inside of the wiper ring was never touched by the varnish. He reasoned that this was, no doubt, due to the air pocket formed by the wiper ring, so he conceived the idea of slipping a small tube, closed at the lower end, over this end of the shaft. This tube is slipped over the pinion end of the shaft just before the armature is dipped, which keeps this part of the shaft free from varnish. This saves the necessity of cleaning with benzine or naphtha or scraping the shaft after the dipping and baking process, and also keeps the varnish out of the threads of the shaft, thus reducing the expense of handling the armatures while giving them this treatment.

Adjustable Hooks Hold Armature in Vertical Position for Dipping

New Equipment Available

A Blueprint Drying Machine

THE C. F. Pease Company, Chicago, Ill., which manufactures automatic blueprinting machinery, has brought out a drier for blueprints and photographic prints. The wet prints are drawn around a heated cylinder by means of an endless canvas belt and delivered into a receiving tray. The delivery speed of the machine is stated to be up to 8 or 9 ft. per minute. A thermostatic control is provided where the cylinder is heated with gas, whereas for an electrically heated cylinder there is an arrangement of switches by means of which the temperature can be readily controlled.

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The News of the Industry

Virginian Railway to Electrify

$15,000,000 Contract Placed with Westinghouse Company Covers Locomotives and Power Supply for 213 Miles of Track—Single Phase System Adopted

THE Virginian Railway has announced its decision to electrify 213 miles of track between Roanoke, Va., and Mullens, W. Va., at a cost of $15,000,000. The division to be electrified crosses the Allegheny Mountains. The a.c. single-phase system will be used. The order for the electric locomotives, power house, transformer stations, and other apparatus has been awarded to the Westinghouse Electric & Manufacturing Company and is said to form the largest railroad electrification contract ever placed.

"The Virginian Railway, one of the newest systems, is a leader in heavy operation, and this undertaking will be epochal in the history of American railroads," said Frank H. Shepard, director of heavy traction for the Westinghouse Company. "Built by the late Henry H. Rogers, of the Standard Oil Company, in accordance with the most modern engineering practice, it has been renowned for the excellence of its construction, the immense size of its trains and its low ton-mile costs ever since it started operations in 1909. The Virginian, as a matter of consistent policy, has regularly increased the size of the trains with every improvement in railroad equipment, until today this railroad is operating the heaviest trains in the world and hauling them by the most powerful of steam locomotives. It is now moving 7,000,000 tons of coal per annum, but this capacity is not enough. Still further increasing the size of the trains is impossible with steam, for the limit in the motive power appears to have been reached. Hence it has been decided to electrify with the alternating-current system this limiting mountain grade division.

"The chief advantage of electric operation is the greater power that can be applied to each train. The largest steam locomotives now in use on the Virginian are the articulated Mallet type, three of which are used to move 5,500-ton trains over the grades. Their combined power does not exceed 7,000 hp., and their speed on the grades is only 7 m.p.h. The new electric locomotives, however, developing 20,000 hp. per train will haul 9,000-ton trains up the grades at the rate of 14 m.p.h., and it will be entirely practicable to increase this power so that 12,000-ton trains can be handled at the same speed.

"This electrification is one of the largest railroad projects since the world war. It is undoubtedly the forerunner of other similar undertakings, because it is generally recognized that the traffic-carrying capacity of a number of our leading railroads must be increased.

"A feature will be the use of regenerative braking on the down grades, which will not only reduce wear on the brakeshoes and wheels and improve operation, but will save 15,000,000 kw.-hr. of electric energy per year.

"Power will be obtained by a 90,000-hp. generating plant to be erected on the New River, supplying 88,000-volt current to the transmission line. This is to be stepped down to 11,000 volts by transformer stations placed along the line."

Ottawa Board of Conciliation Formed

The employees of the Ottawa Electric Railway, who are members of the Amalgamated Association, on April 16 applied to the Minister of Labor for a board of conciliation under the industrial disputes investigation act. A board has been formed. George D. Kelley of the firm of Ewart, Scott, McLaren & Kelley, Ottawa, has been appointed for the company, and Harold J. Burns, barrister, Ottawa, for the employees. The demands of the employees are that all employees shall belong to the union; that the eight-hour day be established in all departments of the company's business, and that hourly rates of wages be increased by 25 per cent. The board will probably begin its sittings shortly.

Detroit Officials Opposed to Wage Increase

At a meeting on April 28 of platform men of the Detroit Department of Street Railways, members of Local No. 27, a letter from the street railway commissioners to the officers of the union was read which explained the attitude of the municipal officials in regard to the 20 per cent increase in wages asked by the men.

The communication advised the men that their request for a wage increase was untimely and could be discussed more properly after May 15, on which date the Department of Street Railways will have completed one full year of operation. It is explained that a study of a report for the year will enable the members of the commission to go more thoroughly into the request of the platform men and study the conditions.

The request, which was practically refused by the commission, will be taken up with Mayor Doremus at some future date by a committee of the local organization's officers appointed by the men at the meeting. The date of the proposed conference with the Mayor has not been decided. The men have decided to ask Judge E. J. Jeffries to represent them in case the petition for the increase in pay is submitted to arbitration.

Wages of Pacific Electric Trainmen Raised 3 to 6 Cents an Hour

An increase in wages of trainmen of the Pacific Electric Railway, Los Angeles, Calif., approximating $350,000 annually and effective April 16, 1923, was announced on April 12 by D. W. Pontius, vice-president and general manager. The change will have the effect of increasing the present scale 3 to 6 cents an hour, according to the class of train service. In making this announcement, Mr. Pontius states that the new rates are partly a restoration of the rates in effect prior to Oct. 1, 1921, at which time a reduction was made in the wages because of economic conditions.

Mr. Pontius stated that the work in the train service was more trying and confining than in any other branch of railway service, as the hours, in a great many instances, were irregular and that the increase was made with the view of keeping in the company's employ a good class of men.

At the time of the wage reduction in 1921 other departments of the company were not affected. This increase in trainmen's wages will not affect other departments of the company.

Following is the schedule of the new rates in cents per hour:

Street Car Service	Hourly
First three months	49
Next nine months	50
Second year	51½
Third year	52½
Fourth year and thereafter	53½
Double-Track Interurban	
First year	52½
Second year	55
Third year	56
Fourth year and thereafter	57
Single-Track Interurban	
First year	55
Second year	57½
Third year	58½
Fourth year and thereafter	59½
Freight and Work Train Service	
Motormen and conductors (flat rate)	66
Brakemen and switchmen (flat rate)	60
Trolleymen (flat rate)	55
Yard foreman (flat rate)	66

Minimum rate for new men entering the service $125 per month.

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Commissioner Convinced Railway in Birmingham Is Right

The Birmingham Railway, Light & Power Company, Birmingham, Ala., is nearing a settlement of all its disagreements of the past over street paving, fares and the Jim Crow law recently adopted by the City Commissioners. According to D. E. McLendon, chairman of the city commission, the differences may be settled within a few days.

It is believed that the company will agree to reduce its fares from 8 to 7 cents, to pave certain streets which have been in dispute, and to partition all cars, thus separating the whites from the negro passengers.

It is also possible that the jitneys will go. In speaking of the jitney Mr. McLendon said:

> If Birmingham's growth is not to be retarded, it is time that we take the jitneys off the streets. In justice to the Birmingham Railway, Light & Power Company the present situation must be remedied quickly. It is time and more than time to take a definite stand. The stand I take is that the jitney must go. Birmingham has given the jitney a fair trial, and I cannot see where it has been of any advantage. Of course, there are individual and group instances where the jitney has been a convenience, but that does not offset the great cost it entails in direct financial loss to the city, and in keeping our biggest public service institution in bankruptcy.

Commissioner McLendon was referring to the railway, which has been in the hands of a receiver for some time, and according to him the jitney is largely responsible for this condition of the company.

Mr. McLendon declared:

> In direct cash revenue the city is losing $12,000 a year because of the curtailment of income to the city from the company. The company is sustaining a dead loss of $60,000 every year. The jitneys are the cause of this loss.

In speaking of the paving matter, over which the company and the city have been squabbling for some time, Mr. McLendon said:

> It is not fair for the company to have to pay many thousands of dollars for the maintenance of streets used by the jitneys. Immediate steps should be taken to relieve the present intolerable situation. Every visitor coming to Birmingham, every prospective factory, is at once made aware that our most obvious public utility is in the hands of a receiver. That cannot but react to the city's discredit.
>
> We should take into consideration the great sums of money the company has paid out for permanent improvements in Birmingham. It has paid much for street surfacing in practically every section of the city and its only return on the investment is community improvements which make more passengers. I don't think it just for the jitneys to step in without paying one cent toward these improvements and reap the rewards. It is time to enact laws that will take the jitneys off the streets and forever prevent them coming back.

Wage Agreements in New York Being Effected

Fears of a strike among trolley workers in Syracuse, N. Y., are rapidly being dispelled as new agreements are being approved by the workers. One of the matters that remain to be adjusted, however, is the new scale for New York State Railways men. The men on these lines have ratified a demand for a 30-cent increase.

The Empire State Railroad Company, operating lines from Syracuse to Baldwinsville, Fulton and Oswego, has renewed an agreement with its men on practically the same terms as last year with the rate remaining at 53 cents. Some of the working conditions have been slightly changed.

This agreement is fundamentally the same as that just executed between the Rochester & Syracuse Railroad and its employees. Only one interurban wage problem is unsettled and that is between the men and the Syracuse Northern. These employees are asking an increase to 53 cents from 48 cents an hour.

The Auburn & Syracuse has settled its differences with its men. The new rates for city men will be 49 cents an hour and 50 cents for interurban employees. Freight and express employees are to get 52 cents.

Pittsburgh Wage Matter Remains Deadlocked

The matter of wages and working conditions for employees of the Pittsburgh Railways has been hanging fire now for several weeks and up to May 3 the deadlock remained unbroken. As was reported in the ELECTRIC RAILWAY JOURNAL, issue of April 14, the receivers of the property had requested the employees to modify their demands on the ground that the 10-cent cash fare now in effect would not be sufficient to meet the proposed 20 cents an hour increase in pay.

On May 2 the employees voted 2,177 against 9 to reject the offer of the receivers to increase the wages 10 per cent or 6 cents an hour. This would bring the maximum to 66 cents. The executive board of Division 85 representing the 3,000 motormen and conductors employed by the Pittsburgh Railways was still in session on May 3 and had reached no decision on the question of ceasing work.

The receivers on May 2 reiterated their proposal to place the entire question of working conditions and a wage increase before the Board of Arbitration, but this the international vice-president and the secretary of the local union refused to approve. Two problems are being passed on by the executive board.

They are: (1) How to avoid arbitrating the controversy which the receivers of the Pittsburgh Railways proposed on May 2 as an alternative to the rejection of the offer of a 10 per cent increase, and (2) how to win the receivers of the company over to restoring the 1920 and 1921 wage rate of 70 cents an hour.

The employees are asking a 33⅓ per cent increase or a maximum rate of 80 cents an hour, which is 10 cents an hour more than was received during the war. It is reported that the executive committee has authority to call a strike without further vote by the members of the union.

It is believed that if the receivers of the company will offer 70 cents, the peak wage paid during the war, the men will accept it.

Will Disclose Operation in Spartanburg Under Commission Management

The South Carolina Gas & Electric Company, Spartanburg, S. C., now operated by the South Carolina Railroad Commission, was scheduled to be the subject of a public hearing in Spartanburg on April 27, at which time the company was to submit statements as to its operating costs and earnings, with a view to letting the public know how it is getting on under the Railroad Commission management.

The Railroad Commission in announcing the hearing stated that it was considered at the request of the Spartanburg company. The Railroad Commission says, however, it does not know whether the company desires a discontinuance of the present plan of operation or desires some amendment to it. The petition for the hearing states that it is asked in the interest of the rights of the public.

The commission is asked to "issue such orders as in its judgment it deems expedient and necessary to protect the rights of the public and the interests of those who avail themselves of or are dependent upon the service of the company."

The Railroad Commission has instructed the railway company to submit at the hearing a complete financial statement and planned to hear any representative of the public.

Some months ago the Spartanburg company discontinued its cars, announcing that losses made the move necessary. The Railroad Commission ordered service resumed, on long schedules, and the commission has since been in charge of the situation. Recently regular schedules were ordered restored, and a 5-cent rate of fare was put into effect.

City and Railway in Toronto Appeal Arbitration Award

The Toronto Railway and the city of Toronto have appealed against the majority award of the arbitration board appointed to determine the value of the Toronto Railway Company's property taken over by the city on the expiration of the franchise on Aug. 31, 1921. The railway's notice of appeal asks that the city appeal be set aside, that the whole matter be sent back to the arbitration board with the instructions that it include in the amount the value of the main office building at King and Church Streets, the Scarboro Beach property and the St. Lawrence Street property and other items which the arbitrators rejected. The price to be paid by the city for the properties had been fixed by the board at $11,188,500. An abstract of the arbitration finding was published in the ELECTRIC RAILWAY JOURNAL for Feb. 10, page 247. It is stated that there is no dispute between the parties with regard to items making up about $7,000,000 out of the $11,188,500 awarded by the majority board.

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Bus Franchise Defeated

McAdoo Interests Lose in Los Angeles —Railway Will Have Opportunity to Make Good

The so-called McAdoo-Hellman twenty-one year motor bus franchise was defeated on May 1 by Los Angeles voters by more than 12,000 votes. The proposition for repealing the present jitney bus ordinance was also defeated by more than 4,000 votes. As a result public motor carriers will continue to be banned in the down-town district.

The People's Motor Bus Company, conceding defeat, filed an application with the local Board of Public Utilities immediately after the election withdrawing all its propositions for motor bus lines in Los Angeles over some nineteen routes paralleling all railway lines and reaching practically every section of the city. The withdrawal, however, is given as temporary. The Hellman-McAdoo interests, back of the People's Company, state there is no necessity of their company entering the field again now, as railway companies have promised Los Angeles adequate bus lines and improved railway service to relieve the transportation congestion.

After the election the railway officials declared the promises made by them to the people of Los Angeles before the election would be fulfilled at once. Work will be started immediately on improvements to cost in excess of $6,000,000.

The failure of the voters to grant a twenty-one year irrevocable motor bus franchise and the decision not to repeal the present jitney ordinance are generally interpreted to mean that the voters were unwilling to cripple the Los Angeles railway lines.

Under the present laws of Los Angeles the Board of Public Utilities can grant motor bus permits for operation outside of the downtown district, but evidently Mr. McAdoo's company did not see fit to spend $1,000,000 for bus equipment and operate under thirty-day permits or even yearly permits.

Prior to the election the two railways filed a joint application with the Board of Public Utiilties for permission to install motor bus service in the Hollywood district on a 6-cent fare basis with interchangeable transfer. This application outlined that the two railways would be consolidated and promised an extension of the Los Angeles Railway lines into Hollywood and the establishment of universal transfers. The application stipulated a 6-cent fare between bus and Pacific Electric Railway cars and a 10-cent fare between Los Angeles Railway cars and buses within defined districts. The statement filed with the board practically admits that when the State Railroad Commission completes its survey of the local railway systems they will be consolidated as one system and that upon consolidation provision will be made for the extension of the Los Angeles Railway lines into Hollywood territory.

"Independents" are filing applications for revocable bus permits for operation in various sections of the city, but the substantial element of the city is demanding the Los Angeles Motor Bus Company, which was organized by the two railway companies, be given all permits for motor buses to be operated in co-ordination with the railway lines. The majority members on the local city Board of Public Utilities are inclined to give permits to the independents and the railways.

William G. McAdoo of the Peoples' Motor Bus Company made the following statement:

> My Eastern clients have withdrawn their application to establish a motor bus system in Los Angeles, and I think they have rendered a genuine service to the community in focusing the attention of the public on the city's imperative transportation problem. The railway monopoly under threat of competition has made various promises to meet the transportation necessities of the community. Those comprehend consolidation of the two street car lines, the building of subways, the extension of railway lines and the operation of motor buses. Everybody will await with interest performance in accordance with these promises.

Wage Advance in Cleveland

The wages of motormen and conductors of the Cleveland Railway were increased 5 cents an hour, starting May 1, as a result of arbitration between the Cleveland Railway and the street car men's union. The wage increase makes the new wage scale for the Cleveland trainmen—55 cents an hour for the first three months service, 58 cents an hour for the next nine months and 60 cents at the end of the first year.

The decision of the arbitrators was not unanimous, the men's representative, Judge Frederick Walther, dissenting from the award, which was concurred in by Judge Fielder Sanders, former City Street Railway Commissioner, and Thomas P. Schmidt, representing the company.

Following announcement of the 5-cent wage increase there was much dissatisfaction among the trainmen because they had asked for an advance of 15 cents an hour.

Meeting with the executive committee of the car men's union, John J. Stanley, president of the company, intimated that the company soon might have a proposal for establishing a pension system for employees who have long been in the service.

Oil City Men Get Increase

To show appreciation for the efficiency of its trainmen and also to attract the best type of man for service on its lines the Citizens Traction Company, Oil City, Pa., has voluntarily raised the wages of all motormen and conductors 5 cents an hour. The new scale is retroactive to April 16.

Under the present arrangement for the first six months of service men will receive 46 cents an hour; for the second six months, 48 cents, and for the third six months and thereafter, 50 cents an hour. One-man car operators will receive 5 cents an hour additional.

The old scale of 41, 43 and 45 cents became effective on June 1, 1921, and was a 10-cent reduction from the schedule which went into force on April 26, 1920.

Foreign News

Liverpool Plans $1,500,000 Overhaul Shop

It is proposed by the Liverpool Tramways Committee to erect a car overhauling depot capable of dealing with about twelve cars weekly, so that the whole stock of 650 cars may pass through the shops in a year. The estimated cost is £300,000.

In consequence of a further fall in the official index figure of the cost of living, the National Joint Council for the British tramway industry has, in accordance with the sliding scale agreement, announced that from the first full pay period in May a reduction will be made in tramway employees' wages of 1s. per week. This makes the total reduction since the maximum period of 15s. per week. The index figure is now 74 per cent over the figure for August, 1914.

The British Minister of Transport announces that he proposes to include the tramways (temporary increases of charges) act in the expiring laws continuance bill of the present session. This means that the operation of the act, which authorizes higher fares than the statutory maxima and which would expire this year, will be prolonged till December, 1924, The act was a temporary one passed to meet post-war conditions of high working expenses. The latter have now come down somewhat, but not sufficient to justify a return to pre-war fares. The index figure of the cost of living is still 74 per cent above the pre-war basis.

The rapid increase in the number of aerials for use in connection with the wireless broadcasting is giving some apprehension to British tramway authorities. In connection with post office wires the regulation is that when these cross above tramway overhead conductors efficient guard wires must be erected. The Council of Tramways & Light Railways Association has written to the Ministry of Transport on the question of what would be the position of a tramway undertaking in the event of accidents to third parties arising from a wireless aerial falling across the trolley wire and coming into contact with a person. The Council maintains that it is unreasonable that a tramway undertaking should be liable to put up guard wires in any case except where they arrived on the scene subsequently to the people against whose property the guard wires are required to give protection. The Council urges that a regulation should be framed so that those arriving on the scene with their wires subsequent to the construction of the tramway shall themselves be under the obligation to bear the cost of providing any necessary protection for the prevention of accidents. The Ministry of Transport is in communication with the Postmaster-General on the subject.

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Financial and Corporate

$167,403 Increase in Net

Trustees of Eastern Massachusetts Street Railway Present Figures Covering 1922 Operations

The public trustees of the Eastern Massachusetts Street Railway, Boston, have presented the following report for the year ended Dec. 31, 1922:

EASTERN MASSACHUSETTS STREET RAILWAY EARNINGS

Combined financial statement of the seventeen operating districts included in the system.

	1922	1921
Passenger revenue	$9,989,729	$10,681,352
Freight and other revenue	56,464	36,899
Rentals, advertising, etc.	252,892	265,122
Interest; other income	413,578	334,891
Total revenue	$10,712,663	$11,318,294
Expenses:		
Way and structures	$1,879,506	$1,768,078
Equipment	1,250,715	1,518,279
Power	1,082,151	1,350,996
Car operation	2,345,373	2,658,888
Injuries and damages	356,701	362,312
Insurance	162,588	153,966
Law expense	13,546	9,912
Rent of tracks	77,258	79,017
General wages and expenses	247,121	263,910
Miscellaneous expenses	343,131	288,745
Operating expenses	$7,758,090	$8,454,103
Taxes	396,823	348,750
Gross income	2,557,749	2,515,410
Interest and rentals	1,497,956	1,623,021
Net income	$1,059,792	$892,389

Operating expenses include charges for depreciation amounting to $848,753.00 in 1922 and $992,847 in 1921.

$95,215 was added to the insurance fund in 1922. The corresponding charge in 1921 was $80,000.

Gross receipts from car fares in 1922 were $9,989,728, a decrease of $691,622, or about 6⅞ per cent compared with 1921. Other items of revenue and income increased $86,021, so that the net decrease in total revenue was $605,601. On the other hand, operating expenses, including taxes, decreased $647,939 and there was, therefore, an increase in gross income of $42,338, notwithstanding the large loss in revenues. Fixed charges and rentals showed a decrease of $125,065. The final result was an increase in the net income for the year, compared with 1921, of $167,403. It was not until toward the end of 1922 that passenger revenues equaled those of the corresponding months of 1921. This improvement is traceable principally to better industrial conditions in several of the cities and towns served by this company, which have been in a state of depression since early in 1921.

The $1 punch-card reduced-rate ticket continues in effect in most of the cities and towns. It is interesting to note that it is being used almost exclusively except by transients and casual riders.

General operating expenses, excluding taxes, were $696,012 less than in 1921. The cost of operating cars was reduced more than $300,000. This was due to numerous economies and increased efficiency, and the use of one-man cars throughout the twelve months as against the general use of one-man cars only during the latter part of 1921.

The cost of maintenance of equipment was reduced $267,568 through better repair shop conditions and because the electrical equipment of cars suffered comparatively little damage during the mild winter of 1921-1922.

Power costs were decreased $268,845 chiefly as a result of cheaper coal during most of the year and the substitution of fuel oil for coal at the Quincy Point power station, which serves practically the entire system south of Boston.

The tax liability of the company for the year increased $48,000 and amounted to $396,823, or more than 36 per cent of the net income of the company after paying interest on its obligations.

During the year eight modern snow sweepers and other units were added to the snow-fighting equipment and the company now has in first-class working order thirty-seven sweepers, forty-five double-truck plows, forty-four single-truck plows and fifteen sets of scrapers. This comprises the most formidable snow-fighting equipment this company has ever had.

During the year there was no abatement of the work of rehabilitating the roadway, and in addition to the expenditures for maintenance of track, shown in the financial statement as "Way and Structures," $367,000 was expended for reconstruction.

Twenty-five double-truck cars of the latest type, suitable for one-man operation, were purchased during the year at a cost of $252,000. Orders for twenty-five and possibly a larger number of new double-truck cars will be placed in 1923.

EMPLOYEES' INSURANCE

The trustees have extended employees' insurance so as to include every person regularly employed by the company.

There has been a substantial reduction in the number of accidents, claims arising from them, and the cost of settlements. Collisions with vehicles, particularly automobiles, are still a serious problem.

For the first time in a number of years the wage agreement with the Amalgamated Association representing the union employees was entered into without arbitration. At the request of the various local unions the public trustees agreed to renew for another year the agreement expiring on May 1, 1922, which was founded upon an award by the State Board of Conciliation and Arbitration the previous year.

The financial readjustment plan announced early in the year met with very general response from all classes of security holders and is now more than 95 per cent complete. During the progress of this readjustment plan, $611,000 par value of common stock was distributed in lieu of accumulated dividends and has been charged to surplus.

In addition to the distribution made under the readjustment plan, dividends were declared during the year by the payment of 3 per cent on the first preferred and sinking fund stocks on Aug. 1 and by the appropriation of surplus accumulated to Dec. 31 to pay 3 per cent on these stocks as well as 6 per cent on preferred B stock on Feb. 1, 1923.

During the year funded obligations of the company to the amount of $463,000 were retired and canceled.

In May the company elected not to exercise its option to extend $479,000 Lowell, Lawrence & Haverhill bonds due on June 1, 1923, and provision has been made to pay them on that date.

Abandonment in Ohio Approved by Court

Following action of the Ohio State Supreme Court in Columbus on May 1 sustaining the order of the State Public Utilities Commission which authorized the Indiana, Columbus & Eastern Traction Company to abandon the branch between Columbus and Orient, F. A. Healy, secretary-treasurer of the company, announced at Springfield that the company would apply at once to Federal Judge J. E. Killitts at Toledo for an order of abandonment to carry out the commission's ruling.

The traction company filed a petition and secured the necessary consent of the commission to the abandonment of the branch some months ago, but residents attacked in court the right of the commission in the matter. The decision of the Supreme Court brings an end to the controversy and permits abandonment.

The Columbus-Orient branch is about 14 miles in length. Petition to abandon service was filed after the company had lost considerable revenue in late months due to automobile and bus competition.

Extends Time for Payment of Ohio Branch Line

Extension of fifteen days has been granted by Federal Judge J. E. Killitts at Toledo to C. D. Taylor, Norwalk, Ohio, for the final payment of $112,500 for the 40-mile Lima-Defiance branch of the Indiana, Columbus & Eastern Traction Company line. The original time limit for payment of the final sum was set for April 30, but counsel for Taylor appeared and asked extension saying that certain details of the financing remained to be cleared. Taylor had paid down $12,500 to bind the contract.

Application for purchase of the branch was made after the traction line had filed a petition and secured an order from the state to abandon the division, due to loss in revenue. Taylor proposes to operate gasoline cars over the branch to connect with the traction line, and has been selling stock in the enterprise to persons resident along the branch.

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Eight Months Operation in Ashtabula Shows Increased Traffic

The municipally owned railway at Ashtabula, Ohio, for the eight months period ended April 1, showed receipts of $71,159 and operating expenses of $88,865. For a similar period the year previous, when the lines were owned by the Ashtabula Rapid Transit Company, the receipts were $55,675 and the operating expenses $60,305. Revenues from transportation for March of this year were $9,658, as against $6,430 in 1922.

Since the city took over the lines a considerable amount of track renewal and overhead work has been done.

Ten new safety cars, a bus and a 2½-ton truck have also been purchased by the lines at a cost of $73,792, covered by an issue of bonds. Total disbursements since the city took over the lines on Aug. 1 last have been $162,657. Since last August the municipally operated lines have carried 808,757 passengers as against 670,055 carried in the same eight months the year previous.

West Chester Street Railway Sold

Kelly, Cooke & Company, engineers, with offices at 424 Chestnut Street, Philadelphia, Pa., have acquired the controlling interest in the West Chester Street Railway.

The transfer was made on April 30, the majority stock holding having been purchased from the John W. Woodside estate, Philadelphia.

The new officers are as follows:

President, Charles B. Cooke, Jr., Philadelphia, Pa.; vice-president, Col. A. M. Holding, West Chester, Pa.; treasurer, Thomas L. Hodge, Philadelphia, Pa.; secretary, Jonas Rice, Philadelphia, Pa.

The officers and William F. Kelly, Philadelphia, Pa.; Marriott A. Good, Philadelphia, Pa., and J. V. Pennegar, Coatesville, Pa., comprise the board of directors.

The Philadelphia office of the railway will be discontinued and all business of the company transacted at its general office in West Chester, Pa.

Arkansas Central Power Co. Successor at Little Rock

The Little Rock Railway & Electric Company, Little Rock, Ark., has been succeeded in ownership and operation of the local traction and electric lines by the Arkansas Central Power Company, which filed articles of incorporation and agreement with the Secretary of State on April 10, 1923. The reorganization was carried out under the terms of the no-par-value act passed by the recent Legislature.

The operation of the company will continue under the old management, the following officers being re-elected:

D. H. Cantrell, president; A. Brizzolara, vice-president and treasurer; W. J. Tharp, secretary and auditor; C. J. Griffith, general manager; and H. U. Wallace, assistant general manager.

H. C. Abell, New York, was elected chairman of the board of directors of the company.

Allowed Return Being Earned in New Orleans

The Public Service, Inc., New Orleans, La., has reported for the first six months of the trial rates fixed under the agreement effected recently with the city of New Orleans. The statement shows that its earnings above all operating expenses were $1,953,125, or a little over 7.5 per cent, which was the rate of return agreed upon by the company and the city authorities.

The six months report shows the company has now on hand in cash $4,129,439, of which $1,701,369 is in ready cash and $2,428,069 in loans and notes receivable. There is also $1,339,899 in liquid assets, in addition to these cash assets.

The railway department is shown to have earned during the six months $748,819, the electric light and power department $721,416 and the gas company $482,889.

With the adoption of the changes recommended in the Beeler report it is expected that an annual saving of $853,717 will be effected, thereby guaranteeing a rate of return of 7.5, assuming that the succeeding six months will make as good a showing as has been made in the first six months of the trial rates.

Final Receivership Report of Fort Wayne Property Made

Robert M. Feustel, receiver for the Fort Wayne & Northern Indiana Traction Company, has filed his final report in the receivership action. It has been approved by Charles J. Ryan of the Superior Court. The report shows that Mr. Feustel took in $2,619,911 and that he expended the same amount. The suit for receiver was filed by the Evans Coal Company in February, 1919, and Mr. Feustel as receiver had charge of the affairs of the company for more than four years.

The record in the receivership case is said to be the longest in the history of the Fort Wayne courts.

The Indiana Service Corporation, Fort Wayne, Ind., is the successor of the old company and Mr. Feustel is the president of the Service Corporation.

Auction Sales in New York.—At the public auction rooms of A. H. Muller & Sons, New York, on May 2 there were sold 200 shares of New York City Interborough Railway, $215 lot.

Gold Bonds Offered.—Hoagland, Allum & Company are offering at 93 and interest to yield 6½ per cent $1,000,000 of first and refunding mortgage 6 per cent gold bonds, series of 1923, of the Iowa Southern Utilities Company. The bonds are dated Feb. 1, 1923, and are due Feb. 1, 1943. The company owns the electric interurban railway connecting Centerville, Mystic and Albia.

Interurban Pays Preferred Dividend.—The Fort Dodge, Des Moines & Southern Railroad, Boone, Ia., declared a quarterly dividend of $1.75 a share on preferred stock, payable on May 1. Previous to this declaration, the last dividend on the preferred was paid in scrip on May 1, 1921. The directors of the company did not act on the matter of the 12½ per cent accumulation on the preferred. The gross earnings for the year ended Dec. 31 were $2,244,501, increase $44,102 over 1921. Net earnings were $615,504, increase $256,247. Interest charges were $295,391, leaving a balance after interest available for depreciation and dividends of $320,112.

Small Accumulated Deficit for Los Angeles Railway. — The Los Angeles Railway Corporation reports to the California Railroad Commission for the year 1922 that its operating revenue was $11,118,873 and operating expenses $7,623,646, giving a net operating revenue of $3,495,227. Miscellaneous non-operating revenue amounted to $130,863. Interest, rent, taxes and other deductions totaled $2,247,313. The net corporate income for the year was $1,378,777. The deficit at the beginning of the year amounted to $1,165,064. Miscellaneous additions to surplus for 1922 amounted to $8,421 and miscellaneous deductions were $235,151, leaving an accumulated deficit at the end of the year of $13,017.

$10,000,000 of 7 per Cent Debentures Offered.—Public offering is being made of a new closed issue of $10,000,000 of 7 per cent sinking fund debenture gold bonds of the Illinois Power & Light Corporation at a price of 100 and interest, to yield 7 per cent. These bonds are a direct obligation of the corporation, which covenants to place no additional mortgage on its properties unless they are ratably secured by the lien thereof, and to issue no additional debentures if the holders of one-third of the principal amount of the present issue object thereto. The company is the successor to the Illinois Traction Company and other properties as noted previously in the ELECTRIC RAILWAY JOURNAL.

Company Making Progress.—During March the Boston (Mass.) Elevated Railway carried 34,691,068 paying passengers and collected $3,027,502 in fares. This was the largest month's business in the history of the company. It set a new mark for railway results. It brought its reserve fund, for the repayment of a debt, up to $958,648, and there is every indication now that the company will have more than $1,000,000 to pay on July 1 to the communities which taxed themselves some years ago to cover the company's deficit from operation. Total receipts in March amounted to $3,097,995 as against $2,868,518 during the corresponding month a year ago. The company is making such good progress, financially, that it is in a position this year to start its trackwork on time. It had an excess of receipts over cost, for March, of $335,937.

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Traffic and Transportation

Ten Cents in Seattle

Council Votes a Return to Higher Cash Fare with Fifteen Tokens for One Dollar

The City Council has voted to return to the 8½-cent ticket fare on the Seattle Municipal Railway after an experiment since March 1 with a 5-cent fare. Council members agreed unanimously on the return to the higher fare on the recommendation of Superintendent Russell. Corporation Counsel Kennedy has been instructed to draft an ordinance restoring the former fare of 10 cents cash or token fares of 8½ cents, the only concession over the previous fare to provide fifteen tokens for $1, or seven for 50 cents.

The new fares cannot become effective before June 15 or July 1, as Mayor E. J. Brown has announced that he will veto the ordinance. However, the Council has enough votes to pass the measure, but it will take about thirty days to put it in effect after it is passed. In the meantime, if the present losses continue, the deficit will reach approximately $500,000 before the change can be made.

Mayor Brown states that he will continue his efforts to have the purchase bond redemption date extended. Corporation Counsel Kennedy advised the Council that if necessary the present issue of revenue bonds issued in payment for the street railway may be refunded. Few city officials believe that the bondholders will agree to any refunding or other method of extension of their bonds.

Losses through operation under the 5-cent fare during the early part of April showed an increase of $102 a day over the average for the month of March. This brings the average daily loss to $4,577.

Courtesy Week in Los Angeles Accomplished Good Results

Co-operating with the Kiwanis Clubs International in "Courtesy Week," April 15 to 21, the Los Angeles Railway accomplished good results toward mutual courtesy between trainmen and employees. Three days before courtesy week began posters were displayed in the cars announcing "next week is Courtesy Week."

During courtesy week an appropriate car card was displayed in the cars and ribbon badges with the words "Courtesy Week, April 15 to 21," were issued to trainmen with the request that they wear them while on duty. The wearing of the badge was not, however, compulsory.

A contest, in which cash prizes were given for the best ideas in promoting courtesy between trainmen and passengers, was conducted in the week preceding courtesy week and served to direct the thoughts of trainmen along the lines of courtesy. These ideas were relayed to passengers through "A-Z-U-R-I-D-E," a pamphlet distributed on the Los Angeles Railway cars by the public relations department.

Members of the Kiwanis Club were given the courtesy week badges and requested by their officials to wear them.

Newspaper publicity supplemented the other efforts to keep the campaign before the public.

Bus Regulatory Bill in Ohio Now a Law

The Public Utilities Commission of Ohio will hereafter control bus operation. The House and the State Senate recently passed the bill, which became a law without the signature of the Governor. It will become effective in ninety days.

The bill gives the commission the power to supervise and regulate all motor bus companies, fix their rates, regulate the service and safety of operation, require filing of annual reports and provide uniform accounting systems. The commission is to have authority over the bus companies to the exclusion of local communities.

Double-Deck Cars Suggested for Detroit

The use of double-deck street cars has been suggested to the Street Railway Commission of Detroit by W. F. Evans, president of the Detroit Motorbus Company. As Mr. Evans sees it, such cars in operation would reduce operating costs and aid materially in solving the problem of mass transportation.

Mr. Evans pointed out that the $5,000,000 bond issue recently authorized by the city cannot buy all the cars and build all the extensions needed. By purchasing double-deck cars such as were built for experimental use along Broadway in New York and running buses hired from the Detroit Motorbus Company for 25 cents a busmile, Mr. Evans holds that the city would be in a position to make that $5,000,000 really aid materially in improving the Detroit street railway service.

Mr. Evans lists the principal items of economy in the use of the double-deck car from a strictly cost standpoint. These, he maintains, are lower maintenance cost per passenger, less power cost per passenger, less platform cost and less investment per passenger. Double-deck cars also afford a reduction in the schedule running time due to the fact that less time is consumed per passenger in loading at the start.

$9,000,000 Valuation Upheld

Superior Court of Pennsylvania Finds State Commission Was Correct in Deciding Scranton Rate Case

As was reported in the ELECTRIC RAILWAY JOURNAL, issue of April 28, the Superior Court of Pennsylvania on April 19 affirmed the findings of the Public Service Commission in the matter of the valuation and rates of the Scranton Railway. This means that the court upheld the commission valuation of $9,000,000 on the property of the company as a basis for the 8-cent fare. The present decision is the result of the city's appeal against the commission's ruling. The fare problem had its beginning in the franchise ordinance which limited the rate to be charged by the company within the city of Scranton to 5 cents. In 1917 the company filed a 6-cent rate with the commission and in 1918 a second schedule was filed increasing the fare from 6 cents to 8 cents. Against both increases the city of Scranton complained on the ground of their being illegal and unjust.

The Public Service Commission then filed a preliminary report holding that the fare limitation prescribed by the ordinance had been superseded by the passage of the Public Service Company law. It suggested a conference of engineers representing the railway and the city to decide on the valuation of the property, but meanwhile established a temporary fare of 7 cents cash or four tickets for 25 cents. From this order the city appealed to the Superior Court. That court affirmed the order of the commission. The Supreme Court has now in turn affirmed the lower court ruling.

Proceeding with the matter of the valuation the commission after careful consideration arrived at a value of $9,000,000. The Scranton Railway was then directed to advertise a new tariff providing for an 8-cent cash fare, with tickets to be sold at the rate of four for 30 cents, this schedule to remain in force for a period of twelve months. The city of Scranton did not appoint an engineer to represent it at the valuation conference, but it did appeal from this determination of the commission. In its brief the city stated that the questions involved were:

1. The determination of the fair value of intervener's property used and useful in the public service, under the public service company law of 1913.

2. A determination of a just and reasonable rate of fare on respondent's lines within the city of Scranton.

The court referred to the public service company law, which conferred on the commission power to determine the facts and conditions in each case which must control in the fixing of rates to be charged. Further, the court contended, the public service company law empowered the commission to determine the fair value of the property and to revalue such property from time to time. In the case of the Scranton Rail-

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way the court ruled the commission complied with the provisions giving all interested parties a patient hearing. Further, the court said that it was without authority to set aside a finding of fact by the commission which was supported by substantial evidence when no constitutional question was involved.

One of the main points in the controversy was the question of the original cost of construction and the reproduction cost of the property. The engineering conference submitted a figure of $7,899,965 for the original cost of construction. The city contended that the original cost of the property was only $5,585,334. The city also contended that the engineering conference in its report as to reproduction cost included items which ought not to have been considered and put an extravagant estimate upon others. The engineering conference submitted a report upon the cost of reproduction new of the property based upon three different unit prices. These were:

1. Prices as of Nov. 1, 1919.
2. Average prices for 1914 to 1919, inclusive.
3. Current prices for the year 1914.

The commission did not accept in its entirety the report of the engineers as to the reproduction cost of the property, but reached the conclusion that the reproduction cost new, exclusive of going concern value and accrued depreciation, as of the several dates, should be fixed as follows:

As of Nov. 1, 1919, at $10,075,000.

As of unit prices for the period 1914 to 1919, inclusive, at $7,000,000.

Under 1914 prices at $6,300,000.

Figuring that the cost of reproduction of the plant as of prices prevailing in November, 1919, would have been $10,075,000 and that depreciation amounted to $1,219,715 the commission arrived at a construction cost less depreciation of $8,855,285. The court concluded that if to this was added the cost of financing—which the engineers found should be allowed—the property was valued at more than $9,350,000 without any allowance for going concern value, although the engineers testified to an amount for going concern value.

To the argument of the city that the 1919 prices were abnormal the court responded as follows:

> That may be possible, but to what extent they are abnormal we cannot say, under the evidence in this case, with that certainty which ought to characterize judicial action. Furthermore, the commission did not fix the valuation of the company's property at $10,000,000 nor did it base its findings upon the unit prices prevailing in 1919. Should prices hereafter decline more rapidly than they have since 1919 it may be that there should be a revaluation of the property here involved, that the statute authorizes that to be done. We are not convinced that the finding of the commission was without substantial evidence to support it.

The city finally argued that even if the valuation of the property of the railway is sustained, the rates of fare fixed by the final order of the commission will produce a revenue in excess of a reasonable return upon the property used in the public service. The court ruled that that argument depended upon the assumption that there would be a very considerable increase in travel after people get used to paying the 8-cent fare and that the revenues of the company would thus be greatly increased. Further, that this was largely a matter of speculation and theory and that it would not be warranted in placing upon a foundation so insecure a decision that the determination of the Public Service Commission is unreasonable and not in conformity with law.

The order of the commission was therefore affirmed and the appeal dismissed.

West Penn Railways Men to Be Rewarded for Accident-Prevention Effort

Although comparative records indicate that the West Penn Railways, Pittsburgh, Pa., is relatively free from accidents, an effort is being made still further to decrease the number of accidents by an accident prevention contest started at the beginning of the year.

In this contest trainmen on each division of the system are divided into teams and at the end of each quarter the team having the fewest number of accidents on the respective divisions is given a dinner by the company.

Some teams have come through the first three months without an accident. This is all the more remarkable in view of the fact that many slight collisions and unusual occurrences are considered as accidents.

The company's past experience was that most accidents occurred among passengers trying to board or alight from a moving car. This class of accident has been practically eliminated by the use of closed vestibule cars and side mirrors. Most accidents involving the cars are now caused by collisions with automobiles. Records of the West Penn Railways indicate that approximately 60 per cent of its accidents are due to this cause, and that while accidents due to all other causes are constantly decreasing, this is more than offset by the increased number of automobile accidents. The majority of these are of such a nature that they can only be prevented by co-operation of automobile drivers.

Because of its appreciation of what has been done and to give encouragement to further effort the company recently announced that, effective May 1, cash rewards would be made to trainmen for each no-accident month. This reward will increase progressively with each consecutive no-accident month so that a trainman will be able to earn a total of $100 for the first twelve months of no-accident record. Trainmen continuing a no-accident record beyond twelve months will be rewarded $150 for second twelve consecutive months of no-accident record. The same rate as for second twelve months period will continue indefinitely for each consecutive twelve months of no-accident record.

Trainmen waiting to take out their runs have been stimulated by the contest to discuss among themselves ways and means of predicting the unexpected moves of pedestrians and motor vehicle drivers.

Common Sense Returning on Jitney Problem, Says Norfolk Paper

In commenting on the recent decisions with respect to the regulation of jitneys in Norfolk, Va., and vicinity the Norfolk *Dispatch* said in part in its issue of April 12:

> Two votes cast in Tidewater Virginia yesterday demonstrated the welcome fact that common sense is getting the upper hand in the matter of dealing with municipal and suburban transportation in general and with jitneys in particular.
>
> One of these votes was cast in Newport News by the people themselves, who, according to the jitney men and their apologists, are all for the jitneys and all against whatever railway may be operating in any given community. In Newport News the jitney men demanded the right to fix their own routes, while the city administration considered, of course, that jitney regulation should be in the hands of the Council. Under the charter of the city, the question was submitted to the voters. They voted against unregulated jitney operation and, by implication, for councilmanic regulation.
>
> The other significant vote was cast unanimously by the members of Norfolk's Council, upholding the recommendation of the City Manager that jitney operation between Norfolk proper and Ocean View be prohibited. If there had been no public interest in the proposed line to Ocean View, Council's vote would not have been especially significant—because it was so obviously right. But the fact that numerous residents of Ocean View and the vicinity asked for the operation of such a line made Council's firm stand on the matter significant.
>
> Council very wisely, and to the ultimate advantage of Ocean View and that entire section, decided that the jitneys must suspend and the railway must continue to give service—improved service, too.

Railway Opens Another Bus Line.—Jamestown Street Railway, Jamestown, N. Y., has opened its North Side bus line loop. Transfers issued on the North Side line are accepted on the other bus lines and on the cars of the railway.

Bus Matters in Poughkeepsie Awaited.—The Poughkeepsie City & Wappingers Falls Railway, Poughkeepsie, N. Y., is said to be considering the advisability of going over to bus service. The city is awaiting the railway's decision with respect to buses as agents in the city's transportation field. The City Council has refused heretofore to grant franchises to bus applicants, but the independent operators in urging their case have called attention to recent court decisions.

Runaway Car in Brooklyn Injures Many.—Thirty-six persons were injured on May 1 when a car of the Manhattan Bridge Three-Cent Line, New York, jumped the track of the "S" curve near Nassau Street at the Brooklyn end of the bridge. The vestibule of the car was demolished and great holes ripped in both sides as it bumped and rocked and swayed for more than 600 feet over the cobblestones of Flatbush Avenue extension, finally crashing into an iron pole and coming to a stop in front of the Technical High School at Concord Street.

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Personal Items

J. A. Carmody Advanced

New York Central Railroad Has Appointed Him to Post of Superintendent of Electrical Equipment

J. A. Carmody has been appointed superintendent of electrical equipment, electric division New York Central Lines, to succeed C. H. Quereau, retired on pension. Under the scheme of organization of the department he reports to E. B. Katté, chief engineer of electric traction.

Mr. Carmody comes to his new job with an unusually all-round preparation. He is now in his forty-fourth year, and has had something to do with railway cars practically ever since he finished high school in Elizabeth, N. J., near which is his birthplace, Linden. After some preliminary training with the Crocker-Wheeler and the Diehl Companies, he became chief electrician of the John Stephenson Car Company. Leaving this concern he pitched right into the railway and railroad electrification game with the General Electric Company, for which he worked on car equipment in different parts of the country and on the fitting up of the first New York Central locomotive, the famous "6000," still running. Refusing an offer as master mechanic of an important interurban railway, he joined the New York Central force, in 1906, as general foreman of car equipment. This involved a lot of interesting work, for the railroad was having cars built by the American Car & Foundry Company at Berwick, Pa., and the St. Louis car company, equipped at the car works and tested on the General Electric Company's test track at Schenectady. Mr. Carmody had charge of inspection until the cars were accepted by the operating department of the railroad and put into service.

MR. CARMODY RETURNS AFTER TEN YEARS

Mr. Carmody left the New York Central in 1909, and there is a gap of thirteen years to be accounted for until his return in 1922, this time in the valuation department. He held several jobs in the interim. One was as valuation engineer with J. G. White & Company, appraising the property of the Capital Traction Company. Another was with the Safety Car Heating & Lighting Company, on railway, train lighting equipment. In the war-time period he was production manager at the Long Island City Works of the Wright-Martin Aircraft Corporation.

The return of Mr. Carmody to the New York Central was primarily for the purpose of appraising the traction lines of the New York & Harlem Railroad, but his preparation as outlined indicated him to be the logical man to succeed Mr. Quereau. His work now includes the direction of the shops at Harmon and North White Plains, where the seventy-three locomotives and the 286 motor cars are maintained.

A. J. Clarkson has succeeded Mr. Carmody, as general inspector, electric division, New York Central Lines. He is a graduate of the University of Illinois, where he spent five years, completing a combined course in electrical engineering and electric railway engineering, leading to the degree of B.S. in E.E. Passing up the opportunity for taking a vacation after graduation he immediately entered the employ of the New York Central on July 1, 1916. Since that date he has progressed steadily. Beginning as junior draftsman in the electrical department he was afterward successively draftsman, senior draftsman, inspector and assistant engineer. His work for the first 4½ years was on the design and inspection of electrical equipment for cars and locomotives. For the remaining time he has been engaged in the supervision of design and installation of new shop machinery and other improvements, and studies of shop operation in connection therewith. He has also made investigations of electric equipment in service. In his present position he is virtually assistant to the superintendent of electric equipment.

J. A. Carmody

Mr. Clarkson was brought up on an Illinois farm. He worked his way through college, where he made an excellent record.

Commission Engineer Will Become Railway Manager in Wausau

E. J. Steinberg, resident engineer in Milwaukee for the Wisconsin Railroad Commission for the past ten years, will resign on June 1 to become connected with the Milwaukee Electric Railway & Light Company. Mr. Steinberg joined the railroad commission engineering force in 1910 as a utility inspector. Three years later he was transferred from Madison to Milwaukee as resident engineer. Since then he has had charge of promulgating schedules upon which the street cars of the Milwaukee Electric Railway & Light Company are operated, as well as other administrative and regulatory duties involving public utility properties in the Milwaukee district. Mr. Steinberg was graduated from the University of Wisconsin in 1909, receiving a B.S. degree and in 1919 the university conferred upon him the degree of E.E.

James D. Andrew Becomes Vice-President of Stevens & Wood, Inc.

James Andrew has returned to his old love—the public utility engineering and construction fields—by accepting the post of vice-president and district manager of Stevens & Wood, Inc., with offices at New York and Youngstown, Ohio. Mr. Andrew's headquarters will be at Youngstown, and one of his first activities will be to take charge of the construction of the 200,000-kw. superpower plant to be erected by his firm on the Ohio River.

In returning to the public utility field Mr. Andrew resigned as president of the American Balsa Company, a subsidiary of the American International Corporation, with which organization he became connected in war times. Indeed, at the height of the shipbuilding period Mr. Andrew had the satisfaction of seeing 122 ships come into being while he was manager of hull construction. But before the ships could be built, it was necessary to have a shipyard. At that task he served in the vital position of general superintendent of plant construction for the American International Shipbuilding Corporation at Hog Island. It was the famous Hog Island problem that lured him in 1917 from his position as superintendent of station engineering for the Edison Illuminating Company, Boston.

Mr. Andrew was born in 1874. He was graduated from the Columbia School of Mines in 1897. His first three years in the workaday world were spent in erecting and testing engines for the E. P. Allis Company, Milwaukee. For the next three years he was mechanical engineer of the Metropolitan Street Railway, New York; and then he moved over for a like period with the New York Edison Company as chief engineer. Tempted by the commercial side, he next became general manager of the Virginia & Alberine Soap Stone Company in charge of production and manufacture. The public utilities claimed him again when the Boston Elevated Railway made him superintendent of power.

Once more Mr. Andrew left a railway to join a central station company—this time the Boston company as noted above. During 1916, however, he received leave of absence to go to South America for the Chile Copper Company to build a 40,000-kw. power plant and then place it in operation. Shortly thereafter his talents were placed at the disposal of his country.

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F. H. Brown Placed in Charge of Pawtucket Lines

In order still further to better public relations there and to afford the Pawtucket system closer supervision, with an object of increased efficiency, the United Electric Railways, Providence, R. I., has opened an office in that city with a superintendent in direct charge of that division. Under this plan the people of Pawtucket find an official representative at hand where before it was necessary for them to journey to Providence.

F. H. Brown has accordingly been made superintendent of the Pawtucket Division. He has been with the United Electric Railways for nearly seventeen years. He gained his first railway experience in Worcester, where he worked as a conductor, gradually advancing until he was placed in charge of one of the carhouses of the Worcester system. Later he entered the employ of the Public Service Corporation in New Jersey as an inspector. He worked his way up to district superintendent in Elizabeth, N. J. In October, 1906, he went to Rhode Island as superintendent of the Northern Division and continued in that capacity up to the time of his appointment to the Pawtucket post.

Edward J. Coffield has been appointed superintendent of the Woonsocket division of the United Electric Railways. The lines in Woonsocket had been cared for previously by Mr. Brown as part of the Northern division.

Mr. Coffield was advanced to this position from that of inspector on the Woonsocket lines. His railway training and knowledge of operating conditions in Woonsocket and vicinity qualify him for these duties. Mr. Coffield is thirty-five years of age. He has been connected with the company since April, 1907, at which time he entered the employ as a motorman.

The system of the United Electric Railways embraces the cities of Providence, Pawtucket, Central Falls and Woonsocket and also a vast amount of suburban territory. The city of Pawtucket, with a population of 64,248, has many lines operating entirely within its borders and several lines running into Providence.

W. C. Fankhauser Appointed Examiner of Commission

W. C. Fankhauser, chief of the division of finance and accounts of the California Railroad Commission, has been appointed an examiner of the commission, in addition to his other duties. This will permit him to conduct examinations into financial matters in connection with the applications to the commission for authority to issue stock and bonds and other financial matters in connection with the commission's work.

Mr. Fankhauser has been associated with the commission since April, 1912. He began his work in the department of statistics and accounts, and was transferred to the stock and bond department in 1913. He was placed in charge of that department in 1917. In 1920 he was placed in charge of the department of finance and accounts, which was formed by consolidating the department of statistics and accounts and the stock and bond department.

Mr. Fankhauser is a graduate of Pomona College, Class of 1909, and in 1912 was given the degree of Ph. D. by the University of California. He is the author of "Financial History of California and a Study on Railroad Reorganization and Receiverships," prepared in 1917 for the Newlands committee of the United States Congress.

A. J. Anderson Made Manager of Tennessee Road

A. J. Anderson has recently been appointed general manager of the Union Traction Company, Nashville, Tenn. Attainment of this post has long been Mr. Anderson's silent ambition, but no providential concatenation of circumstances has had anything to do with his achieving it. Ever since Mr. Anderson entered the employ of the company in 1902 as a section hand he has had his eye on the post next ahead as his ambition, not a covetous ambition, but as a step in the achievement of things still greater. Thus it has been that Mr. Anderson, since his first job on construction, has served the company successively as conductor, motorman, ticket agent and assistant to the general manager. Up from the ranks often means just that and nothing more, but when, as in the case of Mr. Anderson, it means through the ranks with a turn of service in each step sufficient for the mastering of the details of the separate jobs, it has a meaning all its own. Opportunity is dead only to those who believe it to be dead. Mr. Anderson's career is a fair example of what may be accomplished by diligence and hard work, and proves that opportunity is ahead in electric railway work even for those non-technically trained. The road of which Mr. Anderson is the manager operates 25 miles of line, mostly suburban, and owns Rockland Park, a popular pleasure resort near the city.

A. J. Anderson

New Manager at Taunton Promises 100 per Cent Service

James H. Murphy, long a prominent street railway figure in Taunton, Mass., has been given operating control over the East Taunton Street Railway. The directors have voted him manager and elected him treasurer also. In fact, Mr. Murphy will do what he wants with the road, as he will have full authority for an indefinite period.

The East Taunton Street Railway has been in operation for twenty-five years. It was a good proposition up to four years ago, but then it slumped and has not paid a dividend since. In fact, it almost looked as though the permanent home of the Toonerville Trolley was in Taunton. But the East Taunton Street Railway is going to pay dividends, give fine service, etc., because Mr. Murphy says it will. There are Great Expectations in Taunton. Track improvements, overhauled rolling stock, better service than patrons have had for years, are only some of Mr. Murphy's plans. He will welcome suggestions and complaints, too, but after Mr. Murphy has had his way with the road for a time "there ain't going to be no complaints."

Many years ago Mr. Murphy was a tow boy in Taunton. Later he went into the machine shop. He served as driver on the horse cars and as starter and dispatcher. One of his big jobs was superintendent of Division 2, South of the Bay Street Railway, with offices in Taunton. This position was followed by his temporary appointment in 1916 as general superintendent of that division, succeeding in that capacity George F. Seibel.

In 1919 Mr. Murphy was made manager of the Taunton division of the Eastern Massachusetts Street Railway, at the time when the properties of the company were segregated with a manager as the operating head of each division.

Mr. Murphy's new position will in no way interfere with his management of the Taunton division of the Eastern Massachusetts Street Railway. In fact, an agreement has been reached between the two companies. The East Taunton Street Railway is to rent space in the carhouse of the Eastern Massachusetts Street Railway in Taunton and close up its own carhouse. The system comprises more than 10 miles of line.

J. I. Searles, who has been in charge of the railway systems of the Menominee & Marinette Light & Traction Company, at Marinette, Wis., and Menominee, Mich., since he joined that company in September, 1922, has become superintendent of the railway system of the Lake Superior District Power Company, formerly the Ironwood & Bessemer Railway & Light Company. His headquarters will be at Ironwood, Mich. Mr. Searles was formerly connected with the electric railway at Clinton, Iowa, and the railway at La Crosse, Wis., and Winona, Minn., of the Wisconsin Railway, Light & Power Company.

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H. V. Jones has succeeded H. M. Myers as auditor of the Northeast Oklahoma Railroad, Miami, Okla.

Marion McMillan has been added as one of the vice-presidents of the San Antonio (Tex.) Public Service Company.

H. M. Preston, secretary of the Warren & Jamestown Street Railway, Warren, Pa., has also assumed the duties of vice-president.

C. J. Moor has succeeded A. L. Farquharson as general manager and purchasing agent of the Fort William (Ont.) Electric Railway.

E. W. Ford, formerly general superintendent of the Memphis Street Railway, has been elected vice-president and will have jurisdiction over general operation.

A. D. McWhorter, formerly superintendent of equipment and overhead lines of the Memphis Street Railway, has been elected general superintendent with jurisdiction over transportation, mechanical and overhead line departments.

W. Angus Reid is now secretary and treasurer of the St. Johns Light & Power Company, St. Johns, Newfoundland. The position was formerly held by F. J. Hunter, who was superintendent in addition to his being secretary and treasurer.

D. R. Ainsworth has resigned from the office of general manager of the Shelburne Falls & Colerain Street Railway, Shelburne Falls, Mass., which he has held for the past ten years. He will continue as clerk and treasurer. Edward S. Hunter becomes general manager and assistant treasurer.

Frank Kell has been promoted from vice-president to president of the Wichita Falls (Tex.) Traction Company. J. A. Kemp, who was formerly president, will take Mr. Kell's place. L. L. Allbritton, in addition to his duties as general manager and purchasing agent, will also act as secretary and treasurer.

Mark Barkwell has been made general manager of the Northern Cambria Street Railway, Patton, Pa., succeeding C. L. Calahan, resigned, the latter accepting a position in Maryland. The new official of the railway was for the past six years manager of the Clearfield Supply Company at Barnesboro and Clymer.

Charles A. Mead, chief engineer of the division of bridges and grade crossings of the Board of Public Utility Commissioners of New Jersey, has been appointed a representative of the American Society of Civil Engineers on the American Engineering Standards Committee, succeeding Martin Schreiber.

F. D. Jackson is now secretary and treasurer of the Port Arthur (Ont.) Civic Railway. The duties of treasurer were formerly performed by D. McIver and those of secretary by M. M. Inglis. Mr. Inglis, however, will continue as general manager and purchasing agent, which positions he formerly held along with the secretaryship of the property.

William Darbee has replaced D. F. McGee as a vice-president of the Panama Electric Company, Panama. Edmund George Ford, formerly auditor, has taken on the duties of assistant treasurer, and E. P. Summerson, secretary, has also become treasurer of the property. D. G. Beachler is engineer. In this capacity he succeeds W. F. Grimes, Jr., who was known as the electrical engineer.

Fred W. Putnam of Red Wing has resigned from the Minnesota State Railroad & Warehouse Commission, effective on May 1. He will practice law in Minneapolis. Charles Sterling, chairman of the Ramsey County Republican committee, was appointed by Gov. J. A. O. Preus to succeed Mr. Putnam, who was appointed in 1917 and re-elected in 1918 for six years, his term expiring January, 1925.

F. Raymond Latta, who for many years has been superintendent of transportation of the New York State Railways, Syracuse, N. Y., has been promoted to be assistant to John Duffy, general superintendent. The position of superintendent of transportation has been abolished. The move is to centralize all operating direction. The transportation department was organized about five years ago.

W. P. Strandborg, of the Portland Railway, Light & Power Company, Portland, Ore., president of the Public Utilities section of the Associated Advertising Clubs of the World, has been appointed a member of the general reception committee to receive 100 or more representative advertising and business men of the British Empire who will arrive in the United States the latter part of May for a tour of the Eastern and Middle Western sections of the country. The delegation will be composed of publishers, advertising specialists and representatives of large British industrial concerns. The party will attend the annual convention of the Associated Advertising Clubs of the World at Atlantic City early in June.

Col. Charles Keller, who has been engineer commissioner and chairman of the Public Utilities Commission of the District of Columbia, has become associated with the Byllesby Engineering & Management Corporation, Chicago. Colonel Keller's immediate assignment will be business manager of the El Dorado hydro-electric project, now under construction by the Western States Gas & Electric Company on the south fork of the American River near Placerville, Calif. This water power will have an initial installed capacity of 27,000 hp. and an ultimate capacity of more than 100,000 hp. Colonel Keller is an honor graduate of the United States Military Academy at West Point, having been graduated as No. 2 in the class of 1890. After graduation he took the usual post-graduate course, and for a number of years served as an assistant in various engineering districts throughout the country.

Henry R. Trumbower, member of the Wisconsin Railroad Commission since 1918, has resigned to accept an appointment with the United States Department of Agriculture in charge of an investigation of the economics of transportation as it relates to marketing and distribution of farm products. The regular term of Mr. Trumbower on the Railroad Commission expired on Feb. 1, but he was retained by the Governor. In his new position Mr. Trumbower will make a special study of the possibilities of extension of motor truck transportation of farm products. His work will be done in connection with the bureau of agricultural economics and the bureau of public roads of the Department of Agriculture. Mr. Trumbower was appointed to be a member of the Railroad Commission by Governor Philipp in 1916 to succeed Halford Erickson for the unexpired portion of his term. In February, 1917, he was reappointed to a full six-year term. Mr. Trumbower was a professor of economics at the University of Wisconsin from 1910 to 1918.

Obituary

Donald Strode Barton, former general manager of the Canadian Electric Light Company, Levis, and consulting engineer of the Quebec Railway, Light, Heat & Power Company, is dead. Mr. Barton was born in India and was educated in England. He went to Canada in 1900. He settled in Montreal and practised his profession there for five years, when he accepted the appointment as general manager of the Canadian Electric Light Company, and at the same time became consulting engineer of the Quebec Railway. When the Levis company was absorbed by the Quebec Railway he remained with the company in the capacity of consulting engineer.

Frank E. Russell, general manager of the Tucson Traction Company and the Tucson Gas, Electric Light & Power Company, Tucson, Ariz., died at his home in that city on April 15, at the age of sixty years. Mr. Russell suffered a breakdown in health in July, 1922, being taken with a severe attack of sciatic rheumatism which finally developed into pneumonia, from which a complication of diseases resulted. Mr. Russell began his public utility career with the Western Union Telegraph Company, subsequently becoming active in the organization of the Tucson Gas, Electric Light & Power Company in 1892. Shortly thereafter he was appointed general manager and remained as such until the time of his death, a period of more than thirty-one years. In 1910 the Tucson Company became a unit of the Federal Light & Traction Company, New York.

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Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Extensive Car Rehabilitation Plan for D. U. R.

An extended program of car rehabilitation has been laid out by the Detroit United Railway for 1923. Eight trailers which were purchased three years ago for the Pontiac line will be equipped with motors, as the company has adopted the policy of using no more trailers on the Pontiac line. Fifteen of the older type of interurban motor cars are also being pushed through the shop for rebuilding into modern-type cars. The company is also rebuilding two of its 60-ton locomotives with box bodies so that they can be used for freight carrying in addition to hauling cars.

The shop program also includes the rebuilding of eight trail cars which were originally designed for p.a.y.e. entrance and exit at the front end. These will be changed by the elimination of the large front platform and the construction of a rear platform and a smoking compartment. There will also be a rearrangement of the heater system. In this way the cars can be used p.a.y.e. in the city and the fares can be collected in the usual way on the interurban run. Fifteen of the older type of city cars with a side aisle are also being remodeled and fitted with front and rear bulkheads and a change of the aisle to the center.

Two locomotives are being added to the equipment. The bodies are being built by the Cincinnati Car Company and Standard C-80 trucks are being used with 34-in. wheels. The electrical equipment will consist of Westinghouse 562-A-5 motors with H.L.F. control. Each locomotive will be able to haul fifteen trail cars These engines will bring the locomotive equipment of the company up to sixteen.

Existence of Trade Associations Approved by Chamber of Commerce

Approval of the existence of properly functioning trade associations for each important branch of industry and commerce in the country was voted by business organizations affiliated with the Chamber of Commerce of the United States in a preliminary referendum canvas on April 13. Eight separate propositions relative to the activities of trade associations were submitted.

The propositions were taken from the report of the special committee created by action of the board of directors of the national chamber in 1922 to "make a general survey of trade associations, consider activities of trade associations which are in the interest of the public and of the fields of enterprise which are represented."

Philip H. Gadsden, Philadelphia, vice-president of the United Gas Improvement Company, headed the committee as chairman.

The committee expressed itself as of the opinion "that, while a minority of trade associations may have engaged in practices which have laid them open to complaint under the law with respect to restraints of trade, the vast majority have proved their great value for the advancement, day by day, of the processes of production and distribution."

In expressing opposition to government control of trade associations, the committee said:

> The possibility that a trade association may err by violating a statute no more justifies any attempt on the part of governmental authority to control trade associations in all their activities than the possibility of illegal acts on the part of individuals warrants like supervision over all their actions. Such supervision would inevitably restrict the freedom of action of trade associations in meeting the problems which they exist to solve.

The committee laid down as its recommendations three rules with relation to the statistical activities of trade associations, as follows:

> Reports of members to their association should be accurate and sufficiently complete to prevent misconstruction.
>
> As distributed to the membership, the statistics should not be accompanied with any interpretation or other comment which could induce or facilitate concerted action on the part of the members.
>
> All statistics regarding prices should be confined to closed transactions, and should not refer to pending transactions or future transactions.

In summarizing its conclusions the committee said:

> The committee believes that trustworthy information concerning capacity, production, stocks, sales and prices is essential to the effective operation of industry and trade under competitive conditions. The voluntary reporting of such information to trade associations and the subsequent publication and dissemination of such information in a manner which makes it available not only to contributors but also to consumers and to the public generally is beneficial alike to the field of business and the public and does not constitute a restraint of trade.

$1,000,000 for New Buildings

Real estate and building activities of the Indiana Service Corporation, Fort Wayne, Ind., will involve nearly $1,000,000 before the completion of present plans. Half of this sum has been set aside for the erection of the first unit of the Spy Run Avenue-Kamm Street carhouse.

When complete with carhouses 290 ft. x 90 ft. and a washhouse 290 ft. x 25 ft. there will be an initial investment of $100,000. These buildings, together with twenty-eight tracks to be located between the carhouse and the Randolph Street side of the company's property, will be completed this year.

The first carhouse to be erected will be of the two-story type, the lower floor to be used for car repair and barn work while the second floor will contain the offices of the city lines, superintendent and clerks and rooms for the employees. In the second building to be erected will be the wash shop and other departments.

ELECTRIC RAILWAY MATERIAL PRICES—MAY 1, 1923

Metals—New York

Copper, electrolytic, cents per lb	16.50
Lead, cents per lb	7.65
Nickel, cents per lb	27.50
Zinc, cents per lb	7.10
Tin Straits, cents per lb	45.25
Aluminum, 98 to 99 per cent, cents per lb	25.75
Babbitt metal, warehouse, cents per lb.:	
Fair grade	65.00
Commercial	40.00

Bituminous Coal

Smokeless mine run, f.o.b. vessel, Hampton Roads	$6.25
Somerset mine run, Boston	3.175
Pittsburgh mine run, Pittsburgh	2.00
Franklin, Ill., screenings, Chicago	1.95
Central, Ill., screenings, Chicago	1.575
Kansas screenings, Kansas City	2.625

Track Materials—Pittsburgh

Standard Bessemer steel rails, gross ton	$43.00
Standard open hearth rails, gross ton	43.00
Railroad spikes, drive, Pittsburgh base, cents per lb	3.15
Tie plates (flat type), cents per lb	2.575
Angle bars, cents per lb	2.75
Rail bolts and nuts, Pittsburgh base, cents, lb.	4.375
Steel bars, cents per lb	2.575
Ties, white oak, Chicago, 6 in.x8 in.x8½ ft.	1.50

Hardware—Pittsburgh

Wire nails, base per keg	3.00
Sheet iron (28 gage), cents per lb	4.00
Sheet iron, galvanized, (28 gage), cents per lb	5.25
Galvanized barbed wire, cents per lb	3.80
Galvanized wire, ordinary, cents per lb	2.75

Waste—New York

Waste, wool, cents per lb	12-16
Waste, cotton, (100 lb. bale), cents per lb.:	
White	11-13.50
Colored	8-13

Paints, Putty and Glass—New York

Linseed oil, (5 bbl. lots), cents per gal	1.17
White lead, (100 lb. keg), cents per lb	13.125
Turpentine, (bbl. lots), per gal	$1.42
Car window glass, (single strength), first three brackets, A quality, discount*	84.0%
Car window glass, (single strength), first three brackets, B quality, discount*	86.0%
Car window glass, (double strength) all sizes, A quality), discount*	85.0%
Putty, 100 lb. tins, cents per lb	5.05

*These prices are f.o.b. works, boxing charges extra.

Wire—New York

Copper wire base, cents per lb	19.375
Rubber-covered wire, No. 14, per 1,000 ft	7.75
Weatherproof wire base, cents per lb	19.50

Paving Materials

Paving stone, granite, 4 x 8 x 4, f.o.b. Chicago, dressed, per sq.yd	$3.50
Common, per sq.yd	3.10
Wood block paving 3½, 16 treatment, N. Y., per sq.yd	3.19
Paving brick 3½ x 8½ x 4, N. Y. per 1,000 in carload lots	54.00
Crushed stone, ¾-in., carload lots, N. Y., per cu.yd	1.75
Cement, Chicago consumers net prices, without bags	2.20
Gravel, ¾-in., cu yd., N. Y	2.25
Sand, cu.yd., N. Y	1.25

Old Metals—New York

Heavy copper, cents per lb	13.75
Light copper, cents per lb	11.75
Heavy brass, cents per lb	7.50
Zinc, old scrap, cents per lb	5.00
Yellow brass, cents per lb (heavy)	7.50
Lead, heavy, cents per lb	6.75
Steel car axles, Chicago, net ton	24.25
Old car wheels, Chicago, gross ton	26.25
Rails (short), Chicago, gross ton	24.75
Rails, (relaying), Chicago, gross ton	33.50
Machine turnings, Chicago, net ton	14.25

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Rolling Stock

Chicago Surface Lines will shortly purchase seven trailers to replace those lost by fire.

Wisconsin Public Service Company, Green Bay, Wis., expects to receive soon six new cars being built by the St. Louis Car Company for service in Green Bay.

Chickasha (Okla.) Street Railway is remodeling a nine-bench open car for one-man operation by placing the seats lengthwise, installing hand-operated gates and steps, closing the ends and sides with wire netting and installing fare boxes.

New York Central Railroad, New York, N. Y., has ordered thirty new multiple-unit cars, delivery to be about July 1. They are practically the same as the last lot ordered. This brings the total up to 286. The road has seventy-three locomotives. None has been added since 1916.

Lake Superior District Power Company, Ashland, Wis., recently lost an interurban car by fire which broke out when the car was midway between Bessemer and Ironwood. Interurban service will not be decreased as the company will operate on this line new equipment which it has just received.

Track and Roadway

Detroit Municipal Railway has a budget this year of $650,000 for special trackwork. This will include pieces all the way from a single frog to a grand crossing.

Montreal (Que.) Tramways will proceed shortly with a double-track extension on Rosemount Boulevard between Papineau Avenue and First Avenue, Rosemount.

Los Angeles (Calif.) Railway has installed a new crossover on Central Avenue north of Sixth Street for the convenience of cars operating out of Division 1.

Tennessee Electric Power Company, Chattanooga, Tenn., is at work on a program of improvements which calls for an expenditure of about $355,000. Of this amount $106,000 will be spent in the railway department.

Easton (Pa.) Transit Company will soon extend its lines to Twenty-fourth Street. H. H. Paterson, vice-president of the Lehigh Valley Transit Company, will go to Easton in the near future to attend a conference regarding the extension.

Trenton & Mercer County Traction Corporation, Trenton, N. J., will relocate the tracks on Pennington Avenue, from Prospect Street to Parkway, and place them in the middle of the street. A double track will be laid on Princeton Avenue, a distance of about a half mile.

Philadelphia (Pa.) Rapid Transit Company will be in a position to build several additional lines because Mayor Moore has permitted the five ordinances providing for cross-town trolley lines to become laws without his signature. In allowing the bills automatically to become laws, the Mayor yielded to the suggestions made by many persons who reside in the neighborhoods which will be served by the proposed lines.

Power Houses, Shops and Buildings

Hydro-Electric Power Commission of Ontario this year will spend about $1,000,000 for electric railway improvements. This includes a new carhouse and terminal in Toronto to be used jointly with the Toronto Transportation Commission. A new power house will be erected at Lake Simcoe and one or more new substations are on the program.

New Orleans, La. — The two 72-in. pipes which supply water for the plant of the New Orleans Public Service, Inc., at the foot of Market Street, in New Orleans, have been found inadequate since the installation of the new 20,000 kw. turbine. In consequence it has been decided to build a new reinforced concrete intake tunnel, 8 ft. x 10 ft., to cost with connections about $500,000. When in operation at its full capacity, the plant requires 11,570,000 gal. of water an hour. The work on the tunnel will be started when the water in the Mississippi River recedes to a lower level. The Commission Council and the Orleans Levee Parish Board have authorized the construction of the tunnel.

Trade Notes

W. J. Jeandron, American representative of Le Carbone brushes, sailed for Europe recently for a six weeks' visit to the factory at Levallois-Perret.

Borne Scrymser Company, New York, N. Y., announces the removal of its New York offices to the Whitehall Building, 17 Battery Place, N. Y.

Bridgeport (Conn.) Brass Company has announced the removal of its New York offices from the Woolworth Building to the Pershing Square Building. F. Morton Clark has been made district sales manager and Arthur J. Nelson sales manager of the fabricating division at the main office in Bridgeport.

Pure Carbon Company, Wellsville, N. Y., announces the recent establishment of a Minneapolis representative, the Charles A. Etem Company, 917-A Marquette Avenue, Minneapolis, Minn. This representative is in an excellent position to give personal engineering service on all brush problems and requirements in this territory.

Musashino Railway of Japan has placed an order with the Westinghouse Electric & Manufacturing Company, through Takata & Company, agents for the Westinghouse Company in Japan, for three electric locomotives, two motor car equipments and two trail car equipments. Each locomotive will be equipped with four Westinghouse 100-hp. motors geared direct to the driving axles, and will weigh 33 tons. The locomotives will be controlled by standard electro-pneumatic control and will operate over a 1,200-volt system. The mechanical parts for the locomotives will be furnished by the Baldwin Locomotive Works.

Allen B. Coffman has resigned as sales engineer for Crouse-Hinds Company, to become manager of the Philadelphia district for the Reliance Electric & Engineering Company, Cleveland, Ohio, manufacturer of electric motors. For the past three years while connected with Crouse-Hinds Company, Mr. Coffman made a study of different types of electrical installations in various industries from Pennsylvania to Florida. Previous to his association with Crouse-Hinds Company, he was assistant electrical engineer for the Philadelphia & Reading Railroad for approximately four years, having gone with it from the Pennsylvania Railroad electrical department. Mr. Coffman will continue to make his headquarters in Philadelphia and will be located in the Reliance Electric & Engineering Company's office in the Perry Building, Sixteenth & Chestnut Streets.

Chausse Oil Burner Company has been incorporated in Michigan to manufacture oil burning apparatus for asphalt street repairing, installation in electric railway cars, production of house furnace burners and the manufacture of oil burning hand torches. The company is incorporated for $100,000. Its officers are W. McK. White, president; W. G. Chausse, vice-president; Wray P. White, secretary. Offices have been opened at 206 Lincoln Building, Detroit, and plans are being made for location of a factory either in Detroit or in a near-by city. The apparatus which the Chausse Company will make has been produced in a small way for several years for use by steam and electric railways, street paving contractors and municipal boards of work. The 3-gal. Chausse torch, used for thawing switches and signal mechanism, has been a standard in steam railway signal departments for several years.

New Advertising Literature

Mica Insulator Company, New York, N. Y., has issued a circular, together with a revised price list and discount sheet, of its electrical insulating materials. The price list is got up for the convenience of jobbers, dealers and all those using insulation materials.

Lebanon Boiler Work, Philadelphia, and Lebanon, Pa., is distributing Bulletin 23-A, describing its Uniflow improved return tubular boilers. Among other things the bulletin points out that of 465,000 stationary boilers in the United States in 1920 (omitting those in the contracting field), 60 per cent were of the fire-tube type, mostly horizontal return tubular boilers.

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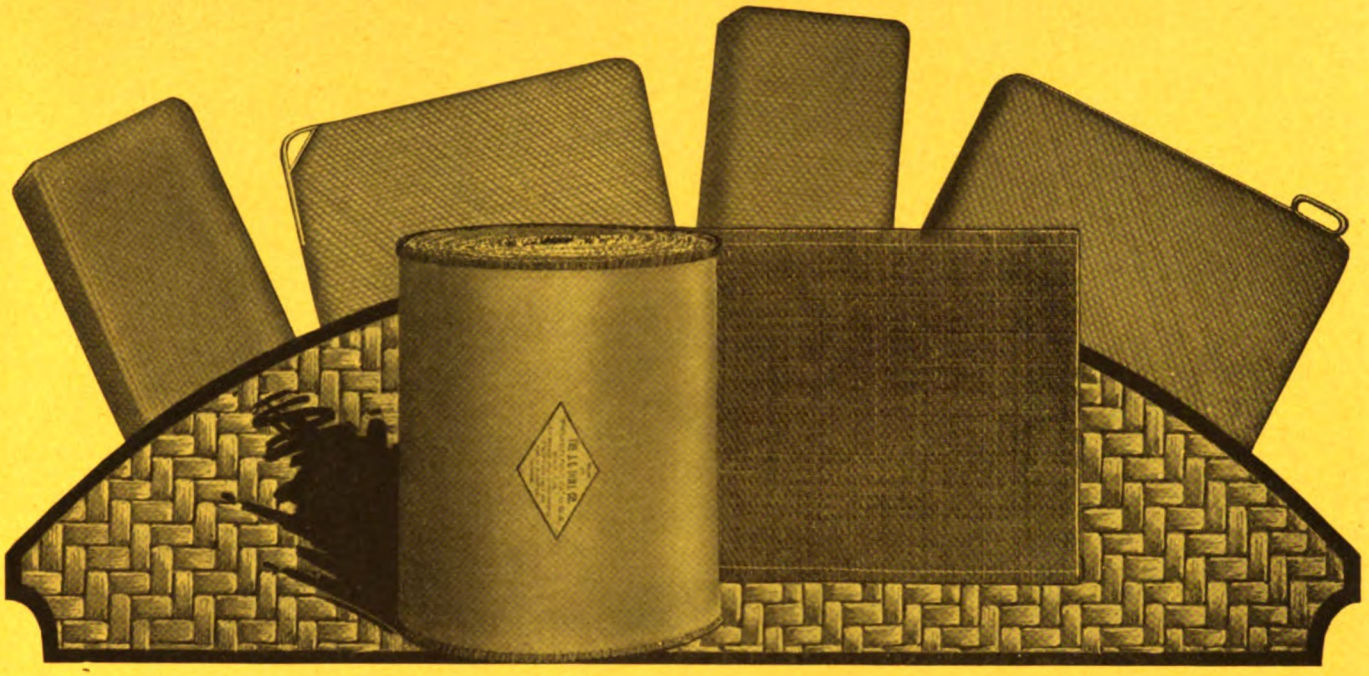

Old Seats Made New

Brill Twill-Woven Seating Rattan

Old and worn looking seats will always detract from an otherwise attractive service. To maintain the clean and attractive appearance of your cars bright new seat covering of Brill Twill-Woven Seating Rattan will prove a valuable asset.

Manufactured from specially imported cane in our own plant both the canvas-lined and unlined Rattan is ready for shipment to you in widths from 14 to 36 inches.

THE J. G. BRILL COMPANY
PHILADELPHIA, PA.

AMERICAN CAR CO. ST. LOUIS MO. — G.C. KUHLMAN CAR CO. CLEVELAND, OHIO. — WASON MANF'G CO. SPRINGFIELD, MASS.

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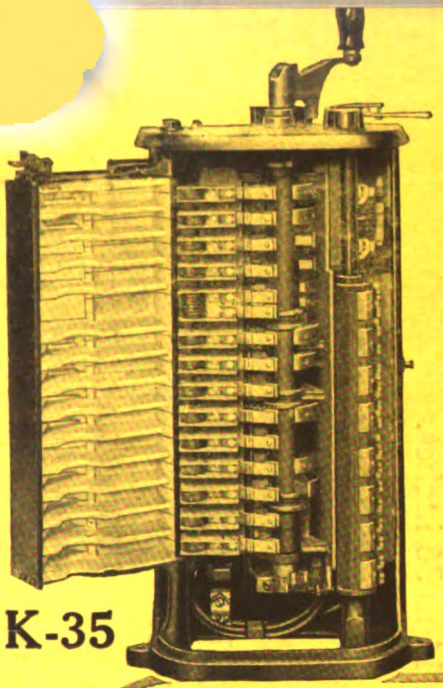


K-35

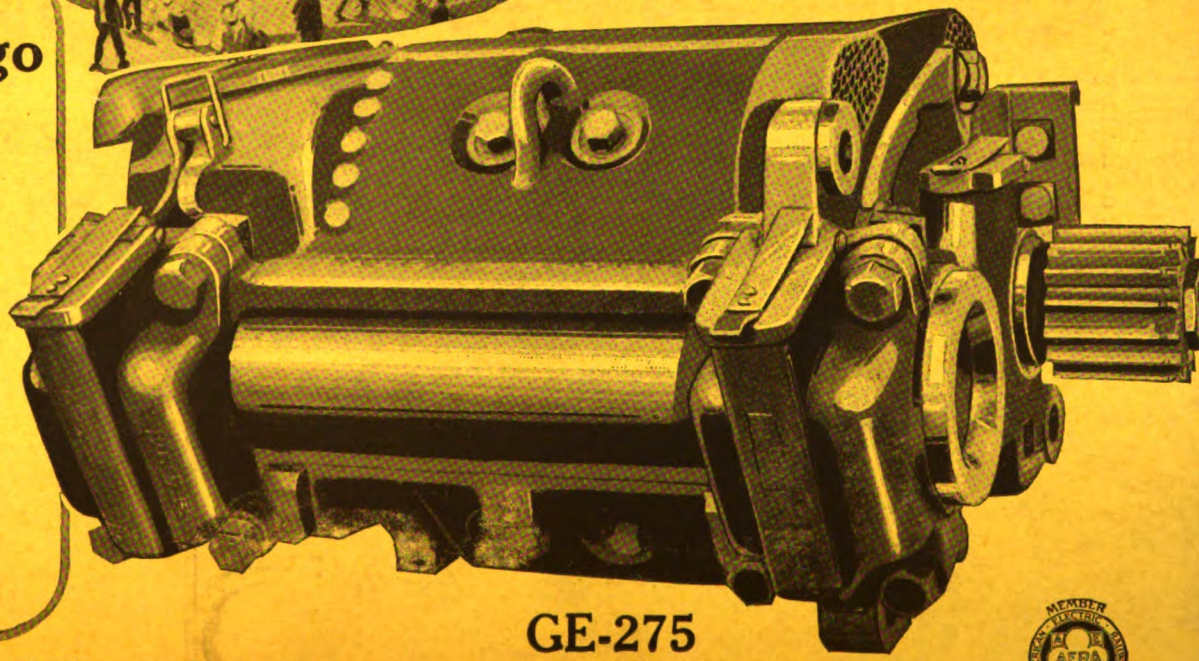
CP-127

400 More Motors for Chicago

Successful operation of the GE-275 Motors on the Chicago Surface Lines has led to a repeat order for 400, making a total of 766 GE-275 Motors for that system.

The first 366 motors, ordered last fall, are for interchangeable use on double-end, wide-platform, two-man cars to handle trailers or on light-weight one-man cars.

These 400 additional GE-275 Motors will be used as four-motor equipments, with K-35 controllers and G-E Line Breakers. The Air Brake Equipment for these 100 cars is also "G-E", with CP-127 (20 cu. ft.) compressors.



GE-275

General Electric Company
Schenectady, N. Y.

GENERAL ELECTRIC

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McGraw-Hill Company, Inc. May 12, 1923 Twenty Cents Per Copy

ELECTRIC RAILWAY JOURNAL

A *"healthy thing"* for your profits

The manager of a large road recently said:

"Perhaps we have gotten into a rut. Let's look into this scientific lubrication.

"It is often a very healthy thing for our road, or any other road, to make a change. We many learn something by so doing."

Operators are custodians of large investments. In order to earn dividends, their investments must work. Every time a capital unit is out of service, they not only lose production, but profits. Correct Lubrication keeps capital units in service.

In many large central power stations throughout the country, Gargoyle D.T.E. Oil Light for Turbines is showing superior performance in terms of less sludge, fewer shut-downs, less make-up, fewer unit recharges per year.

We shall be glad to get in touch with you. Kindly address our nearest office.

GARGOYLE

Lubricating Oils

A grade for each type of service

VACUUM OIL COMPANY

Domestic Branches:

New York—
(*Main Office*)
Buffalo
Milwaukee
Boston
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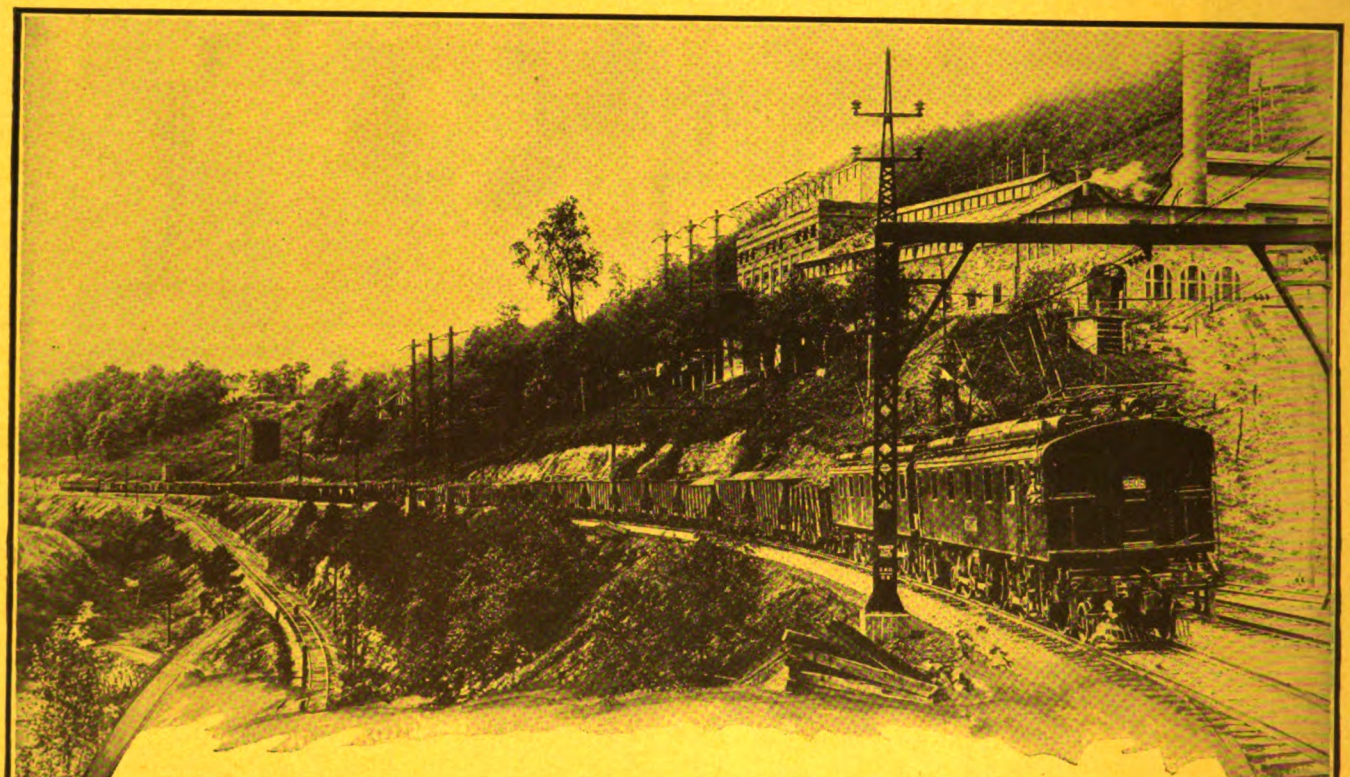

Another Successful Alternating-Current Installation

Winding over and through the mountains of West Virginia, hauling approximately two million tons a month, the electric locomotives of the Norfolk & Western have more than met expectations.

As a proof of the successful operation of this alternating-current electrification, the Norfolk & Western Railway are extending their electrified zone a distance of thirty route miles.

This extension will insure a more rapid and efficient handling of the 3250-ton trains through this coal-mining region which includes the 2% Elkhorn grade over which these trains operate at a speed of 14 miles per hour.

Were steam locomotives used to handle the present tonnages the number required would be at least three times the number of electrics now employed.

MEMBER AMERICAN ELECTRIC RAILWAY ASSOCIATION AERA

THE BALDWIN LOCOMOTIVE WORKS · PHILADELPHIA, PA.

WESTINGHOUSE ELEC. & MFG. CO. · EAST PITTSBURGH, PA.

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New York, Saturday, May 12, 1923

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Company, Inc.

HENRY W. BLAKE and HARRY L. BROWN, *Editors*

Volume 61
Number 19

Toronto Reports a Surplus of $109,468 for Sixteen Months

A GREAT deal of interest will attach to the report, digested elsewhere in this issue, of the operation of the Toronto lines by the city for the sixteen months ended Dec. 31, 1922. The surplus shown is $109,468. On the basis of fixed assets of $34,586,698, the return on the investment approaches the infinitesimal. Judging from the report, which, however, gives very meager information and makes it impossible really to know what has been charged up to the railway or transferred to other city accounts in arriving at this net, the city has done one thing. It has apparently made the enterprise self-supporting. This is what it set out to do. The management there never fell for the fetish of the 5-cent fare. The average fare is 6.165 cents. Moreover, in discussing the fare question, H. H. Couzens, the manager of the Toronto Transportation Commission, explains that with a flat fare every extension to the system increases the cost of doing business without a corresponding increase in revenue.

The report is not intended to be a railway operating statement, but it is interesting in that the manager for the commission has made it quite plain that the operation of the system is in no way free from the hazards that attach to private management. Thus he calls particular attention to construction work carried out at the greatly increased prices for material and labor prevailing in the present market, charges that Toronto must meet in the future by increased car fares.

Plan Ahead to Cope with Growing Vehicular Traffic

LAST week an item appeared in this paper showing an increase of 17 per cent in motor vehicle registration for 1922 over the preceding year.

Dr. Wilfred I. King of the National Bureau of Economic Research, and author of the book "Income in the United States," is quoted as saying that he can see no immediate saturation point in this field. Dr. Wesley C. Mitchell of Columbia University, author of "Business Cycles," agrees in this and argues that with decreases in price and reduced cost of upkeep, we can double the number of cars in use. These and other authorities indicate that with the present population we can support some 20,000,000 passenger automobiles in the United States. In the case of trucks, the limit will be found on the basis of comparative costs as against other forms of transportation, but there is no indication of any reduction in the rate of expansion for some time.

Interurbans are very much interested in this growth in motor vehicle use from the standpoint of competition. The street railways have some interest in this direction, but they will probably be more concerned from the standpoint of the increased street congestion, which means slower schedules and more accidents. It all points to the need to plan ahead to give the best possible service with attractive cars and fast schedules, and to work toward traffic control measures that will keep the car routes open and free of such obstructions as come from promiscuous parking, cruising, left-hand turns, permitting heavy trucking and other vehicular movement to be concentrated on car line streets, etc.

The Public Can Do Much to Reduce Accident Hazard

WITH the growth of street traffic comes the accident, like Banquo's ghost, to haunt the railway man. Every forty minutes a motor vehicle kills some one on America's highways. In 1922 the number of persons killed in this way approached that of the list killed in action in the late war. William P. Eno, the international traffic authority, believes the records are far too small, as he says many of those who die ultimately from traffic accidents get home, out of town, or to a hospital, and all records of the cause of the death are often lost. He thinks it not unlikely that the number of deaths from highway traffic is 36,000 a year.

Some persons believe that this waste of life can be prevented by legislation. Undoubtedly much can be accomplished by good regulations, well enforced, but no laws can eliminate the reckless driver or the careless pedestrian. Education of the individual, which can be accomplished best through organized effort in a community, is the best way to reduce the hazard.

What part does the street railway play in this? For some time past the companies have conducted and organized safety campaigns among the employees, and the result has been that little more can be accomplished along this line in further reduction of accidents. Most of the street railway accidents nowadays are caused by persons having no connection with the company, and are entirely beyond its control. While the street railway accidents are but a small part of the total, the best way to reduce them is to appeal to the public at large. Prevention of the accident eliminates the liability for which the railway is the particular target.

The accident situation is not discouraging, however, as good results have been obtained from the safety agitation already done, if viewed in the number of accidents per hundred thousand car miles, or per hundred vehicles. But the greatly increasing vehicular movement practically compels the electric railway, in defense of its earnings, to carry propaganda for safety beyond its own employees to the community at large.

This week is published the first of a series of articles by C. W. Price, an authority on safety work, who has organized several successful campaigns, among them one in Washington, D. C. In this series he takes up the methods employed and shows how accidents actually have been reduced, in some cases the fatalities being 30 per cent less in 1922 than in the previous year, even though the total traffic increased. The articles will

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discuss safety campaigns as planned and carried out by street car companies so that they should be especially helpful to railway executives in planning their future safety activities.

Home Rule Legislation Fails in New York

GOVERNOR SMITH'S program of utility legislation has failed. Desperate efforts were made by the Governor at the last moment to save something from the wreckage for the home-rule advocates, but the differences between the two factions in the New York Legislature proved irreconcilable. Mayor Hylan played the game of all or nothing, and in this case he got nothing. The result has been more idle vaporing from Hizzoner and a demand upon the Governor by the Board of Estimate of New York City for a special session of the Legislature to consider transit legislation.

The Governor, however, has said that he can see "no reason at present for such a session." Not content with that, the Board of Estimate has instructed the Corporation Counsel to prepare legal charges asking the Governor to remove members of the Transit Commission. The Mayor has scored the "four Republican obstructionists" in the Legislature and they in turn have lambasted the Mayor, who is accused by them of making "false appeals in order to keep alive a political issue which he and his associates have found profitable."

According to the Governor, himself a Democrat, the Democratic view of the legislation he advocated meant a comprehensive solution of the transit problem as a whole, while the Republican program at best promised something in 1928. This statement was, of course, intended for popular consumption, but the program of the Democrats in New York should be analyzed in the light of the facts in the case. First of all, they wanted a return to home rule, with a new commission for New York City responsible only to the Mayor and the Board of Estimate, the decisions of this commission not to be subject to review by the courts. In addition, they wanted, briefly, the right to own and operate new subways and eventually to own and operate all subways; the right to regulate the present privately operated subways, and the right to establish municipally owned and operated bus lines anywhere in the city without securing a certificate of convenience and necessity. The Republicans insisted that the state should be permitted to continue to regulate security issues; that the city should secure the necessary rights from a state commission before being permitted to place buses in operation in competition with existing means of transportation, and that after operation of any transit facilities for a reasonable length of time at a 5-cent fare the fare be increased, if necessary, to make the operation of such lines self-supporting. The Republicans were unalterably opposed to any deficits from operation being met from general taxation.

These are just a few of the irreconcilable differences between the two factions. They show, however, the extent of the assault that it was proposed to make upon the present existing order of things in an effort to satisfy the vanity of an administration that has construed its election to office to mean that it should be permitted to proceed without let or hindrance with a program of municipalization staggering in the possibilities of evil that might come out of it.

As matters now stand the present Transit Commission in New York is left with its powers intact to carry on to completion, if it can, the program for unification of the existing transportation lines and the construction of new rapid transit routes, while the Mayor is left to think things over and perfect the paper plans for the construction of the separate system of lines which the city administration has recently indicated it proposes to carry to completion under its existing powers. There remains, of course, the possibility that the Mayor and the commission may get together on the matter of future subway building, and some of the New York City papers have gone to laborious lengths to point out that the differences between the city administration and the commission are not irreconcilable.

Chamber of Commerce Makes Progress in Solving Transportation Problems

THE main subject announced for the annual meeting of the Chamber of Commerce of the United States in New York this week, namely, "Transportation in All Its Phases in the United States," is somewhat misleading because city transportation was not considered. The papers and discussions on transportation were on how the trunk line railroads could be rehabilitated so that they could better serve the public and how the operation of the motor truck and waterway could best be co-ordinated with the railroad in the country's transportation system. While electric railways, as freight carriers, were mentioned only indirectly, the meeting had many points of direct interest to them because many of their financing and labor problems are similar to those of the steam railroads; they also are faced with automotive competition, and they are vitally interested in regulation and in the coal question. Electric railway problems are also to be taken up as part of a study of the general transportation situation by a committee whose appointment was decided upon by the Chamber some time ago. Five sub-committees of this main committee made progress reports at the meeting and will consider, among other things, freight rates, cost of operation and taxation of motor and railway carriers, wear on highways by motor trucks, possibilities of co-ordination of the motor bus and electric railways, and other allied topics.

The most interesting feature of the discussion on transportation at the meeting was that in the addresses and debates two principles stood out as being generally accepted, not only by the membership in general but by the advocates of motor transport and water transport as well. The first of these is that the main transportation of the country will still have to be carried on rails and that government ownership of these rail carriers is undesirable. In consequence, such a policy must be adopted toward them as to encourage their development and expansion under private initiative. The second conclusion reached is that in the interests of both public and carriers there should be better co-ordination between the different modes of transit, so that each shall undertake only that part of the work for which it is better fitted than the others, and that this comparison should include a consideration of the cost of operation, of which a part is any subsidy which it may receive by having part of its right-of-way furnished free at government expense.

Altogether the meeting was a step forward in the correct solution of transportation problems, as well as in the other questions considered, and much may be expected from the reports of the five committees now working under the direction of the Chamber studying various phases of the transportation problem.

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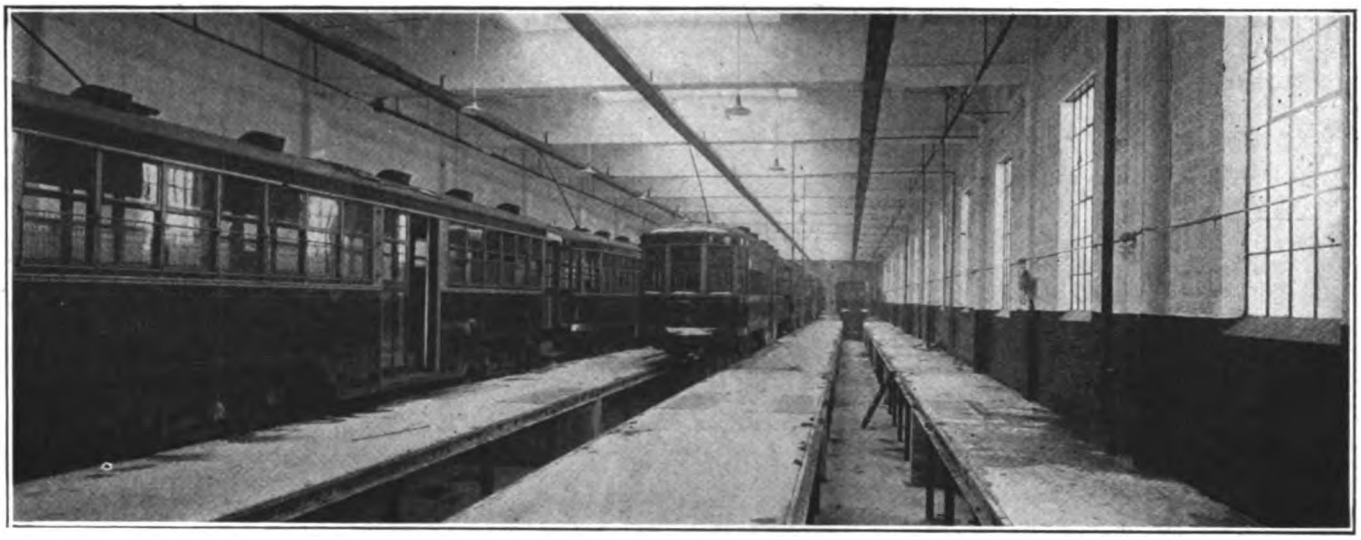

Inspection Bay No. 2 in Carhouse Just Constructed at Toronto

Toronto's New Car Storage Facilities

Rehabilitation Program Includes Expansion and Improvement of Division Inspection and Storage—One Layout Has Just Been Completed—A Feature Is the Provision for Fire Protection—Reinforced Concrete Selected on Competitive Annual Cost Basis

THE rehabilitation program of the Toronto Street Railway system, under the direction of the Toronto Transportation Commission, includes the erection of several new carhouses. One of these, with division headquarters and employees' rooms, has recently been completed at the corner of Eglington Avenue and Yonge Street, and plans have been prepared for a similar building to be known as the Danforth carhouse.

The Eglington carhouse, or inspection shop as it might more properly be called, occupies part of a plot of 10.32 acres which was purchased by the commission. The arrangement of the carhouse and yards, however, is such that a portion of this plot of about 3 05 acres is available for resale for stores and residences. The space occupied by the main carhouse is 41,695 sq.ft. and that by the office building is 5,450 sq.ft. The rest of the space used for railway purposes is given up principally to storage tracks, as in Toronto open storage is used for most of the cars.

The storage capacity of the carhouse proper is thirty-four cars, based on a 50-ft. length. The yards at present will hold 120 cars, but this can be increased by additional tracks to hold fifty-three more cars when desired, thus providing a total capacity of 207 cars at this place. The entrances to the yards and to the carhouse are paved with granite blocks and the remainder of the yard is ballasted with cinders.

The main entrance to the yard is from Eglington Avenue and the general movement of the cars is south to the Yonge Street exit. Toronto service is given largely by single-end cars, with trailers in rush hours, and the yard is adapted to that kind of operation. Two electric shunters are used to move the trailers around.

The Division Headquarters Building Has a Pleasing Exterior

CARHOUSE AND STORAGE YARDS

The carhouse proper is a reinforced-concrete structure with brick and tile walls, steel sash and electrically operated rolling steel doors. It has no wood in its construction and is equipped throughout with automatic sprinklers and an auxiliary fire hose system. It is divided into three bays by fire walls, each bay being 307 ft. long by 44 ft. wide. The two westerly bays are used for the inspection of cars. Each has three tracks and is closed by doors at either end. The remaining bay, with two tracks, accommodates the workshop, storerooms, boiler house, lavatories and locker room. Under every track is a concrete inspection pit running the full length of the building.

In addition to the sprinkler system and auxiliary fire-hose system in the carhouse, a number of monitor nozzles are located on the roofs, while others are on poles. These nozzles are capable of playing water over the site used for storing the cars. There also are yard hydrants and standpipes, the locations of which are shown on the accompanying plan. This special fire protection not only insures very low insurance rates, and so justifies itself on this ground, but it provides as far as possible against se-

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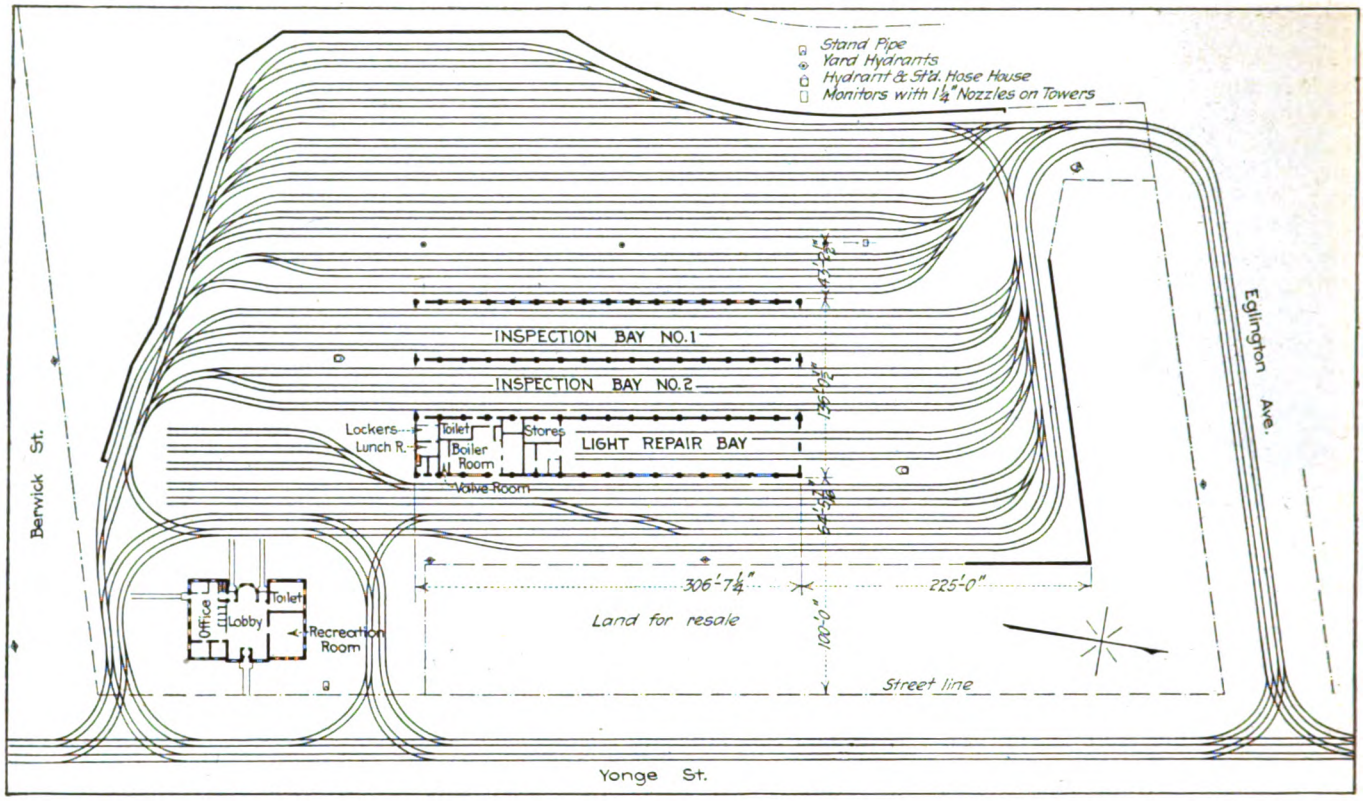
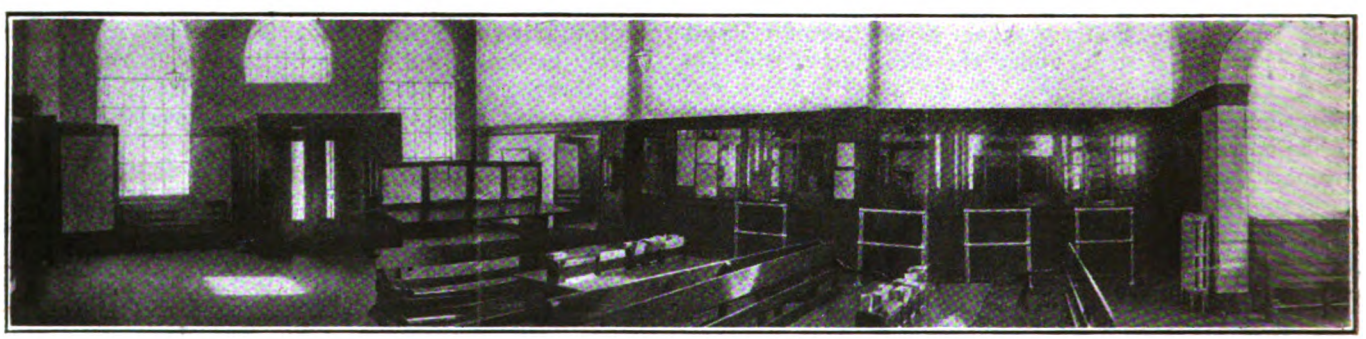
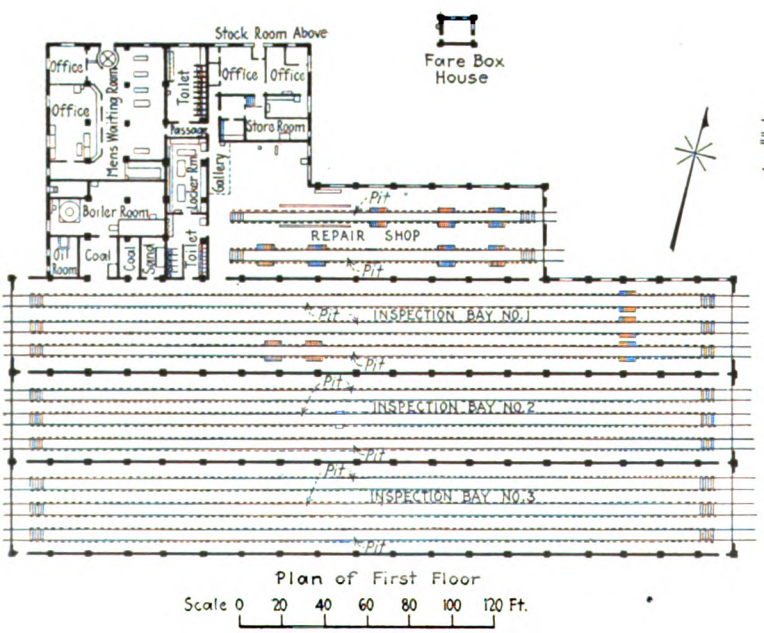
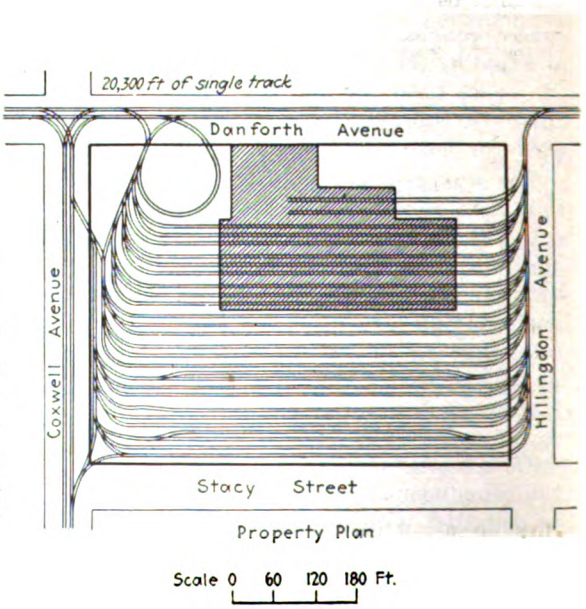


Plan of Eglington Carhouse and Storage Yards Shows Minimum Use of Street Frontage



The Main Room in Division Headquarters Is Well Lighted and Cheerful





Plans of Danforth Carhouse and Yards Under Construction

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rious disorganization of the service if a fire destroyed rolling stock which the company could not replace for months.

Within the carhouse the spraying system of car washing is employed. It is similar to that used by the Detroit Municipal Railway and described on page 705 of the ELECTRIC RAILWAY JOURNAL for Oct. 28, 1922. On both of these railways cars are washed as they pass through the carhouse.

The building is heated by hot air, driven by fans through concrete and tile ducts to outlets in the pit floors.

OFFICE BUILDING

The office building, located at the southeast corner of the site, is a brick structure with steel frame, 92 ft. long by 60 ft. wide, and provides accommodation for the men and staff of the division which operates from this depot. In the center of the building is a well-lighted lobby with large windows at both ends. It contains schedule racks, order boards, tables where the men can make out their reports, with ticket and cashiers' windows at the left. The general interior view of the waiting room shows this side of the lobby, with the railings, which are of aluminum piping. Opening to the right are the trainmen's recreation room and lavatories.

COST OF CONSTRUCTION

The total cost of the carhouse and office building, including furnishings and equipment, but exclusive of land, was about $275,000. Before adopting this construction the Transportation Commission made an analysis of different types, with the results shown in the accompanying table. Reinforced concrete, the type adopted, was most expensive in first cost, but the reduction in insurance premiums on buildings and contents and the lowered maintenance of buildings brought the total annual operating costs of the three types of construction to almost the same. Hence the great advantage to the system of having a practically fireproof construction at the same time was secured without extra cost.

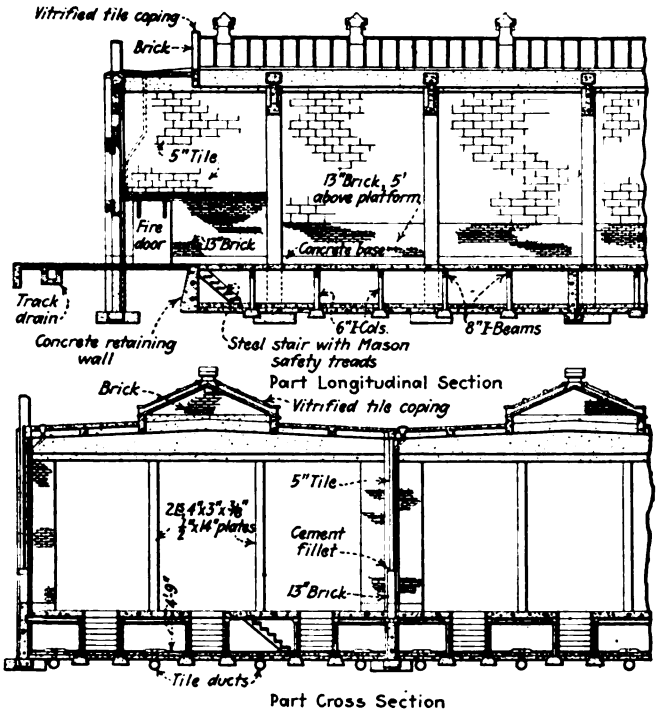
COSTS OF DIFFERENT TYPES OF CONSTRUCTION FOR CARHOUSE TO ACCOMMODATE THIRTY-FOUR CARS

(Including sprinklers and track in buildings)

Type of Construction	Reinforced Concrete (Columns and Roof)	Steel Trusses, Steel Columns, Gypsum Roof	Steel Trusses, Steel Columns, Wood Roof
Capital cost	$215,000	$213,000	$207,000
Annual charges:			
Interest and sinking fund at 9 per cent	19,350	19,170	18,630
Insurance premiums on buildings and contents, and maintenance	2,828	3,077	3,542
Total	$22,178	$22,247	$22,172
Costs per car:			
Capital	$1,194	$1,183	$1,150
Annual operating	123.21	123.59	123.17
Costs per cu.ft.			
Building, shell only (cents)	19.1	18.9	18.4
Building, equipped (cents)	19.7	19.5	19.0

The Eglington carhouse replaces the old Yorkville carhouse, which was closed Dec. 14 after a long career, first as a barn for horse cars and later as a carhouse for electric cars.

In addition to the Eglington carhouse, which has been completed, the Toronto Transportation Commission is building a somewhat similar structure with accompanying storage yard occupying an entire block at the corner of Danforth Avenue and Coxwell Avenue. With the yards the capacity is 263 cars, there being twenty-six storage tracks, of which nine pass through the three inclosed inspection bays. Two additional tracks enter the repair shop. A plan is given in the lower diagram on page 792.



Use of Reinforced Concrete Secures Fire Protection

Broadcasting Utility Information in the Middle West

THE Iowa Committee on Public Utility Information has adopted a novel method of interesting the public in the work of assisting in solving problems which the public must face if adequate utility service is to be furnished. The director of the committee, Joe Carmichael, gave a fourteen-minute talk on the evening of April 30 from Radiophone Station WOC, Palmer School of Chiropractic, Davenport, Iowa.

"WOC" is one of the strongest broadcasting stations in the country, and telegrams, phone calls and letters indicated that the talk was heard in distant parts of the country. Thousands of people listened in in the immediate vicinity of Davenport.

The speaker discussed briefly some of the difficulties confronting the electric light, gas and electric railway industries. He pointed out that the public was confronting the utilities with the biggest economic task that any industry ever faced. In order to provide service which the public was demanding, the utilities had to double their investment in the next six or seven years. That investment now exceeds thirteen billions of dollars. It has been accumulating for half a century, yet it now must be duplicated in a few years.

The utilities, he said, did not know where the money was coming from, but they knew where it was not coming from. It was not coming from dissatisfied, disgruntled customers. It was not coming from anywhere, if there was any appreciable number of disgruntled, dissatisfied customers, for no one was going to invest money in an industry whose public relations were bad.

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Exchanging Ideas on Publicity Work

The Publicity Men of Several Mid-West States Are Exchanging Views and Presenting Discussions on Various Aspects of Their Work Through the Medium of a Bulletin—Some of the Matter Presented Therein Is Abstracted Here

By E. B. Sanders
Publicity Manager Kansas City Railways

PUBLICITY is either good or bad, beneficial or injurious; it molds public opinion either favorably or adversely; it can "make or break you."

With the right kind of publicity an ordinary actor becomes a star overnight; print a few words of commendation on the successful manner in which some lawyer has handled a case and clients will flock to him for counsel; boost a street railway and you have won public sentiment to the side of the company.

As a general rule newspaper editors are more inclined to boost than to criticise. Any individual who is constantly striving to do the right thing usually receives the support of the newspaper; and the same principle applies to any industry. The electric railway industry needs plenty of publicity—the right kind of publicity. But we can't get it unless we go after it in the right way.

In the first place there must be something done to create good publicity. It's the lack of effort that usually results in the wrong kind of publicity.

The fact that service is the one and only commodity the electric railways have to offer necessarily implies that our efforts to secure publicity must be concentrated on that one sales article.

Keep Up the Supply of News

Fortunately, however, service covers a lot of territory. It may be divided into many classes—and each class is deserving of the proper publicity. The idea is to keep showering the newspapers with news. If we don't furnish the material, how can we expect to be fairly treated?

King "Tut" had to wait a long time to break into print, and then didn't profit by it. The street railway man can't wait that long. He has to advertise while there is still time to reap a reward, for three thousand years from now when some "Americanologist" unearths one of our twentieth century cars, places it in a museum, and the people pass by and remark, "What an odd looking chariot," it won't make much difference to us what the newspapers say about us or our "chariots."

But today—that's a different story.

In the publicity game today we are either King Tuts or King Solomons. The latter was a good advertiser—he got his while the getting was good. That's what the street railway men in the Middle West are trying to do.

Last summer the more than fifty companies in five Middle Western states (Missouri, Kansas, Iowa, Nebraska and Oklahoma) "pooled" their publicity and advertising ideas. In other words, these companies agreed to exchange advertising copy of all kinds as well as suggestions and ideas along that line. As a medium of such exchange a *Bulletin* was started and sent to every company in this territory. Published every other month, this *Bulletin* contains articles on subjects of interest to the electric railway publicity men, advertising copy used by the various companies, ideas and suggestions on how to secure publicity, what and how to advertise, and other valuable information Everything appearing in the *Bulletin* is prepared by the men who handle the publicity for their companies. This "pooling" of ideas and suggestions has proved invaluable to the men in this territory.

Before the first issue of the *Bulletin* appeared, the following questionnaire was sent out to every company in these five states:

1. Do you use any of the following advertising channels? (a) Newspaper space. (b) Window signs. (c) Company publications. (d) Dash cards. (e) Cards inside cars. (f) Handbills. (g) Other mediums.
2. Do you receive much newspaper space in the way of news items?
3. Are your newspapers friendly to your company?
4. How many daily newspapers in your city?
5. Do you call the newspapers whenever you have any news that would be of interest to the public?
6. Have your receipts increased or decreased within the past year?
7. To what do you attribute such increase or decrease?
8. Have you any jitney competition? If so, approximately how many jitneys?
9. How many employees have you?
10. Would you be willing to write a short article for our bulletin on some phase of advertising or publicity work?
11. Will you please offer us some suggestions on ways and means of making the bulletin a popular and beneficial publication (these suggestions to be published in the bulletin)?

Practically every company filled out this questionnaire immediately, and the answers were published in the first *Bulletin* so that every company would know what the others were doing.

This investigation brought out the fact that very few companies were doing advertising of any kind; a few were receiving some free publicity—mostly news concerning accidents for which the company was not responsible, or pertaining to breakdowns in service.

Every company was 100 per cent strong for the *Bulletin*. All agreed to co-operate in every way to make this innovation a success. *And they have done so!* To day every *Bulletin* reader will tell you that he has been benefited by the ideas of others as expressed in each issue. More companies are advertising now than previously—and with splendid results.

Since the inauguration of the *Bulletin* several companies have begun publishing weekly pamphlets for distribution on their cars. This was one of the first suggestions made by one of the *Bulletin* readers. Other suggestions offered in the way of advertising mediums were as follows: Newspaper space; company publications; inside cards; dash cards; window signs; handbills; large signs on construction work detailing cost and number and quantity of materials used; moving picture films; and addresses by officials at club and civic organization meetings.

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It might be said that today every company in this territory is using effectively one or more of these advertising mediums. One company official suggested that arrangements be made with radio broadcasting stations in this territory to broadcast occasional short speeches on the electric railway situation. And this was so good that plans are now under way to do this.

Speaking of publicity and public relations, an Oklahoma official said in *Bulletin* No. 3:

Public relations are in a large measure, whether good or bad, established by the employees of the utilities. Therefore, it would appear of the utmost importance to sell the service to employees first. Adequate, reliable service and conscientious employees who are good salesmen are the two important factors which establish and maintain public relations.

Advertising Pays Well

In *Bulletin* No. 4 appeared a number of splendid articles on "The Value of Good Newspaper Publicity." Here is an abstract of one by an official in Oklahoma:

Whatever the merits of such advertisings are, it must be borne in mind that the results can only be estimated, and to undertake to state a value in dollars and cents would indeed be difficult.

Advertising managers and others who are closely associated with advertising work, due to their extensive study of the values of the various methods of advertising, almost unanimously agree that newspaper advertising has a psychological value, which is difficult if not utterly impossible even to estimate. In this connection, my experience with newspaper advertising, from a public utility point of view, convinced me that the values of such advertising come from two directions, stimulating traffic and molding public sentiment. Whether either or both are worth what they cost is a matter of speculation. Personally, I believe they are. I am firmly convinced that public opinion, however unfavorable, can be changed to more favorable and probably made satisfactory by constant agitation in the proper way, through the columns of the newspapers, and this is indeed too important to be overlooked. Yet the most brilliant manager would demur if asked to place a dollar and cents value on it.

Advertising is like adjusting an important claim; one cannot say whether the investment was good or bad. It is largely a matter of opinion, and what appears to have been profitable could easily have been expensive without our having positive knowledge to the contrary.

Each utility has its own difficulties to overcome, many of which are characteristic to that community only. With a small property, such as ours, located in a sparingly populated district, the people soon familiarize themselves with the schedule, rates, etc., rendering the advertising of such useless, or practically so. Therefore, in such communities, and the same is true to some extent with larger properties, newspaper advertising must be designed to build up and maintain good public relations.

The newspapers, without a doubt, could be, if they are not, the most powerful agency in making public opinion either favorable or unfavorable to a local utility. Therefore, it would appear of considerable importance that our relations with the newspapers should be very favorable.

Utilities advertising is quite different from the ordinary advertising. in that they have but one article to sell, "Service." Everybody knows what a street car ride is, as well as what it means to have gas, telephone or electric service, and unless there is something special in the matter of rates or change of schedules, it requires an artist to write an advertisement that will attract attention enough to be generally read. Of course, at certain seasons of the year amusement parks offer a good field for newspaper advertisement, and where there is jitney or bus competition, much can be done through newspaper advertising to influence traffic in favor of the railway.

In conclusion, I want to say that personally I attach much importance to newspaper advertising. I believe that most utilities could expect to find it profitable to spend from ½ to 1 per cent of their gross receipts for carefully designed newspaper advertising.

Favorable Publicity Brings Patronage

A street railway official out in Kansas contributed this article on the subject:

A street car system cannot put an itemized valuation on good newspaper publicity. It is like the "going value" of any business, intangible, nevertheless an asset worth hundreds of dollars in real cash. Good newspaper publicity, which always means favorable publicity, brings this company car fares daily, many of them. How much of a day's revenue can be credited to friendly publicity can never be reckoned nor even approximated. Yet it is indisputable that favorable publicity brings patronage; unfavorable publicity would drive it away.

We know of scores of specific instances. Here is one of the outstanding examples:

A certain business man in our town lives near the end of a line, the principal source of revenue to our system. This man drives to and from work every day. His direct route would be on this car line to the business section. He always turns off at the paved cross street nearest his home, drives a block and turns on an avenue paralleling this line, to run downtown. In short, he turns two blocks out of his way daily.

Why? Let him explain, as he explained to a patron of our lines whom he happened to pick up one day:

"I always turn off of Santa Fé at that corner—maybe you've noticed it." he said. "Two blocks out of my way. Just because I don't like to pass up acquaintances waiting for a street car, and at the same time I don't like to take those nickels away from the street car company. I know the company needs them. Oh, if some one has missed his car and will have to wait or walk, or if it's bad weather, I always pick up as many as my old bus will hold. But the company can't get along without its fares, and those fellows can get along without a ride downtown in my hack; I just don't like to pick up passengers when the street car is right behind me. But if I pass up my friends, they begin to wonder what kind of a swell head I'm getting. That's why I always run downtown on this side street."

That man is a real friend of our company. He does not owe or own a cent in it. Nor did I, personally, know who he was until the street car patron told me about the incident. Then why his friendship for the company? Good newspaper publicity explains it, and nothing else does, in my opinion.

Regarding the value of good newspaper publicity as proved, the next question is how to get it. With both newspapers friendly, that is not difficult here. We do not impose on them by asking them to "say something nice" about us. Nothing would turn them against us sooner, and justly so, than constant begging for boosts. We get our favorable publicity by creating news.

We make news by making improvements in service whenever possible and by trying out ideas for the public's convenience. To be printed, it must reach the reporters. We consider it a part of our business to keep acquainted with the reporters. To get news about the company's plans or activities published, we need only to tell the reporters. They are anxious to get it. But it must be real news, not propaganda or "bunk," as they term it. For instance, we recently received considerable publicity on trying out a bus line as a substitute for one of our main lines; also for some track improvements we made. Meanwhile we had a line break down one night. Many faults could have been dug up about that. Instead the newspaper told about our efforts to restore service.

Another important reason for the friendly attitude of the press can be best expressed by the reporter who once gave me one of my most valuable publicity hints. He spoke inelegantly but eloquently. He said:

"I don't mind handing you guys a little boost once in a while, because you never try to cover up on accidents and such stuff; you give us all the dope you got on 'em. In other cities where I worked the street car companies were always hushing up stuff like that, and they'd lie and do anything to keep us reporters off anything they didn't want in the newspapers. Their motormen and conductors never told us anything because they knew they'd be fired or catch hell if they did. The bosses always made it as hard for us as they could to learn the facts about smashups and running over kids and such. You bet your life we never went out of our way trying to write anything good about them."

The value of good newspaper publicity to this company, and to any small-city line, is as much, almost, as the value of the franchise and investment. In a bigger city, where a large portion of the public must depend on traction service because the distances are greater, good newspaper publicity is not necessary to existence. However, good or bad publicity represents the difference between getting or losing the fares of the fellows who would rather walk or ride in a jitney than

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pay a fare to that "grafting corporation." The total of those fares in a year can easily make the difference between a dividend and a loss.

KIND OF COPY IS IMPORTANT

Here is what another Kansas official says:

About two years ago we changed the plan of our newspaper advertising here in this city and made a cut of approximately one-third in the space carried, adopting for the advertisements a conversational form between two supposed car patrons, using a cut showing a business man and a laboring man on a car. In each ad at least one thought was conveyed, such as the company's yearly payroll, the amount of taxes paid annually, the number of families supported by the company, the amount of material and supplies purchased annually, and other such items, these subjects being interspersed with advertisements pointing to the high grade of service being rendered. Fine results were obtained within four months after the starting of this campaign, and the attitude of the public was changed from condemnation to boosting for us.

It has also been my experience that newspapers are very ready to publish what are commonly termed "human interest stories" in regard to politeness and efficiency of car operators, and incidents of a somewhat unusual nature occurring in the operation of cars. They are always very ready to publish news stories regarding new installation of equipment, track special work, etc. I believe that all publicity of this nature it is possible to secure is of great advantage in maintaining a friendly feeling between the street railroad and its patrons.

The superintendent of an interurban company, illustrating a point in his article, told the following story:

A Jew was in business and his turnover so slow that he was rapidly losing money. Business was indeed rotten. One day as he stood in the door looking for prospective customers, a minister of the gospel came by and noticed the disheartened look on the Jew's face. He stopped to give him a word of encouragement and asked him about his business. The Jew told all of his troubles and the minister said to him: "Well, Isaac, the trouble with you is that you do not pray enough to your God. Pray to Him reverently and fervently, and have faith in prayer, and it will be answered." The Jew promised the minister that he would do this.

Some days later the minister was passing the store again and noticing the disheartened look still on the storekeeper's face, stopped and asked if business had improved. "No," the Jew replied, "it is no better, and I have been praying to God and praying and praying, and my prayers have not been answered." "How have you been praying, and what have you been asking for?" kindly asked the minister. "Well," replied the Jew, "every day I have gone into my closet and prayed to God for the eight thousand dollars profit I have told Him that I need right away, and have repeated this prayer several times a day, but still it has not been answered." "That isn't the way to pray," suggested the minister. "You have been asking too much." To which the Jew replied, "Well, how did I know that was too much? Why didn't He make me an offer?"

In explaining his point, this superintendent said:

We, too, have been working for business and praying for an increase in earnings; but like the second-hand dealer, we have not been telling the people properly what we offer. We, too, have seemed to be waiting for an offer.

There were a number of other interesting articles in *Bulletin* No. 4 on "The Value of Good Newspaper Publicity."

This plan of "pooling" ideas has indeed proved profitable for the publicity men in these five Middle West states. Certainly there are no King Tuts "out where the West begins." King Solomon had nothing on them.

The Pennsylvania Water & Power Company has installed and tested a carrier-current or "wired-wireless" telephone outfit on its lines. It has been so successful that similar facilities are contemplated by the company between the generating station and the Lancaster (Pa.) substation.

Large Power Station Project in Detroit

THE vote on April 2 in Detroit in favor of the $12,000,000 bond issue for a municipal power plant is another step in the erection of this station to supply the needs for energy of the municipal undertakings. It will be recalled that an initial appropriation of $1,000,000 was made last June. This the Public Lighting Commission has been using for developing the site, for substructures and for engineering. The present appropriation of $12,000,000 is required to complete the work, $7,000,000 being for the power plant and $5,000,000 for the transmission system. Until the present debt limit of 2 per cent for public utilities in the city charter is increased, however, bonds cannot be sold for its erection.

The proposed new city station would be built at the foot of Morrell Street with a capacity of 120,000 kw. and would be equipped to burn powdered fuel. Its first equipment would consist of four 20,000-kw. turbines and it is estimated that it could furnish energy under the present load factor for 1.12 cents per kilowatt-hour, including interest and amortization charges on a twenty-two-year sinking fund basis.

At present, the city has a small municipal lighting station, and the railway department inherited two old power stations from the Detroit United Railway.

During recent years, while the Detroit United Railway was operating the city system in Detroit, it generated about one-third of its power and purchased about two-thirds from the Detroit Edison Company under a ten-year contract. This contract, which was entered into in July, 1913, provided that at the end of ten years either party could serve notice on the other that it was not ready to renew the contract, but in that case the contract would not terminate abruptly. Instead, the terms in regard to rates, power to be supplied, etc., would continue for a year. At the end of that time one-third of the load would be taken over by the purchaser; at the end of the second year two-thirds of the load would be taken over, and only at the end of the third year would all of the load be discontinued by the Edison company.

In the meantime, the Department of Street Railways has made an interim contract with the Detroit Edison Company for energy at substation d.c. bus bars. The rates under the contract for energy are on a sliding scale and include a coal clause, but it is estimated that the charges will be approximately as follows:

July 1, 1922, to July 1, 1923	1.006 cents per kw.-hr.
July 1, 1923, to July 1, 1924	1.243 cents per kw.-hr.
July 1, 1924, to July 1, 1925	1.482 cents per kw.-hr.
July 1, 1925, to July 1, 1926	1.750 cents per kw.-hr.

Under two supplementary contracts the Detroit Edison Company will also install in its substations 8,500 kw. of motor-generator sets which will be taken over by the city at the end of the contract. To care for its requirements in a section near the River Rouge, where the Edison company's substation isn't large enough to permit of additional equipment, the Department of Street Railways is installing a 2,000-kw. substation. The electrical equipment for this substation, which will consist of two motor-generator sets, has already been purchased from the Indiana Service Corporation. The Edison company's substation capacity will be increased by about 2,500 kw. by September and by about 6,000 kw. more when the new motor-generator sets already mentioned have been installed by the Edison Company.

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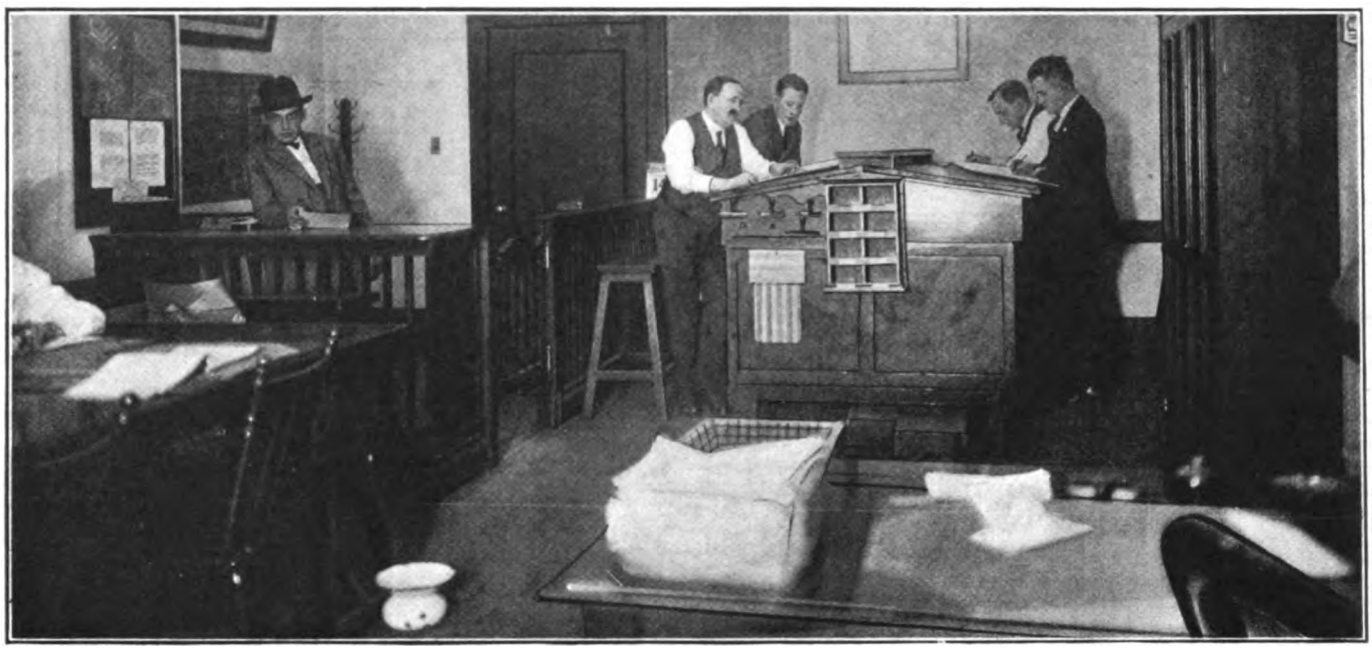
Revamping the Filing and Record System of an Engineering Department

This Work Was Done in Order to Enable the Clerical Division of the Montreal Tramways Engineering Department to Handle a Largely Augmented Volume of Work with Speed and Accuracy

By R. B. Genest
Chief Clerk Engineering Department, Montreal Tramways



Head Timekeeper's Office Is Arranged to Facilitate Record Making

IN THE May 5, 1923, issue of the ELECTRIC RAILWAY JOURNAL the author explained how the cost accounting system of the Montreal Tramways was revised. There were several other improvements made in the filing and record system at the same time. In fact, these formed an integral part of the general rehabilitation of the accounting system.

THE ENGINEERING DEPARTMENT FILING SYSTEM WAS TACKLED FIRST

It was found, first of all, that our filing system was daily losing its effectiveness due to the worn condition of the file folders and the lack of space for the continually increasing number of files. The file system inaugurated fifteen years ago was, in other words, gradually falling down. Preliminary to a revision of the filing system, a representative of the engineering department attended a filing school, where he learned of the modern successful methods of handling correspondence. As a result, an economical system of filing which is adaptable to engineering work was devised.

The study which was made of methods of filing showed that the correspondence of an electric railway engineering department is difficult to classify. No hard and fast rules can be laid down which would be generally applicable. It is, however, not possible in general to index by the names of letter writers. In our case a simple index was devised containing the following headings:

A
3 ..... Accidents
6 ..... Agreements (extra copies)
35 ..... Automobiles

B
52 ..... Bath-St. Denis Yard
73 ..... Bills
84 ..... Blue Prints and Plans (Correspondence)
87 ..... Boilers, General
88 ..... Bolts, Track
90 ..... Bonding
90 ..... Bonding cars
104 ..... Bridges
119 ..... Bureau of Standards, Washington

C
126 ..... Cable
131 ..... C.P.R.-Longue Points Spur
137 ..... Car Barns-Cote, Hochelaga, St. Denis, St. Henry, Terminal .....
137-A ..... Car Hoists
137-B ..... Car Stop Fasteners
137-C ..... Car Stops
137-D ..... Car Operating (Timekeepers)
141 ..... Cattleguards
142 ..... Cement
151 ..... Cinders
152 ..... Claims
161 ..... Coal
170 ..... Concrete Mixers
170-A ..... Conduits
173 ..... Construction Cars
185 ..... Crane Cars
189 ..... Crossings (railroad-diamond)
189-A ..... Crossings (open)
189-B ..... Crossings (underground)

D
213 ..... Depots Cote, Hochelaga, St. Denis, St. Henry
213-A ..... Derailments
215 ..... Devilstrip (width of)
228-A ..... Drainage
230 ..... Drills, Track
232 ..... Dumps

E
247 ..... Electrolysis
247-A ... Electrical Commission of Montreal
247-B .. Electric Railway Journal
247-C ..... Electrification South Bank Branch CPR
247-D ..... Elevators
251 ..... Employees
252 .... Engineering Department Orders
259 ..... Excavations
259-A ..... Expenditure, Maintenance and Renewals; Expenditure, Maintenance and Renewals; Expenditure, Maintenance and Renewals; Expenditure, Maintenance and Renewals

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F
262 .....Farm Tile Pipe
262-A .....Farm Ditches
266....Fences and Cattleguards
271 .....First Aid
271 .....Fires
282 .....Forms
282-A .....Form Letters
287.Franchises and Ordinances, Miscellaneous
289 .....Freight Shed
296 ....Filing System

G
301.....Garage, Cote Street
303.....Gages, Track
305....Genest, R. B. (Personal)
324...Grades, Grade Separation
326 .....Granite Blocks

H
340.....Hack Saw Blades
364 .....Hayes Derails
366 .....Head Office
414..Hydro-Electric Commission

I
418 .....Intersection
418-A .....Interlocking Plants
418-B .....Insurances
418-C .....Instructions

J
424 .....Jacks
433 .....Joints
433 .....Joints (Removable Paving Blocks for)

K
459.....Kinnear Doors, General

L
483 .....Lanterns
501.....Lighting, General
509 .....Locks
513 .....Loop, Nolan Street
518 .....Lumber

M
539...Machinery, Miscellaneous
545 .....Manholes
546 .....Manufacturing Orders
547 .....Maps
556 .....Material
564 .....Memoranda
569.....Meteorological Service
574 .....Mileages
583 .....Miscellaneous
587.....Montreal Tramways Commission

N
629.....Nova Scotia Tram & Power Co.

O
642 .....Organization
644....Ottawa Electric Railway

P
656 .....Paving
663 ....Permits
669 .....Photographs
670 .....Picks
677 ...Poles, Light Standards
679 .. ..Postal Rates
681 .....Power Plants, Cote, Hochelaga, St. Denis, St. Henry, Pte-aux-Trembles, St. Laurent, William Street, Youville
681..Power Distribution System
688 .....Programme
688-A .....Property, M. T. Co.
688-B....Proposed Construction
690 .....Publications

Q
692.....Q. P. U. Commission

R
693 .....Rails
693-A ....Rail Saws
693-B.....Rail Grinders and Drillers
693-C.....Railway Commission, Board of
698 .....Recorder's Court
698-A .....Receipts
706 .....Revenue Passengers
711 .....Rifle Range, Pointe-aux-Trembles
712 .....Right-of-Way
722 .....Roofing
732.....Royal Trust Building

S
744 .....Sand
744-A .....Sand Boxes
744-B .....Salt Bags
744-C .....Sand Drying Plant
748 .....Scales, Track
773.....Secret Service Reports
776 .....Semaphores
778 .....Sewers
779 .....Shanties
783 .....Shelters
786 .....Shims
786-A .....Shovels
788 .....Sidings
792 .....Signs
803 .....Snow Removal
803...Snow Melters (Electric)
808 .....Special Work
811 .....Spikes, Track
817.....Stations and Platforms
817-A .....Statistics, Transportation of other street railways
817-B .....Stationery
818 .....Steam Roller
828 .....Stock Inventory, Hochelaga Const. Stores
828-A .....Stock Inventory, St. Denis Yard
829 .....Stone
831 .....Stop Blocks
838 .....Subways
841 .....Switches
841-A..Sweepers and Sprinklers

T
847 .....Taxes
847-A .....Tarpaulins
848 .....Telegrams
848...Telephone and Telephone Numbers
858...Ticket Offices and Waiting Rooms
858-A .....Ties
858-B .....Tie Rods
858-C .....Tie Plates
862 ....Tool Inventory
862-A.....Tools and Machinery Department
864 .....Track Maintenance
864 .....Track Costs
864-A....Track Extensions and Renewals
864-B .....Track Removals
865 .....Traffic
870 .....Turbines

V
881 ..... Valuation (contract)
881-A.....Valuation (Terminal Line)

W
884.....Vernon B. (Personal)
885 .....Victory Bonds

W
903 .....Water Meters
903-A .....Water Mains
913 .....Welding
920 .....Wheels, Car
950.....Working Force, Reports
951.....Work Orders, Current

Y
955 .....“Y's”
958 .....Youville Shop

The letters of a file are placed in a smooth, stiff expansion folder, bearing a non-breakable clip and an extended metal nameplate or label holder. The numbers of the main file headings run from 1 to 1,000. These numbers, combined with direct name guides, and a generous use of alphabetical sub-divisions and file headings will care for 20,000 files.

The sub-division of files without the use of auxiliary numbers is further facilitated by the use of colored labels. All file headings, guides and name plates are staggered in the file cabinet boxes, so that when a drawer is opened the names of all files are visible in alphabetical sequence under the main file number.

The outside box plates show the file number, main headings and alphabetical sequence.

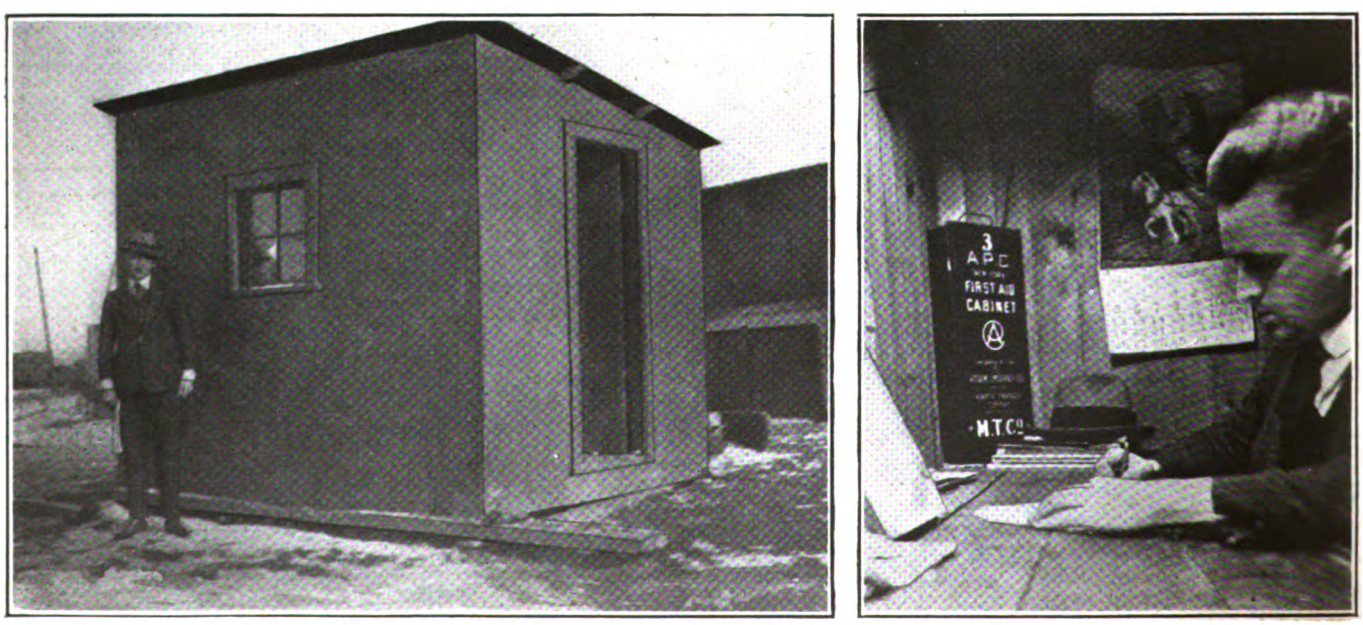
When a file is removed, an “out” folder is inserted. This contains sufficient information to permit the file to be traced promptly to the borrower.

Several copies of the file index were distributed among the staff, so that the file numbers soon became known and the work of the file clerk was considerably facilitated.

This plan of filing through the use of the guide numbers minimizes the possibility of replacing a file in a wrong location. These guide numbers prevent a file from going very far astray, even if, as is true in some cases, there are several hundred files covered by one file number. It may be of interest to note that the revision of the filing system involved the rereading and reclassifying of 15,000 files, averaging 250 letters per file.

Revision of Forms

The filing system having been put in order, the next move was the overhauling of all forms used by the en-



At Left—Checker's Portable Shanty. At Right—Checker at Work in His Portable Shanty

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Office Facilities for the Checkers, Inspectors and Timekeepers

gineering department. A committee was appointed from the staff to carry out this work. There were found to be about seventy-five forms in use, many of which had become obsolete, while others did not call for sufficient information.

The whole system of forms was put on a logical basis. The forms were numbered consistently and standard letter-size sheets were used for them where possible. Careful consideration was given to interlocking forms; that is, those which have to be checked against each other, or preliminary reports which lead up to summarized statements. In the revision of these, generous use was made of reference and serial numbers with a view to correlation with the filing system.

Finally, provision was made for storing the forms in the head timekeeper's office, in closed cupboards divided into compartments. Stock cards are used to check quantities on hand, consumption and dates of orders and deliveries.

Accommodations for Field Staff and Records

As the investigations continued it was found that the office accommodations for timekeepers, inspectors, clerks and material checkers, both in the field and in the main office, did not enable these employees to produce the best results on account of the limited facilities at their disposal.

The first thing done was to overhaul all of the shanties used in the field. These were enlarged and rebuilt in collapsible form to permit of rapid dismantling and erection in moving from one location to another. The sections of the shanties were numbered and fitted with hooks and bolts. The exteriors were painted dark green and the interiors battleship gray. Provision was also made for electric lighting and heating of the shanties by means of temporary connections to the overhead wires, through the co-operation of the superintendent of power plants.

Each shanty is furnished with a table, stools, locked drawer, large stationery box and first-aid cabinet. Each timekeeper is given a list of stationery required and from time to time he is supplied with a reasonable quantity of each item.

At headquarters an office of ample size was fitted up for the use of the traveling checker, excavation permit clerk, excavation inspectors, paving inspector, material checkers and timekeepers. Arrangements were also made for handling the executive work in connection with the operation of the permit agreement covering excavations through right-of-way, covered in an article by the writer in the issue of this paper for April 29, 1922.

The general instructions to checkers and timekeepers were next brought under review. A revision of these was made in connection with the changes already described. As these instructions show clearly the way in which the work of these men is done they are reproduced below:

General Instructions to Timekeepers and Clerical Staff Revised

General

Checkers shall report to and receive instructions from the chief clerk in the chief engineer's office. They shall also do all clerical work requested of them by the foreman on the job and render him all assistance possible.

Checkers shall also render all assistance possible to the timekeepers from the accounting department or the engineers from the chief engineer's office.

At the beginning of a work order there will be placed a small shanty to be used as an office by the checkers and general foreman only, with a counter and a drawer which can be locked, where the checker can keep all his records.

During the absence of the checker, the checker's shanty must be locked. The general foreman must not allow any one access to shanty in the checker's absence.

Where it is not possible to have the use of a free telephone the checkers will be allowed to use pay telephones and charge the cost of same to a petty cash account to be sent in to the chief clerk.

Unless absolutely necessary, the checker shall not leave the work while it is in progress as he will be held personally responsible for the receiving and sending of all material.

All daily reports are to be forwarded to the chief clerk's office not later than 10 a.m. of the following day.

All semi-monthly reports to be sent to reach the traveling checker's office not later than the 3d or 18th of the month.

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DUTIES OF CHECKERS

1. Timekeeping.
2. Field ledger.
3. Requisition and credit slips.
4. Receiving and sending of material.
5. Rehabilitation sheet.
6. Interruptions to traffic.
7. Requests for cars.
8. Discharge slips.
9. Moving public utilities corporation poles, etc.
10. Tickets for men.
11. Assist engineer to measure work.
12. Keep list of tools for foreman.
13. Distribution of labor.
14. Distribution of material.

1. TIMEKEEPING

At about 7 a.m., 11 a.m., 2 p.m. and 6 p.m., the checkers shall travel over the job and take the time of the men, making distribution over the items noted in Sec. 13.

At each of the above times he will take the time of the workmen by asking for and making note of workman's check.

Any man arriving late or leaving early must first find the timekeeper and report or he will not be paid for his work. Any man working only part of a day will be paid to the nearest half hour.

The checker will also make out the daily time sheets with the distribution mentioned above and send sheets to the chief clerk the following morning. All time sheets are to be made out in rotation of numbers, and no time sheet shall be destroyed, but if made out incorrectly, a sheet shall be marked "Canceled" and sent to chief clerk.

At completion of work all time sheet blanks left shall be sent to chief clerk. Every time sheet issued to a checker is to be accounted for.

2. FIELD LEDGER

Material. The checker shall keep a ledger in a loose-leaf book provided with a separate sheet for each kind of material, showing material received and returned daily.

These ledger sheets will give the requisition number or credit note number and way bill number with date and car number, and quantity and kind of material.

On the fifteenth, and at the end of each month, the checker shall make out a list of all material received and returned during the half month and forward to the chief clerk.

Labor. Checker shall also keep ledger sheets for labor in his loose-leaf pocket book, and after the time sheets are made out, shall enter daily on a ledger sheet the distribution of the time over each of the thirteen distributions.

The total amount charged against each item shall also be sent twice a month to the chief clerk as outlined for material.

These ledger sheets must be kept up to date daily.

At the end of the work the complete field ledger shall be sent to the chief clerk.

W. O. Number Pending. While a W. O. number is pending, returns should be made out in the usual way and forwarded to the office under the heading, "W. O. No. Pending."

3. REQUISITION AND CREDIT SLIPS

When directed by the foreman, the checker shall request material by making out the requisitions in triplicate giving full particulars of the materials required and the W. O. number; these requisitions in duplicate to be sent to the stores department the day previous to time when the material will be required, when possible.

One requisition book shall be used exclusively for material used on the work, and one book for miscellaneous items such as tickets, cars, etc. No requisition is to be destroyed, should it be made out incorrectly, but shall be marked "Canceled" and left in the book. At the close of the work the requisition books are to be sent to the traveling checker and every requisition in the books must be accounted for.

Any corrections or copies of requisitions shall be made by crossing out the errors and writing in the corrections. Figures or notations are not to be erased.

No materials will be delivered by the stores until they first have received a requisition except in the case of stone, sand and cement, which shall be handled as follows:

The checker will make out a requisition for the above three items required and across the face mark "No Charge" and forward it to the stores by 4 p.m. of the day previous to the time the material will be required. The same day the material is received the checker will make out a requisition for the actual amount received, giving car number and way bill number, and forward requisition to the stores, with his requirements for the following day.

All materials returned to stores or to another job shall be covered by four copies of a credit note, giving a full account of the material work order number, etc. Three copies of the credit note or transfer slip are to be given to the motorman and a fourth copy to be signed by the motorman and retained by the checker, who will enter car number thereon.

The same instructions relative to correcting and forwarding of requisitions to the chief clerk at end of work shall also apply to credit notes.

4. RECEIVING AND SENDING MATERIAL

All material sent to the work shall be personally received by the checker, who will sign the duplicate way bill covering shipments. The original copy of this way bill must be kept by him. On the checker's copy of the way bill is to be marked the requisition ordering this material, and at the end of the work all these way bills are to be turned in to the chief clerk. All material received must have duplicate way bills, and if these are not sent in at once, chief clerk should be notified.

All material sent from the work shall be personally sent by the checker, who will make out the proper credit notes as outlined in Sec. 3.

5. REHABILITATION SHEETS: FORM NUMBER

These sheets are to be made out daily giving all information as to progress of work and weather report only; giving locations from chainage marked by the engineer.

6. INTERRUPTIONS TO TRAFFIC AND ACCIDENTS

The checker shall make report daily of all interruptions to traffic, giving cause, time, car and address number, and if caused by other than Montreal Tramways, the name of the person or company with all information obtainable.

The checker shall make report daily of any accidents to people or vehicles other than Montreal Tramways employees, giving time, cause, name and address, as well as names and addresses of two or more witnesses.

In case of accident to employees of the Montreal Tramways, blanks provided shall be filled out.

All of the above reports are to be sent daily to chief clerk.

7. REQUEST FOR CARS

The checker shall make requisition for all construction cars necessary, to be forwarded to store keeper at St. Denis yard not later than 3:15 p.m. of the day previous to that on which they will be required.

8. DISCHARGE SLIPS

In case of the discharge of an employee it shall be the duty of each checker to fill out a form, which shall be signed by foreman and given to man discharged.

Discharged employees shall be sent to timekeeper at the Cote St. construction office between 5:30 and 6:00 p.m. of the same day for their pay.

In case an employee leaves the employ of the company he shall not be given the above form, but must wait until the following day for money due him.

9. PUBLIC UTILITIES CORPORATION POLES

Should it be necessary during the progress of the work to move any property belonging to anyone other than the Montreal Tramways, the checker shall at once notify the chief clerk in writing, giving complete information.

In case of emergency, the checker should telephone the chief clerk, afterwards confirming the message in writing, but in no case shall the checker or other employee deal with the property owner direct.

All work performed in conection with above shall be divided for labor and material, also a division made to indicate work done by anyone other than the Montreal Tramways.

10. TICKETS FOR MEN

It shall be the duty of the checker to supply workmen with two car tickets per day, making distribution when he takes the time at the end of the day.

Requisitions for tickets are to be forwarded to the chief clerk the day previous to that when tickets will be required.

11. MEASURING WORK

The checker will give any assistance asked for by an engineer coming to the job to measure work, etc.

12. TOOLS AND CEMENT BAGS

The checker will keep the lists of tools and empty cement bags for the foreman, but the foreman will count tools each night and will also furnish the checker with all information relative to tools received and sent away.

The checker will also be furnished with a list of empty cement bags by the foreman, which must correspond with the number of full bags received. A form to show the number of empty

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bags is to be made out by the checker and sent to the chief clerk on the 15th and at the end of the month as well as a final report on completeion of work.

13. DISTRIBUTION OF LABOR

Labor charges in connection with straight track are to be kept separate from those of special trackwork.

(*a*) *Removal of Paving:* Includes cost of removing paving blocks, and piling, cleaning, loading, shipping and unloading old blocks.

Includes cost of removing paving base to bottom of ties and block paving.

Includes, for all other types of permanent paving, removal of paving surface and paving base to bottom of ties.

For pavings which are not permanent, such as macadam, this includes excavation down to bottom of tie.

(*b*) *Grading:* Includes cost of concrete, stone, macadam or earth excavation to grade and cost of excavation for tile drains.

(*c*) *Removal of Excavated Material:* Includes cost of removal of excavated material, cleaning up street and loading material on cars. If material is to be wasted, unloading is to be charged to this item; if removed for use as ballast or backfill on any other job, unloading is to be charged to the proper item for other job and number of work order to which it is sent is to be shown on daily report.

(*d*) *Temporary Track:* Includes cost of loading and unloading material for temporary track.

Includes cost of laying track and backfilling, also cost of removing, reloading and return of material to yard.

(*e*) *Track Foundation:* Concrete slab includes cost of unloading material, mixing and laying concrete; stone or cinder foundation includes cost of unloading and spreading of material whether stone, cinder or macadam.

(*f*) *Straight Track or Special Trackwork Removal:* Includes cost of removing rail, ties and all track material and loading, shipping and unloading and sorting of same at yard by a representative of construction department. Should the crane car have been used in doing this, a note to that effect should be made under this item on the final report.

(*g*) *Straight Track or Special Trackwork Laying:* Includes cost of loading, shipping and unloading of rail and track material, rail bending, laying rail on special trackwork, placing ties and tie rods, gaging, spiking and bolting and all labor in connection with track laying.

(*h*) *Track Drains:* Includes cost of laying 6-in. farm tile drain, and excavation for and installation of standard track drain basins and their connections to sewer.

(*i*) *Tamping, Lining and Surfacing:* Includes cost of unloading and handling of tamping material, whether done by machine or by hand, lining tracks or special trackwork and surfacing.

(*j*) *Paving Base and Wearing Surface:* "J. B." paving base includes cost of unloading of material, mixing and laying of concrete.

"J. S." wearing surface includes cost of unloading material, recutting blocks on job, laying sand cushion, rail plaster, laying blocks, mixing grouting material and grouting where block paving is laid.

Includes labor of laying asphalt top and binder when such paving is used.

Includes labor of laying special concrete top course when concrete paving is laid.

A separate record of quantities of material used in "J. S." wearing surface must be maintained in ledger, that is to say, material used for grouting, rail plastering and sand cushion. If possible, please notify head office when sand cushion is being laid.

(*k*) *Backfilling:* Includes cost of unloading material, filling track, use of steam roller.

(*l*) *Overhead Charges:* Include wages of head foreman, checkers, water boys, messengers and watchman.

(*m*) *Miscellaneous Charges:* Include cost of laying crossings, cutting and changing curbs and sidewalks, removal of hydrants, poles, etc., and rearrangement of public underground utilities.

15. FINAL REPORT AND SKETCH

The checker is to note in a pocket note-book or on a sketch, as the work progresses, and have ready for transfer to the final report immediately on completion of the work, the following:

1. Location of concrete slab.
2. Location of stone, cinder or macadam ballast, where used.
3. Location of new or old paving blocks of each brow, each track and devilstrip separately.
4. Location of track drains.
5. Location of switch drains, state whether connected to sewer or not.
6. Kind of rail, and kind of joints used.
7. Kind of rail removed.
8. Location of making up guards of open track curves.
9. Location and length of temporary track, noting side of street in which same is laid and date of removal.
10. Location of all switch points, center of diamond crossings, beginnings and ends of curves where possible.

Anything out of the ordinary is to be noted where M. T. standard type of construction is specified and anything contrary to specifications where special construction is called for.

Should a checker experience any difficulty in making his sketches, he can have them made for him at the engineering office by request to the chief clerk.

On completion of a job all unused track material is to be returned to St. Denis construction yard and a proper credit note made out.

If tools are to be returned to the tools department, the cost of removal will be charged against the work order just completed. If they are removed to another job, the cost will be charged to the work order to which they are removed.

Boston "L" Employees Complete Course in Practical Electricity

WITH a dinner at the Harvard Club of Boston on April 30, and the award of 140 certificates to employees completing the course in practical electricity under the Division of University Extension, Massachusetts Department of Education, the Boston (Mass.) Elevated Railway signalized the successful termination of a new project to furnish instruction to interested members of its personnel.

Last September Edward Dana, general manager of the company, offered a course in practical electricity under the state division in co-operation with the board of trustees of the company, and about 330 employees enrolled. Weekly lectures and home study comprised the program. Among the subjects included were the flow of electricity, electrical units and laws, types and connections of electrical instruments, electric circuits of the simpler types, measurement of power, motors, generators, etc. The course required one night a week for about twenty weeks, and the interest was so marked that a day class was established and maintained for the benefit of those whose hours of duty precluded night attendance. A $5 fee for text books and other accessories was required on admission and was refunded on completion of the course.

Instruction was in charge of Charles O. Bourne, chief electrician, Boston Navy Yard, assisted by Robert E. Lee of the Boston Navy Yard and George E. Wilmarth of the Wentworth Institute, Boston. The course ended on April 13, and of the 140 graduates, thirty-seven men were from the maintenance department, thirty-seven from the transportation department, twenty-nine from the department of rolling stock and shops, eight from the power department, and three from the department of wires and conduits.

At the dinner, Mr. Dana was toastmaster. Congratulatory addresses were made by James F. Jackson, chairman board of trustees, Boston Elevated Railway; President Samuel W. Stratton of the Massachusetts Institute of Technology; James A. Moyer, director of the Massachusetts Division of University Extension, in the absence of Payson Smith, Commissioner of Education, Massachusetts, and Charles O. Bourne.

In appreciation of their work, the three instructors were presented with gold pencils by their classes and each also received a sum in gold from the students. Each graduate received a certificate, a photograph of a class in session and a copy of Elbert Hubbard's "Message to Garcia."

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City Transit Conditions Compared

Supervising Inspectors of the New York City Transit Commission Visit Fourteen Cities and Report on Observations Made

AN INTERESTING summary on transit conditions in fourteen cities has recently been submitted to George L. Lucas, acting chief executive officer New York Transit Commission, by Walter E. Edgerton and William O. Smith, supervising inspectors of the commission. The observations are based on a trip of twenty-nine days between Nov. 8 and Dec. 7, 1922, and the cities visited were Boston, Syracuse, Cleveland, Detroit, Chicago, Milwaukee, Minneapolis, St. Paul, Omaha, Kansas City, St. Louis, Cincinnati, Pittsburgh, Cumberland, Baltimore and Philadelphia. An abstract of the conclusions, with two of the tables presented in the report, follows:

RAPID TRANSIT SERVICE

In rapid transit service in the cities noted, the principal point which impressed these observers was the large number of trains operated in the loop district during the maximum rush hours by the Chicago Elevated Lines. During the morning rush hour, they say, the company operates 193 trains per hour in double track operation, making all station stops. Some of the methods used to maintain this high standard of operation are double platform lengths so that two trains can stop at the same station at the same time, the use of platform men at stations to accelerate train movement, and the operation of trains over track line intersections in groups. The length of station stops has also been reduced by increasing the number of trains so that a train is not held up because passengers have trouble in boarding and alighting, due to the crowded condition. It is thought that some of these methods can be applied in New York. The report also calls attention to the fact that in none of the three cities with rapid transit systems visited are guard railings used for protective purposes on the edge of station platforms. Both the Boston and Chicago systems, however, use them to some extent to segregate streams of passengers going in different directions.

The observations on surface car operation are much more extended than on rapid-transit service. Messrs. Edgerton and Smith say, in their report, that they were much impressed with the progressive attitude found in many cities in trying out new and improved methods for equipment and operation. This was particularly true in connection with car design and especially with the one-man type of car. They found the principal criticism of the original Birney car by operating men was the lack of entrance and exit facilities. This design provided for a narrow entrance so that the motorman could control the traffic as it boarded the car, but at heavy transfer points this made the stop altogether too long. The operation of the Adams double-truck one-man car in Chicago was observed, and the report makes this complimentary comment:

> It is the best one-man car yet devised, and we believe that it has a much broader field of usefulness than any other one-man car. It is our belief that this car with its double truck, light weight body, seating capacity of forty-five and a weight of 633 lb. per passenger, with the roomy effect which it presents, is far superior to all other one-man cars. The car was observed under the various operating conditions and appeared to meet every requirement. This includes speed, running time, quick loading and unloading facilities and its capacity for handling large loads conveniently with a minimum amount of discomfort to passengers. This car would have a place in any of the systems in our city, and would be a wonderful improvement over all of our present one-man car operations.

They consider the Birney car "to have a place somewhere in nearly every system, especially for handling very light traffic or to improve conditions on a very light line, but a unit that is able to care for only thirty passengers at one time is necessarily limited as to its use." They consider the car with a turnstile on the rear platform a decided improvement over the Birney car, in that it has more entrance and exit facilities and the rear entrance permits a much better distribution of the load, though this car increases the running time by about 10 per cent over two-man operation.

They also point out that many of the cities claim that a car of the Peter Witt type, perhaps with minor modifications, is best adapted to handle their traffic, but that local conditions are often controlling in the choice of car. For instance, they say, the extremely cold weather during the winter season in Minneapolis and St. Paul makes it necessary for cars used there to be kept closed as much as possible, so that a car with a side entrance is out of the question. Two tables accompany the report, one listing the rolling stock in the several cities and the other giving traffic statistics. Both are reproduced.

TRAIN OPERATION

The inspectors were particularly impressed with the development of the use of trailers to a large extent in many cities, but particularly in Cleveland, and with the speed and simplicity with which trains of motors and

TABLE I—EQUIPMENT OF SURFACE CARS IN FOURTEEN CITIES

		One-Man Cars						
	Surface Cars Owned	Motors	Trailers	Birney	Others	Articulated	Single End	Center Entrance
Chicago	3,193	3,101	92	11	....	....	0	0
Philadelphia	2,801	2,691	110	....	219	0	75	1,160
Boston	1,649	1,429	220	....	75	115	.....	396
St. Louis	1,549	1,370	179	10	8	Open Cars Only	1,342	282
Cleveland	1,509	1,055	454	....	3	0	1,055	Tr. 428 M. 433
Baltimore	1,500	1,400	100	50 Mod.B 30	20	Yes	0	Tr. 100
Detroit	1,495	1,276	219	250	....	....	All	.....
Pittsburgh	1,210	966	244	....	Few	0	50%	40%
Minneapolis and St. Paul	1,035	1,035	...	0	0	Sev.	All	None
Kansas City	744	722	22	94	30	....	All except 20	None
Milwaukee	685	575	110	....	100	**72	.....	.....
Cincinnati	675	615	60	....	*75	0	Nearly all	Tr. 60
Syracuse	180	180	...	....	100	0	Nearly all	Some

* Not used as such.
** Company has thirty-six three-truck, two-car trains; is building twenty-five more, and intends to build twenty-five more next year.

TABLE II—TRAFFIC RATIOS ON THIRTEEN RAILWAY SYSTEMS

				Car-Miles per		
Companies	Rev. Pass. per Car-Mile	Rev. Pass. per Pass. Car	Pass. Rev. per Rev. Pass., Cents	Car-Hour	Mile of Single Track	Passenger Car
Boston	6.8	194,943	9.56	11.3	93,547	28,789
Cleveland	8.2	219,189	....	6.0	107,895	26,872
Chicago, Surface	6.3	274,512	7.69	8.7	111,605	43,323
Chicago, "El"	3.6	120,580	9.29	....	256,689	33,637
Minneapolis and St. Paul	7.3	268,864	6.00	10.0	65,970	36,731
Kansas City	5.1	210,755	7.55	9.2	80,465	41,290
St. Louis	6.4	242,444	6.91	9.3	96,141	38,027
Cincinnati	5.6	200,240	8.14	8.5	72,095	35,885
Baltimore	6.6	237,905	6.82	8.4	81,774	36,233
Philadelphia	7.9	282,234	6.54	9.3	119,385	35,906
Third Avenue Ry., N. Y.	10.9	293,970	4.89	7.7	81,908	27,807
Brooklyn City R. R.	9.3	295,165	4.98	8.0	114,403	31,603
New York & Harlem Ry.	10.9	308,023	4.98	7.4	147,307	28,350

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trailers are made up in that city. They say that motor cars without trailers are used during the middle of the day, but at the approach of the rush hours trailers are attached to many of the motor cars as the latter pass the depot, the cars being coupled in the street, and the time taken is no longer than that of an average car stop. They also point out that in cities with steep grades, as Kansas City, St. Louis and Cincinnati, the use of trailers is limited to certain lines on account of the grades.

Bus Competition

In no city did they find a thoroughly organized bus system in competition with the street car lines at the same rate of fare. The Detroit Motor Bus Company seems to be doing well with three lines and contemplates extending its system, but the fare is 10 cents, whereas the street car fare is only 5 cents. The Chicago Motor Bus Company also charges 10 cents fare. Baltimore is practically the only city where the street car system has gone into the operation of motor buses as an adjunct to surface car operation, and here the buses are only just beginning to show a profit. They liked the de luxe bus service as operated in Milwaukee and think it would be feasible for some runs in New York. The fare in Milwaukee on these buses is more than 3 cents a mile with a minimum charge of 25 cents, and in New York such service might be the means of relieving the streets of many of the privately owned automobiles which contain but one or two people.

One of the principal objects of the trip was to study rush hour conditions in the cities visited. On this point the report concludes as follows:

> An inspection and analysis of service and traffic in fourteen cities showed us that the rush hour conditions are practically the same all over. Through some contributory cause the loading may be a little above or below the average, but taking the entire system in each of the cities and comparing them to the New York systems during the rush hours you will find very little difference in the density of the loading. The rush hour peak is generally shorter in other cities and there is no such traffic density anywhere else in the country as we find on the main East and West Side Interborough subway lines; but to a stranger, the conditions at the Park Street station on the Cambridge subway line in Boston, the Thirteenth Street station on the subway line in Philadelphia, and the Thirty-third Street station on the Lexington Avenue subway line in New York show very much the same conditions of service and overloading. The same thing would hold true at the intersection of Grand Avenue, Halstead Street and Milwaukee Avenue in Chicago, of Woodward, State and Gratiot Streets in Detroit, or of Flatbush Avenue, Livingston Street and Lafayette Avenue in Brooklyn, as to the traffic and service on street surface lines.
>
> In other words, due to the abnormal increase in traffic during the rush hours over the other hours of the day, the companies find it necessary to carry a great many passengers standing, and these conditions are no worse in New York, as far as the street surface cars are concerned, than in the other cities.

The Northern States Power Company has used radio communication successfully in quickly locating "trouble" on its lines. When the two St. Croix transmission lines tripped out at 1:55 p.m. on Jan. 30 both telephone lines to St. Croix were put out of commission. F. J. Gerlich, superintendent of the service department, lost no time getting to the radio set and upon tuning in immediately heard the wireless operator at St. Croix calling Minneapolis. By means of radio-telephone communication the trouble on the transmission lines was quickly cleared up, and both lines were back in service by 2:05 p.m. (within ten minutes). Wire telephone communication was not re-established until half an hour later.

Novel Traffic Tower an Aid to Railway

Electric Device on Tubular Steel Pole Controlled from Booth at Curb Makes Possible Installation at Center of Intersection

THE presence of electric railway tracks in the street often complicates the problem of traffic control by making it impossible for the directing authority to place himself in the exact center of an intersection. If the ordinary "Go—Stop" semaphore is used, it must be placed on one side of the street, and it is difficult for traffic on the opposite side of the street to see the semaphore over the tops of passing vehicles. This results in confusion and delay, from which the railway suffers quite as much as the vehicular traffic. In order to overcome the difficulty the Department of Public Safety of the city of Scranton, Pa., working in conjunction with

Specially Designed Traffic Tower in Scranton, Pa.

the Scranton Railway, has designed a traffic signal somewhat different from any that is used elsewhere.

The signals are given by colored electric lights facing in the four directions. The tower is so slender that it can be placed in the center of the roadway directly between the street car tracks and is sufficiently tall so that it cannot be obscured by passing vehicles. An operator comfortably housed in a booth at the curb operates the signal. The upright, supplied by the railway company, is an 8-in. tubular steel pole, 16 ft. in height, set in a pyramidal concrete base, as shown in the accompanying illustration. The box at the top to house the lenses and lights has a clearance of 14 ft. from the pavement. The clearance is an important point, because a lower box might be damaged by a motor truck passing too close. Eight lights are located in this box, a red and a green on each of the four sides. Four additional red lights are set around the base of the pole for use as a warning of the presence of the tower when the upper lights are not in operation.

All the lights are manipulated by the operator at the curb, whose position is raised sufficiently so that he can clearly see traffic approaching from any direction. By a single motion he changes one set of lights from green to red, stopping one movement, and simultaneously the lights controlling cross traffic from red to green, starting the other movement. When the lights change a

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gong rings to warn pedestrians. An electric heater is provided in the booth for the comfort of the operator, and it is planned to replace the heater with an electric fan when the weather makes the latter more desirable.

The first of these towers was installed about Jan. 1, 1923, at Lackawanna and Wyoming Avenues. On weekdays the operator is on duty from 9 a.m. to 7 p.m., those being the hours of heavy vehicular traffic on Lackawanna Avenue. When he leaves the booth he switches on the red lights at the base, which remain throughout the night as a warning. The performance of the apparatus has been so satisfactory that it is now proposed to install similar traffic towers at nine other intersections in the congested district.

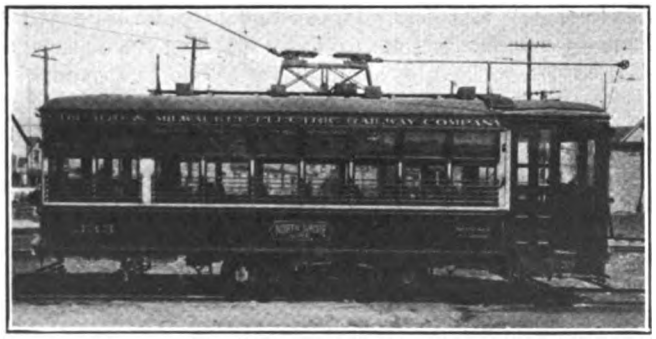
After careful study of the movement of street cars turning into and out of Lackawanna Avenue, it has been decided that better results will be obtained by having each tower independent of the others, rather than having them interlocked. The operators should co-operate with each other to expedite the movement of traffic, but it is thought that it would delay movement if the several signals were controlled at all points by the conditions at any one point.

Plush Seats for Safety Cars

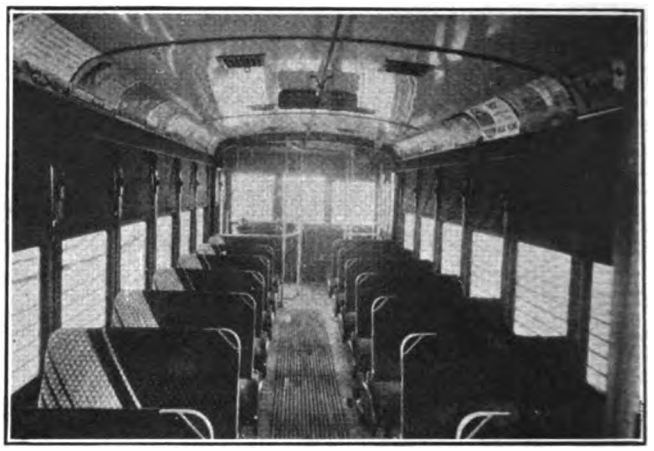
New Cars of the Chicago, North Shore & Milwaukee Railroad Have Separate Exit and Entrance, 23-In. Aisle and 36-In. Seat Width—Comfort of Passengers Chief Consideration

A DISTINCT step in the direction of making transportation more salable has been taken in the design of twelve safety cars recently placed in service by the Chicago, North Shore & Milwaukee Railroad on its city line in Milwaukee, Wis. The idea of making the ride as attractive as possible has been the governing consideration. In doing this, it is notable that the interpretation, in terms of equipment, of this conception of selling a ride is almost entirely responsible for all deviations from the standard safety car.

Briefly, the car has been designed with increased length and width. The additional length has gone into longer platforms with double doors to permit simultaneous loading and unloading and hence faster schedules. The addition in width has permitted a wider aisle and wider seats. But in point of comfort and appearance, the seats are far better than the slat seats with which the earlier safety cars were equipped, and they are also considered by the company a decided improvement over the more generally used rattan seats. The seats used are of full spring construction, covered with a figured green plush, and manufactured by Hale & Kilburn.



Exterior of North Shore One-Man Car



Interior of North Shore Car Showing Plush Seats

The increased length and width of the cars necessitated larger sections for the side frames and platform supports. The weight is 19,700 lb. light, and the seating capacity thirty-two. The cars are provided with standard safety controls and air brakes. The inside of the car is finished in cherry. Electric heating is used with Railway Utility Company thermostatic control. The trucks follow closely the Cincinnati Car Company's standard design, but they have been strengthened to accommodate the increased body weight. The trucks have a standard 8-ft. wheelbase and are equipped with two GE-264 motors. Wheels are 26-in. rolled steel. The trucks are also equipped with Smith-Ward slack adjusters.

The principal dimensions of the North Shore car ars as follows:

Over-all length	29 ft. 6 in.
Platform length	5 ft. 6 in.
Over-all width	8 ft. 1¼ in.
Door opening (clear)	24 in.
Aisle width	23 in.
Seat width	36 in.
Seat spacing	28 in.

From the above it will be noted that the North Shore car is approximately 1½ ft. longer than the original standard car and that the platform has 1 ft. of extra length. The width has been increased by 3 in., while the aisle width has been increased from 21 to 23 in. and each seat has been given 1 in. additional width. The seat spacing is the same as that of the standard, namely 28½ in. The car has been designed for one-man operation only, and has proved very satisfactory in the Milwaukee service.

The farebox is located in a convenient place, easily accessible to the entering passenger and the operator in charge of the car. To facilitate operation transfers are issued only at a transfer point, where the passenger leaves the car. This has, to a great extent, lightened the work performed by the operator.

United States Consul B. S. Hayen, Leipzig, in a report to the Department of Commerce, reviews the German government's present effort to circumvent the coal shortage by electrification of the State Railways. By demonstrating the superiority in service and economic efficiency of electricity over steam it is hoped to offset the handicap to German railway transportation resulting from the occupation of the Ruhr coal fields and the deliveries previously made under the Versailles Treaty. Not only railways, but factories, will be compelled to use electric power. Lack of coal has forced the German State Railway Administration to withdraw a large number of trains.

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Carrying Safety to the Public—I

Increasing Volume of Traffic Emphasizes Need for Consideration of Street Accidents—In Sixteen Years Automobile Deaths Have Increased Thirty-five Times — Remedies by Legislation Are of Questionable Value—Organized Safety Campaigns Have Reduced Fatalities Greatly

By C. W. Price
Vice-President in Charge of Safety, Elliott Service Company, New York City

EDITORS' NOTE: The continuous growth of motor vehicle traffic makes the problem of accident prevention yearly more important for the electric railway. Fairly consistent work has been done in promoting safety in the railway's own organization, and with good results, but the larger work of making safety a community-wide activity remains to be done. Just how to go about this from the point of view of the railway executive, and what may be accomplished, will be told in a series of ten articles, of which this is the first. The author has had a great deal of experience in this work. For twelve years he was with the International Harvester Company, during which time he organized the twenty-three plants for safety. For four years he was assistant to the Compensation Commission of Wisconsin, working on the drafting of a complete new code of laws covering safety. In 1913 he assisted in organizing the National Safety Council, afterward serving as vice-president, field secretary and general manager. During the war he directed the work of organizing for safety in all the arsenals and navy yards. He has done pioneer work in organizing local councils and in promoting public safety and safety instruction in the public schools.

C. W. Price

THE editor of the ELECTRIC RAILWAY JOURNAL has asked me to answer this question: Can the public be reached with the safety idea? Or to put the question in another form: Can safety be organized in a community as successfully as it has been organized in the great industries, with a continuous campaign of education which finally will grip the interest of all of the people and cause them to stop being careless and begin being careful? My answer is that it can be done. However, if I would convince the practical electric railway executive I must not only prove that it has been done but I must tell how it was done.

In succeeding articles I shall, therefore, outline those features of an organized community effort which have proved determining factors in reaching the public in cities where substantial reductions have been made in accidents. During the past three years a definite plan of organization and a program of activities for community safety have been developed. These are as well defined as the program for a great industry, a program which if applied in any community with the same leadership will realize equally satisfactory results.

But in this first article I wish to present some facts regarding the present accident situation and the status of public opinion.

A recent analysis of the accident experience of a number of electric railways revealed the significant fact that from 65 per cent to 75 per cent of the accidents could not be prevented by any effort on the part of the employees, no matter how loyal they were to the safety idea; if prevented at all it must be by reaching the drivers and pedestrians on the streets.

It is not necessary to remind any railway man that the traffic situation is rapidly growing more complex and difficult to cope with. A recent analysis of accidents in representative cities of the United States showed that over two-thirds of the accidents on the streets were due to automobiles and trucks.

It is difficult for us to realize how new this problem is in our community life. Before 1906 or thereabout there was no automobile problem. In that year there were only a few thousand machines, and the government reported 374 deaths caused by automobiles, while in 1922 there were 12,357,376 automobiles thronging our streets and highways and, according to insurance statisticians, approximately 13,900 lives were sacrificed by this new and giant hazard. Seven people were killed by automobiles for every one killed by street cars.

A factor in this problem which has not been recognized sufficiently is this: Fifteen years ago the majority of the owners and drivers of automobiles were citizens of some means and responsibility. Today the millions of cheap cars manufactured and the enormous number of second-hand cars thrown on the market each year make possible the ownership of cars by a class of citizens, especially young men, who are of the more reckless type—men of little sense of responsibility. Add to this list the rapidly increasing number of drivers of taxicabs and trucks, many of whom are incompetent. Then picture these thousands of swiftly moving cabs and trucks and automobiles fighting their way through narrow streets, many of which were laid out for horse-drawn vehicles, and we have a suggestion of some of the factors which are daily adding to the complexity of the problems confronting the railway executive of today.

In many cities, during the past two years, the toll of deaths and injuries reported in the daily press has aroused public sentiment to a point where the people are demanding that something be done to control the evil.

As is usually the case in a sudden fit of alarm, all sorts of remedies are being suggested. Some insist that what is needed is more police, better traffic judges, heavy fines, and even the imposition of jail sentences.

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These people forget the perfectly obvious fact that law enforcement is possible only as soon, and no sooner, as public opinion is developed to a point where, first, it will tolerate law enforcement, and, second, demand that the laws be enforced. The experience of every city in which successful work has been done in controlling the accident situation emphasizes the fact that there is only one final solution—an organized community-wide educational campaign, which will reach every man, woman and child and change his attitude and habits. To appreciate what such a campaign will mean we only need to recall the campaign for better sanitation and health which during the past twenty years has so greatly improved our habits of life. Consider the vital place which health instruction has come to occupy in our homes, our schools and the newspapers and magazines. Safety must come to occupy just such a place in our community life if we would solve the accident problem.

St. Louis, Milwaukee and Washington are good examples of what can be accomplished through organized effort, as is shown by the following records:

	Accidental Deaths		
St. Louis	1917	1922	Per Cent Reduction
Total deaths	510	334	34
Street railways	32	14	56
Steam railways	50	20	60
Industrial	110	15	86
School children	50	25	50
Automobiles (per 10,000 machines)	32	13	60
Milwaukee	1919	1921	Per Cent Reduction
Total deaths	320	243	24
Automobiles (per 10,000 machines)	26	12	54

In Washington, D. C., remarkable results have been achieved by the first two months of organized work. A "Safety Week" was conducted the last week of November, 1922, and a permanent organization was developed during January, 1923. The record for February and March, as compared with 1922, shows that the total deaths were reduced 32 per cent, the total traffic deaths reduced 43 per cent, and the total children's deaths reduced 65 per cent.

The experience of some dozen cities in which community safety has been organized has taught us that certain factors are indispensable to obtain success in the initial steps in developing a permanent organization and in the promotion of the continuous campaign. Since these articles are written primarily for the attention of railway executives, who in their respective communities may be called upon to take an active part in developing a safety organization, it may be well here to outline somewhat in detail these factors:

1. Where there is a Chamber of Commerce safety should be organized as a department of it. This plan provides for a permanent anchorage of the movement in an institution of standing and is in line with the growing tendency among business men to centralize civic activities and to avoid the multiplication of new organizations.

2. Because the success of a safety campaign depends on the wholehearted co-operation of a large number of individuals and organizations, it is exceedingly important that the president of the organization be a citizen of standing who will command the confidence and support of the whole community. Such a man is necessary to draw into the organization strong men and women who will act as chairmen and members of committees. In a number of cities the movement has ended in failure because of the lack of such leadership.

3. In the larger communities it is absolutely essential to the success of the work that a paid secretary or manager be employed to give his entire time to it. Because community safety is of such recent development, it is difficult to secure a man of experience for this position. Therefore, in many cases it is necessary to select some local man and train him. Given a fair education, the two indispensable qualifications in such a man are leadership and organizing ability.

4. There are two successful ways of financing a safety organization. The first is to finance it out of the budget of the Chamber of Commerce. The Milwaukee Safety Council is a good example of this plan. The second plan is to secure contributions from those business concerns which will be financially benefited, such as the public utilities, industries and concerns having commercial vehicles on the streets. Under the second plan, it has been found that where accidents are reduced as the result of a successful campaign and a corresponding reduction in insurance premiums is made, the concerns are willing to renew their contributions each year.

5. The following has been found to be a practical working plan for a safety organization:

President.
Vice-presidents, three or more.
Manager.
Treasurer.

The following committees:

Finance	Drivers' School
Publicity	Industries
Police	Women's
Schools	Traffic
Posters	Speakers

Statistics

The officers and chairmen of committees constitute the executive committee.

It is important in the initial stages of developing an organization to secure the support of all city officials who are in a position to give co-operation, such as the mayor, chief of police, superintendent of schools, traffic court judge, coroner and street commissioners. These officers should be given important positions on the committees.

6. In a subsequent article, the subject of publicity will be covered more fully, but at this time I wish to point out the necessity in the initial steps of giving wide publicity to the plan of organization and the program of activities. It is difficult for the average person to understand how a community-wide safety effort can be organized that will reach all of the people. In order to convince them, they must be shown in a simple and constructive way just how it is to be done. In addition to daily publicity in the newspapers, it is advisable to issue a small leaflet containing an outline of the organization with the names of the officers and a brief description of the various activities. It is also advisable to have speakers appear before the representative clubs of business men and present the scope and purpose of the campaign.

Resistance to Water Flow Through Valves

EXPERIMENTS made in the laboratories of the University of Wisconsin* have shown that in the flow of water through valves and pipes from ½ to 12 in. in diameter, globe valves offer from fifteen to forty times the resistance of gate valves, the ratio increasing with the size of the valve. The length of straight pipe of the valve size which will produce the same loss of head as the valve varies from ¾ to 4 ft. for fully opened gate valves and from 20 to 35 ft. for fully open globe valves. In the case of globe valves the smaller valves are equivalent to the greater length of pipe measured in pipe diameters.

The loss of head in clean, wrought iron pipe from ½ to 12 in. diameter is

$$H = \frac{0.0B19}{d^{1.16}} V^{1.9}$$

where H is the loss in head per 100 ft. of pipe; V is the velocity of flow in feet per second and d is the pipe diameter in feet.

*See Bulletin of the University of Wisconsin, Engineering Series, Vol. IX, No. 1, by C. I. Corp and R. O. Ruble, U. of W. Engineering Experiment Station, Madison, Wis.

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Freight Business Built Up By Making Special Schedules

Petaluma & Santa Rosa Railroad Adopts the Slogan "Last to Leave, First to Arrive" and Campaign for Freight on the Basis of Service

THE Petaluma & Santa Rosa Railroad connects San Francisco with the fertile valleys of Sonoma County by steamer across San Francisco Bay and via Petaluma River to Petaluma, whence the company's rail system reaches out to farming communities that produce heavily in perishable commodities, such as poultry, eggs, berries, fruit, etc. Most of the territory served is traversed by excellent paved roads, and because the districts are all prosperous automobiles are plentiful.

Under these conditions the passenger travel is comparatively light and there is good opportunity for effective service in the rapid transportation of freight. Special attention has, therefore, been given to arranging schedules that would be most convenient to freight shippers; also to building spur tracks to warehouses wherever it was at all possible, regardless of the amount of tonnage offered at the time and with the idea that the track facilities would increase the tonnage. So far, company officials report, there has not been a single case where these spurs have not proved to be well worth while. The company's freight business has been increased almost 30 per cent in the past year, tonnages handled for the past six years being:

1917	133,173 tons	1920	140,082 tons
1918	120,077 tons	1921	159,950 tons
1919	114,256 tons	1922	204,024 tons

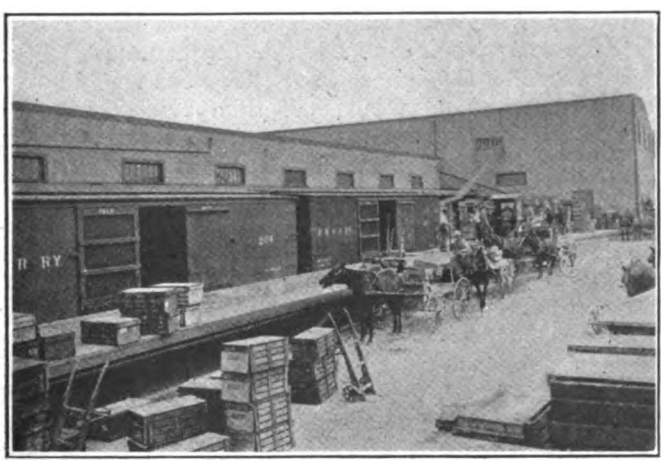
Of the 11,000 acres planted to apples, which are tributary to the system, only 4,000 acres are yet in full bearing and the yield should increase at the rate of 25 per cent annually. The present apple shipments over the railway total about 1,000 cars annually. About the same number of cars of eggs are also handled. Both commodities are shipped in refrigerator cars, the eggs being consigned chiefly to New York and the apples to all parts of the United States. The demand for the apples is particularly good due to their being about three weeks earlier than apples grown in other parts of the country.

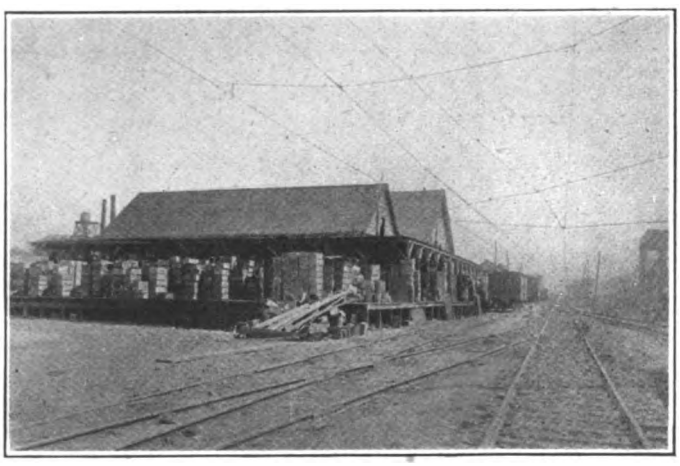
Freight schedules are arranged to afford an overnight service each way between San Francisco and the points served by the railway. Southbound freight schedules are fitted to the needs of each commodity produced in the territory served, the objective always being the delivery to the markets as early as practicable after the commodity is harvested. This can be done so effectively that fruit or berry growers and poultrymen can place today's produce on the breakfast table in San Francisco tomorrow morning.

In the opposite direction freight can leave San Francisco late in the evening and reach the northern termini early in the morning. Thus retail dealers, by phoning the San Francisco wholesaler as late as 4 p.m., can receive goods desired by 7 a.m. on the following morning. This condition enables the retailer to do business on small capital investment and to carry only small stocks.

Apple Packing Plant on Electric Line

Commerce Chamber Taken Over the System





A Number of Apple, Berry and Other Fruit Shippers Depend on the Petaluma Line for Fast Service

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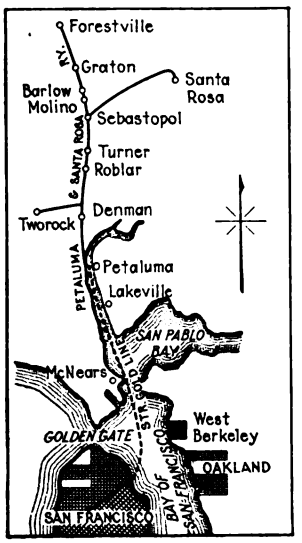
Thus he does not need to risk losses on stock that does not move readily or which deteriorates rapidly, and his insurance, interest on investment and storage requirements are lower.

The company has not overlooked the opportunity to advertise the fact that this overnight service makes faster time than the U. S. mail. A consignment of freight delivered to the company's wharf in San Francisco at 4 p.m. will reach the consignee at 7 o'clock on the following morning, while the invoice mailed in San Francisco at the time the goods were shipped is not delivered until noon of the next day.

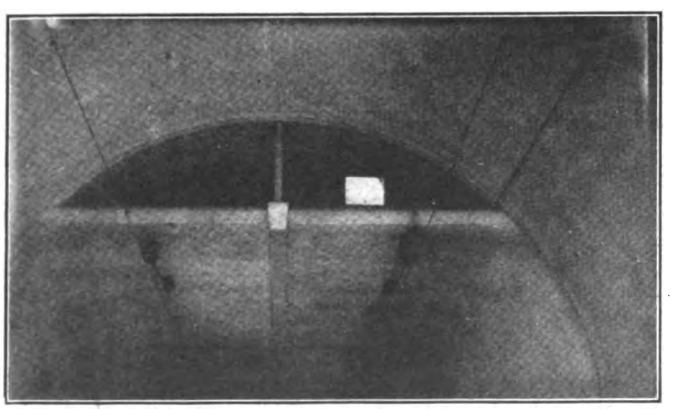


Rail and Boat Route of P. & S. R. Ry.

The passenger patronage on this system consists almost entirely of rural residents traveling between their ranches and trading points. In 1916 approximately 800,000 passengers were handled. In 1922, despite considerable growth of the territory, the number of passengers handled had decreased to 600,000 annually. This decrease has been due largely to the increased use of privately owned automobiles. Thus far there has been no commercial competition of auto stage or freight companies.

The slogan "Every employee a business solicitor" has been most effectively carried out by this company, as described in the ELECTRIC RAILWAY JOURNAL of June 10, 1916, page 1097. A feature of the company's public relations work is the practice of taking the members of the Chamber of Commerce of the principal towns served over the line so as to keep them familiar with improvements and other company activities. Every effort is made to tie the line as closely as possible to the community. The general manager belongs to all Chambers of Commerce and sees to it that the real value of the company's service to the community is properly kept before the people.

Time Saver on San Francisco Railway



Mirror at Entrance to Tunnel in San Francisco

THE mirror shown in the accompanying illustration has been placed just inside the west entrance to Twin Peaks tunnel, in San Francisco, to enable the motormen to see if the trolley wheel is on the trolley wire before starting through the tunnel.

The Readers' Forum

Way Engineer Emphasizes the Importance of Wood Preservation

PUBLIC SERVICE RAILWAY COMPANY

NEWARK, N. J., May 7, 1923.

To the Editors:

In the issue of the ELECTRIC RAILWAY JOURNAL for April 21 there appeared an editorial entitled "There is Economic Necessity Behind the Wood Preservation Movement." This, I feel, is worth enlarging upon at this time because of the extreme importance of the subject to our industry.

In the issue of the paper for March 18, 1922 (pages 460-462), I discussed an article on the accounting features of tie treatment, written by Earl Stimson, chief engineer of maintenance, Baltimore & Ohio Railroad. I incidentally took advantage of the opportunity thus offered to explain the timber situation in this country as disclosed by government statistics, available to everyone interested enough in the subject to send for copies. I also outlined some of the essential economic features of wood preservation, presenting facts which cannot be controverted. They showed the actual unfortunate timber situation in the United States at that time, and conditions are certainly no better today than they were when the figures quoted were compiled. The data are worthy of being taken out of the file and given careful thought and study.

Not more than 25 per cent of the original timber of our country now remains standing, and the annual growth is only about 35,000,000,000 ft., board measure, as against an annual consumption of from 100,000,000,000 to 110,000,000,000 ft., board measure, out of which only about 1,500,000,000 ft. is being treated for all purposes. How long are we going to ignore the "handwriting on the wall"?

The wood preservation committee of the American Electric Railway Engineering Association, which is functioning this year for the first time as a special committee, is endeavoring to bring the existing wood preserving specifications of the association up to date, and to present for adoption as many additional specifications as practicable, following along the lines of most generally accepted practice. In this way our member companies will have at their disposal up-to-date information as to what they can and should do. But in the final analysis the situation that confronts us is very well covered by the old proverb: "You can lead a horse to water, but you cannot make him drink." Unfortunately it is too late to "lock the stable door after the horse has been stolen." How long are we going to remain blind to the facts?

Part of the ultimate solution is, of course, in immediate and extensive reforestration. But in the meantime, until the results of this work are available for consumption at least a generation or more hence, wood preservation must be practiced on a much larger scale than at present, in order to reduce rather than increase the rate of timber depletion. There is a considerable range in the matter of choice of treatment to be used, the effectiveness of the different methods being very largely proportional to their respective costs, but regardless of the costs the expense is more than justified

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by the results obtained and any treatment is better than none at all. Effective wood preservation is not limited to the use of coal-tar creosote oil, although this has always been recognized as the most effective. There is a satisfactory treatment for every use to which timber is put and for almost every kind of timber used for construction purposes. Every dollar spent in this way will be returned through the resulting increase in the useful life of the material treated and the accompanying reduction in the annual charge for depreciation.

HOWARD H. GEORGE,
Engineer of Maintenance of Way.

Three-Car Detroit Train Compared with Two-Car Milwaukee Train

MILWAUKEE ELECTRIC RAILWAY & LIGHT COMPANY
MILWAUKEE, WIS., May 5, 1923.

To the Editors:

The article on the latest idea in articulated cars in the April 28 issue was of particular interest, as this type of car has received a good deal of attention from us. The argument for a train of this type, on account of its advantages as to track space occupied for the number of passengers carried, is entirely patent, but when it comes to the advantage claimed in economy by reducing the platform labor expense through minimizing the number of car operators, we wonder if the proposers of the three-car articulated train have not overlooked something in the arrangement to produce the maximum economy in this respect.

This three-car train with four operators does not produce any saving over the three-car multiple-unit train or the motor car and two trailers, such as are operated in Boston and elsewhere. The articulation of two cars with the arrangement which we brought out for Milwaukee in 1920 permits the operation of a train seating 104 passengers with two men.* Comparing the figures given for Detroit's Woodward Avenue line, their proposed two three-car articulated trains would require eight men for 300 seated passengers, whereas three of our two-car articulated trains would require but six men for 306 seats.

We built our trains out of two old cars, and were therefore limited somewhat in the seating capacity which we could install; but on new construction it is conceivable that the seating capacity could be increased somewhat more on a two-car unit, and still keep within clearance lines.

The only other feature of the articulated three-car train, as proposed, which might limit the usefulness of such an outfit would be that its length (113 ft. over all) would make it somewhat unwieldy to handle in the shop, especially on transfer tables or under usual crane arrangements.

J. H. LUCAS,
Superintendent of Rolling Stock.

*Milwaukee's three-truck train was described in the ELECTRIC RAILWAY JOURNAL for Jan. 15, 1921, Vol. 57, page 131.

Association News & Discussions

Commerce Chamber Discusses Transportation

Large Attendance at Meeting in New York This Week—Principal Topics Considered Were Finance and Co-ordination of Various Means of Transportation, Especially Steam Railroad, Highway and Vessel

THE Chamber of Commerce of the United States, which met in Washington a year ago, chose New York as the place of its eleventh annual convention, which took place May 8 to May 11. There was a large attendance, and the American Electric Railway Association was represented by a committee of ten members with ten alternates. The official topics, according to the program, were "Transportation in All Its Phases in the United States" and "Europe and Europe's Affairs." Actually, the papers and discussion on transportation were practically limited to steam railroad affairs, transportation on the highways and maritime matters. It is understood, however, that the work of the five special committees on transportation which have been appointed by the chamber for a comprehensive study of all phases of the transportation situation will include the function of the electric railway in the transportation scheme. Some phases of this study were brought out at the meeting of the transportation and communication group on Wednesday afternoon, when progress reports were read of the subcommittees of this group.

At the meeting of national councillors of the chamber, held on May 7, for the nomination of directors, two electric railway men were nominated, namely, Philip H. Gadsden of Philadelphia to represent the second district, and Paul Shoup of San Francisco as head of the Department of Foreign Commerce. They were subsequently elected by the delegates at large. The choice for director of transportation and communication department was A. L. Humphrey, Westinghouse Air Brake Company.

GENERAL MEETING ON TUESDAY

The general plan of the convention was the holding of general meetings in the mornings of Tuesday, Wednesday and Thursday, group luncheon meetings in the afternoons of Tuesday and Wednesday, with a general business session on the afternoon of Thursday, and general meetings each evening with addresses by speakers of national importance or some other program of general interest. This report relates particularly to matters of electric railway interest which came up at the different meetings.

Some statistics of national import presented in the address of President Julius H. Barnes at the general meeting on Tuesday morning were that since 1900 the population of the country has increased 40 per cent, the volume of food production 38 per cent, the volume of mine production 128 per cent, the volume of factory production 95 per cent. The per capita annual earnings in the United States in 1850 were approximately $100, in 1890 approximately $200, and in 1920 approximately $600. The total national wealth is now $300,000,000,000. The freight car of 1875, which was 65 per cent dead load and 35 per cent earning cargo, has been developed so that now there are cars 20 per cent dead weight and 80 per cent earning load. Per railroad employee in 1922, the railroads of the country showed 243,000 ton-miles and 21,600

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passenger-miles. Per $100 of capita investment the record was 1,750 ton-miles. During the last year the use of the motor truck has been developed, until last year the actual tonnage listed by it exceeded 50 per cent of the tonnage of all the railroads combined, indicating that the subject of transportation must be studied and developed in wider aspects than railroad development alone. This has led to the appointment by the chamber of five special committees to study various phases of the transportation situation, namely, railroad consolidations, governmental relations, relative rates, motor transport and waterways.

In an address on Tuesday evening Herbert Hoover, Secretary of Commerce, mentioned the greatly increased consumption of conveniences and comforts per capita of the population, which, he maintained, is normal progress. He also outlined some of the methods by which commerce and industry may keep the nation permanently prosperous. On the first point he said that we must get away from the notion that pre-war standards of living and volume of business would be normal now. We have been able to add to our standards of living by more general distribution of many articles and by increased efficiency of production and distribution.

He referred to the present industrial recovery and said that the government index shows wholesale prices today about 30 per cent below the crest of 1920, but 6 per cent above that of nine months ago. Increases in price, he said, are a necessary accompaniment of business recovery. We are undoubtedly in a plane of prosperity and should be able to discipline ourselves so as to hold onto it. One great need is the willingness of people to save their enlarged earnings, another is caution as regards over-expansion and credit.

Mr. Hoover said that now there is a tendency to an increase in the construction of buildings, railways and plant and equipment generally, as well as federal, state, and municipal construction. Tax-free securities lie at the base of a good deal of the last, but in the speaker's opinion all government work of this character except that which is essential should be deferred in times like these.

Group Meetings on Tuesday

At the meeting on Tuesday afternoon of the finance group, one of the papers was by Pierpont V. Davis, vice-president National City Company, on the subject of credit requirements of the railroads from the standpoint of the investor. Among other things Mr. Davis pointed out that there had been a great change in the investment market due to the income tax law and the large number of tax-free securities issued. Large investors were turning generally to these tax-free securities and selling their railroad and other taxable securities. He knew of one very large estate which had now only about a million dollars in taxable securities.

The average sale per customer of taxable securities by his concern is $3,500, whereas before the war it was ten or twenty times that. Another factor in the reduction of the demand for railroad securities was the competition for funds by foreign nations and the issue of securities by public utility companies to a much larger extent than twenty years ago. Referring to the railroad situation he spoke of the plans for valuation which had been urged by some with the idea that the railroads were greatly over-capitalized, whereas it is now found they are considerably under-capitalized.

The civic development group discussed immigration. John W. O'Leary, chairman of the immigration committee of the Chamber of Commerce, said the present 3 per cent law is wise as a temporary policy, but it is not a permanent solution of the problem. This must be worked out on a selective basis, which will give preference to the more desirable classes of immigrants. Much can be done to help out the labor shortage by shifting the unemployed from certain industries to others where they are needed. For example—the 250,000 coal miners said to be unnecessary can be placed in other lines of endeavor.

Congressman Albert Johnson, chairman of the House committee on immigration, thought that future legislation is likely to be tighter rather than looser. The present law allows a possible annual influx of 357,800 persons, and for the present year all but 45,000 have already arrived. The committee on immigration of the House wants to go back to 1890, as the status for basing the new law. This is so as to give more weight to the Northern races of Europe. In future legislation provision must also be made to take care of relatives of those who have already come to this country.

Allen T. Burns, of the Carnegie Corporation, showed that, contrary to general belief, the southeastern countries of Europe have sent immigrants who have become naturalized sooner than those from the older, northwestern countries. He said that the applicants for citizenship were largely from among the skilled workers.

At the meeting of the fabricated production group, Robert S. Binkerd said the annual average freight haulage per inhabitant in the United States was about 4,000 ton-miles, or ten times the average in Europe. This situation must lead to ultimate decentralization of production, he said. As showing the development of this idea during recent years, mention was made of the growth of satellite communities on the outskirts of large cities, and the movement of factories to smaller towns. In the discussion which followed it was suggested that the closed shop question had had some effect in causing manufacturing plants to seek new locations. This was admitted, but it appeared to be the sense of the meeting that a certain amount of decentralization was the ultimate solution of the freight transportation problem.

The discussion of the domestic transportation group centered in cost reduction by elimination of transportation wastes in distribution. A factor in this, said W. Lee Cotter, is proper warehousing with the aid of pool-car shipping. The pool car is a car fully loaded but containing consignments for different consignees, distribution being effected through the largest consignee or, preferably, through a public warehouse. Other speakers backed up Mr. Cotter in his statements. The general plan of store-door delivery by the railway was urged by W. J. L. Banham, who said that the plan has been widely used in Canada and elsewhere, and has been successful. The object is to relieve congestion at terminals and expedite delivery. Discussion in general favored Mr. Banham's proposition.

The group on transportation and communication confined its discussion on Tuesday afternoon to maritime matters.

General Session on Wednesday

The meetings of Wednesday began with a general session at the Metropolitan Opera House with President Barnes in the chair. The topic of the morning was "Developing a National System of Rail, Water and Highway Transportation." There was an address in favor of waterways by C. A. Newton, member of Congress from Missouri. This was followed by an address on "Co-ordination of Railroads, Waterways and Highways," by Charles H. Markham, president Illinois Central Railroad, who thought that the public was sometimes deceived as to the relative cost of furnishing the various forms of transportation because of the expenditures made out of public funds for the construction and maintenance of navigable waterways and hard surfaced highways. The taxpayers foot these bills, whereas the rail lines bear the expense of the roadways used by them. Thus, between 1910 and 1922 more than $3,000,000,000 was expended in this country upon the construction and maintenance of good roads, toward which the operation of motor vehicle carriers contributed comparatively little. In the speaker's opinion, the destruction of lightly built roads by heavy trucks was so great as to call for some remedy, and he suggested the construction of short stretches of hard surfaced roads designed primarily for the use of motor trucks, to be built only where the conditions were favorable to their use and where the saving, as compared with rail transportation, would be sufficiently large to justify the expense.

There was also an address on highway transport by Roy D. Chapin of the Hudson Motor Car Company, who urged a study of the place of the motor vehicle and its co-ordination with other facilities of transportation. Surveys by the Bureau of Public Roads and the State Highway Department in Connecticut, he said, showed that in that state 36 per cent of the motor truck traffic

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was hauled a distance of 9 miles or less, 31 per cent between 10 and 29 miles, 19 per cent between 30 and 69 miles, and only 14 per cent more than 70 miles. Most of this haulage was within the state, and that for long distance was largely made up of special commodities, such as furniture, where the packing, handling and breakage charges made truck haulage cheaper than if the movement had been by rail. He believed that actual competition of the motor truck with the steam railroad was negligible, except for short hauls which the railroads consider unprofitable. He urged the construction of the railroad terminals in the suburbs of cities rather than in the centers and distribution of freight from them by trucks.

Group Meetings on Wednesday

The meeting of the transportation and communication group on Wednesday afternoon was devoted entirely to progress reports of the special committees to investigate various transportation topics, appointed by President Barnes. These committees, of which there are five, will report to a general transportation committee, whose personnel has not yet been completed.

The first report was on governmental relations to transportation and was submitted by George A. Post, who said the committee was studying different clauses of the railroad act and was unanimously opposed to government operation. Carl R. Gray, chairman of the committee on railroad consolidation, pointed out that this committee was considering the national aspects only of railroad consolidations and that its work would in no way interfere with or overlap that of the Interstate Commerce Commission. His committee reached the opinion that the economies possible by consolidation were not very important, but there were other advantages, such as reducing the problems of car interchange and rate adjustments. F. A. Delano reported for the committee on adjustment of relative freight rate schedules, and was followed by A. H. Swayne for the sub-committee on the relation of highways and motor transport to other transportation agencies.

Mr. Swayne said that this committee had organized three sub-committees, one to review the field of motor use outside of the terminal area, the second the field of motor use inside of the terminal area, and the third the legal aspects of highway transport in its relation to other carriers. P. H. Gadsden is chairman of the third committee. Arrangements have been made to secure data and other assistance from various government bodies, and the American Electric Railway Association will supply figures on the cost of operation of electric railways. The facts as assembled will be correlated either by government officials or the staff members of the committee. Assistance to the legal committee, of which Mr. Gadsden is chairman, is being given by the National Automobile Chamber of Commerce, which is preparing a statement of the municipal regulations of common carriers on the highways, by John E. Walker, former tax adviser of the Treasury Department, who is studying taxation of rail, motor and electric carriers; by the American Electric Railway Association, and by the Bureau of Public Roads. The committee has already secured enough facts to show that there is a broad field for the supplemental use of the motor bus and the electric railway and that some method of co-ordination is possible which will eliminate unnecessary competitive charges to the public, while still preserving the flexibility of service in which the public is most interested.

Progress was also reported by the committee on development of waterways and co-ordination of rail and waterway service by its chairman, W. L. Clause.

In the foreign commerce group meeting, George L. Duval explained some of the difficulties involved in marketing American goods abroad. J. Walter Drake, Hupp Motor Car Corporation, gave several fundamental principles which apply to the export of American manufactures in general. These are: (1) Mass production permits competitive prices. (2) Personal contact is needed with foreign selling agencies. (3) World markets are essential to balance domestic commerce. (4) The new tariff allows for prompt adjustment with nations which are favorable to us. (5) The success of any American industry abroad adds to the prestige of the others.

The session of the natural resources group was devoted to the subject of coal. A report of this meeting appears in another column.

At the meeting of the insurance group, Hon. Robert L. Luce, former Justice of the Supreme Court of the State of New York, said that regulation, which had been enforced on public utilities, is now being applied also to the insurance business. In England the insurance business is unregulated, and the rates there are correspondingly lower.

Asa S. Wing presented a table showing the investment in railroad securities by the life insurance companies from 1860 to 1922. Prof. William Leslie spoke in favor of government regulation of insurance.

A special meeting was arranged on Wednesday afternoon to discuss taxation. This group made the following formal recommendations, which were referred to the board of directors before going to the resolutions committee:

1. Capital gains and capital losses should not be recognized for income tax purposes.

2. The present 50 per cent maximum surtax should be reduced to 25 per cent.

3. There should be a general sales tax of one half of one per cent on turnovers to make up for proposed repeal of the so-called "nuisance" taxes, such as excise taxes on theater tickets, club dues, and occupations of various kinds.

4. There should be created a court of income tax appeals, entirely separate from the treasury department, which would sit in various parts of the country, so that persons and corporations might settle their cases with the government near their homes.

General Sessions on Thursday

This session began with an address on the farmers' interest in transportation, by O. E. Bradfute, president of the American Farm Bureau Federation. This was followed by an address on the need of financial support for the railroads by W. N. Doak, senior vice-president Brotherhood of Railroad Trainmen. The speaker declared that the employees' interest in adequate financial support for the railroads must be apparent to all and that those employees who do not feel such interest should seek other fields of endeavor. Labor is also opposed to Federal ownership, control or operation. He saw help from the efforts of the Chamber to study the railroad situation. The public should be educated to adopt a sympathetic attitude toward the railroads and toward their employees in their efforts to furnish transportation, and much good can undoubtedly be accomplished by both railroads and employees going to the public with a joint appeal for fair dealing.

The final address of the session was by Walter W. Head, first vice-president American Bankers' Association, whose topic was the re-establishment of railroad credit. He pointed out that in 1920 railroad securities reached the lowest point in their history and the quotations today still are far below the normal trend of such prices in the years prior to 1914, though the roads were carrying the greatest traffic in their history and their efficiency has increased. The great need now is for increased facilities, especially terminals.

Two elements that enter into every loan are, first, whether the tangible assets are worth the outstanding capitalization, and second, the prospects for future growth. As regards the first point, in 1921 the Interstate Commerce Commission has valued the roads for rate-making purposes at considerably more than the market value of the outstanding securities, and only 6 per cent less than their par value, so that any reasonable allowance for increased cost since that time supports the belief that the railroads as a whole are not over-capitalized. As regards the second test, there is a general fear on the part of the investor that the railroads are victims of too much political pressure from particular interests. The government will probably continue to control rates and to mediate the wages, but with efficient management, loyal service from railroad labor and stability of regulation, renewed confidence should come.

Resolutions

Following the practice of the Chamber, a series of resolutions was presented at the final business meeting, for approval by the delegates present.

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They were offered by the committee on resolutions and embraced a variety of topics. The following were of particular interest to electric railways.

One resolution declared that the present 3 per cent limit on immigration was not adapted to present conditions. To this 3 per cent a possible added 2 per cent quota on a selected basis was recommended, and it was suggested that this might lead to the placing of all immigration on a selective basis.

As regards the railroads, it was pointed out that in 1920 the country started on a new constructive transportation policy. It was urged that this liberal policy be followed in the future, and it was suggested that much valuable information would be available from the results of the transportation conference recently initiated by the Chamber.

A pledge of co-operation with the National Coal Commission was passed, coupled with the statement that the Chamber had already gone on record in adherence to the open shop principle.

Greater attention was recommended to methods of reducing the fire loss and civil responsibility for probable loss to others caused by gross negligence was urged.

On the subject of public utility regulation the Chamber passed unanimously a resolution favoring state regulation in preference to city regulation. The full public utility resolution follows:

Regulation of public utilities has developed through its various stages until the principle of regulation through a body created by the State has been recognized throughout the country as best calculated to result in decisions equitable alike to utilities and their patrons and to determine the questions of large importance both to utilities and their owners and to the public.

The advance which has thus been made should be maintained. As the source of the power of regulation of utilities, each State should exert this power through its own agency and should not attempt to delegate it to local authorities. Such a course would represent retrogression, and its consequences would be detrimental to the best interests of the public.

Complete Unionization of Coal Mines Would Be Ruinous

The Various Remedies Commonly Proposed Are Criticised—Six Suggestions Were Made on Other Ways by Which the Coal Situation Can Be Improved

THE disastrous results which would follow the complete unionization of the coal industry was the subject of a talk given before the recent meeting of the Natural Resources Production group of the United States Chamber of Commerce by J. G. Bradley, president of the Elk River Coal & Lumber Company. He emphasized the point that since 1917 the price of coal has been governed by difficulties of distribution. Priority orders during the war time, the railroad switchmen's strike, and the shopmen's strike so interfered with the transportation of coal that they became the dominant factors in the situation.

As illustrating the effect of railroad conditions upon the coal industry Mr. Bradley said that a shortage of 20 per cent in the number of cars available added 12 per cent to the cost of production, a 30 per cent shortage added 19 per cent, and a 60 per cent shortage added 54 per cent. The latter condition is that which now prevails in the West Virginia mining district. He predicted that the time would come, however, when production costs would again govern the price of coal.

The economic future of general business in this country depends upon the proper preparation of the coal industry to meet this situation. It cannot be met, Mr. Bradley said, if labor organizations are allowed to dominate the industry. He spoke of the annual burden of $15,000,000 to $36,000,000 which is added to the price of coal in order to pay the expenses of "absentee union leaders." Comparing the productivity of union miners and non-union miners, he stated that the average production of coal per man per year in the non-union fields of West Virginia is 1,500 tons, whereas the average for the whole country including union mines is only 650 tons. He declared that complete unionization of the coal mines would simply mean granting a subsidy to a particular group of workers, with consequent increased costs.

Legislation Not Effective Remedy

None of the plans yet proposed to improve conditions in the coal industry is adequate to solve the problem, according to George H. Cushing, publisher, Washington, D. C., who spoke on the same occasion. In his opinion it would be impossible to remedy existing evils of intermittent production and price fluctuation by legislative means alone. The answer lies rather in a comprehensive scheme which will gradually work improvement in the situation by helping the coal industry to help itself.

Mr. Cushing spoke of the various remedies that have been suggested and outlined the shortcomings of each. The first cure considered was the so-called "stabilization" plan. This means arbitrarily wiping out half of the existing mines in order that the other half may enjoy full-time productive activity. Half the miners would be compelled to seek other employment under this plan. He said that it was very doubtful if any practical and legal means could be found to accomplish such an end.

The second plan to be considered was that of community storage, whereby the mines could maintain a steady production in spite of seasonal fluctuations in demand. The objection to such a proposal is that it costs from 50 cents to 60 cents a ton to put coal in storage and take it out again. Hence the stored coal could not meet the price competition of coal coming direct from the mine unless a surcharge were added to the latter. In that case the effect would be to raise the price of all coal.

Consolidation of mines by districts is another plan that has been suggested. Under this arrangement the uneconomical mines would be put on the shelf and only the more efficient ones operated. Unfortunately, the overhead and capital charges of the operating mines would be nearly doubled by this plan, and the price of coal would be increased as under the storage plan.

The fourth scheme discussed by Mr Cushing was nationalization. This would result, he said, in changing the ownership without in any way solving the problem of operation. All of the four remedies have the general fault of creating a virtual monopoly backed by the federal government. He questioned whether any private corporation would be allowed to do of its own accord what it is urged that the state undertake.

Just what the recommendations of the Fact Finding Commission now investigating the coal industry will be it is impossible to forecast at this time. Mr. Cushing said, however, that the investigation is becoming so obscure, that one might be justified in thinking that the ultimate object is to evade the issue. At the present time the great users of coal, the railroads, the electric railways, and the electric power companies, are legally held to fixed rates, while at the same time they have to purchase fuel at whatever price is demanded. A bound consumer and a free producer are incongruous. But that does not mean that the producer should therefore be subjected to price regulation also.

Mr. Cushing then outlined the steps which could be taken to help the coal industry to help itself without any revolutionary changes. He mentioned first the necessity of putting the railroads in a better position to serve the mines. A second step should be an attempt to absolutely ban coal strikes, legally when possible, and by force of public opinion. In this connection the value of staggering the dates of contract expiration was mentioned. State laws requiring a certificate of competency before a miner can work should be abolished. The non-union mine should be encouraged in every possible way as a force to counteract the power of the miners' organizations. A nine months' notice to railroads should be required when a new mine seeks a spur connection. This would discourage wildcat ventures that decrease the ability of the carriers properly to serve regular mines. Lastly, public opinion should force the acceptance by the miners of all available labor-saving devices.

Iowa Convention Date Changed

THE annual convention of the Iowa Electric Railway Association will be held at Hotel Hanford, Mason City, Iowa, June 26, 27, 28, 29, instead of June 20, 21, 22, as previously announced.

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Roller Bearings for Cars*

Experience in Germany Indicates That Many of the Difficulties Experienced with Ball Bearings on Electric Cars Have Been Overcome Through Use of Roller Bearings

TESTS on roller bearings, covering very long runs, show extremely great differences in power consumption due to the use of unsuitable materials, to poor workmanship and to inadequate maintenance. The greatest advantage of roller bearings over ordinary bearings for street car service is not found in a possibly smaller power requirement, but in their considerably greater reliability, their lower maintenance cost, the less lubrication required, and the absence of chafing between armature and pole faces of the motor. In fact roller bearings permit of a reduction of the air gap, thus improving efficiency and lessening heating.

Ball bearings were found unsatisfactory for heavy street car service, partly due to too high specific stress upon the balls, and partly on account of the wrong way in which the fiber of the steel is stressed in the balls. They are made by cutting off small pieces of a round wire which are then upset. Electric contact conditions are also much better for rollers than for balls. The great superiority of roller bearings over ball bearings for heavy service is now generally admitted by all factories producing both kinds of bearings.

Roller bearings were made originally with very long rollers, sometimes five to six times as long as their diameter. The development of high-grade steel, however, resulted in a considerable shortening, until today most rollers are made with a length equal to twice the diameter or less. For very heavy bearings, somewhat longer rollers or, better, two or more rows of rollers are used.

How Performance Can Be Secured

The following basic conditions must be maintained to guarantee best performance:

1. Shafts must be sufficiently heavy to prevent bending. It is useless to install roller bearings on shafts which can bend.
2. The highest grade steel should be used for the rollers, which must not show measurable wear after several years of operation.
3. Rollers must be made with utmost precision to distribute the stress upon them equally and to permit replacement.
4. Short rollers are preferable, because long ones may cause edging.
5. Heavy inner rings which cannot be rolled over or become loose are desirable.
6. All rings upon the shaft must be firmly pressed on, and they should be so arranged that an inspection of the bearing does not require removal of the rings.
7. Shafts should be of sufficiently tough steel to avoid loosening of the rings due to the constant blows upon them.
8. A durable but light construction of the roller cage is desirable.
9. All parts should be lubricated with a thick grease. The use of hollow rollers, running on a through-going bolt, is not recommended, because reliable and satisfactory lubrication is difficult to obtain.
10. Bearings must be absolutely dust and water proof. A small amount of dust will destroy the best bearing.
11. Good lubricants, free of acids and resin, should be used.
12. Bearings should be stored in a place where rusting is prevented.
13. Great care should be exercised in installing the bearing to insure exact alignment and to avoid foreign materials.
14. Bearings should be cleaned carefully at intervals, removing all old grease.

Barrel-Shaped Rollers Counteract Bending of Shaft

The necessity or advantage of conical rollers is not recognized in Germany. One concern uses barrel-shaped rollers, to counteract any possible bending of the shaft. To take up side thrust, experience has shown that for all railway car service a bead directly on the rollers or beads on the running rings are all that are necessary. Even after years of operation no measurable side wear could be found.

Great attention is being paid to an exact and uniform tempering of the rollers, a process usually kept secret. With a double roller set, the two rows of rollers should be as far apart as possible. To permit of quick and convenient inspection of the bearing it should be so designed as to permit the removal of the rollers without stripping of the front ring. Modern bearings are so built that they permit the removal of the commutator and even the armature punchings without removing the running ring from the shaft.

Good roller bearings require lubrication only every six months or yearly. The use of thin oil is not recommended, because of the large amount required, and because it is very difficult to prevent the oil from running out of the bearing.

The economies to be had from roller bearings open up new possibilities for use in urban service of a light four-motor double-truck car. The superintendent of the Stuttgart street railway system says that 10 per cent of the balls furnished in some trial ball bearings for the road had to be replaced within three years. Later their cars were rebuilt for roller bearings, and there were no failures during four years of operation. After 155,000 miles of service, no wear could be found in the bearings. While ordinary bearings consumed 35 lb. of oil for 250 operating days, the roller bearing consumed only 7 lb. of grease.

*Abstract of a paper presented by Director Albert at the International Street Railway Congress in Vienna.

Special Meeting of Traffic Association

ON APRIL 26 a meeting of the Central Electric Traffic Association was held in Toledo, Ohio, to determine whether the electric railways would compile a tariff covering the transportation of explosives and dangerous articles on passenger cars, or whether they would participate in a similar issue compiled by the steam railroads. It was decided at the meeting that the electric lines in the central territory would participate in the steam railroad tariff. It was further decided to reissue the interline intrastate joint passenger tariff covering Ohio lines in order to include the Northwestern Ohio Railway & Power Company in the tariff. Passenger fares will be adjusted in accordance with the local tariffs of participating lines.

Central Accountants to Meet

A PRELIMINARY announcement of the forty-fifth meeting of the Central Electric Railway Accountants' Association states that the meeting will be held on July 27 and 28 in one of the gardens on the Kentucky side of the Ohio River, in or near Louisville. The trip from Cincinnati to Louisville will be made on the *Queen City*, leaving at 5 p.m., July 26, and arriving at 9 a.m., July 27. Those who take the boat will be served dinner and breakfast thereon, and there will be dancing on the boat in the evening. Those who desire to join the party on the boat should send reservations not later than May 1 to J. C. Longon, auditor Cincinnati & Dayton Traction Company, Dayton, Ohio, accompanied by $2.25 for each, this being one-half of the total charge. The balance will be paid to the purser on the boat.

American Association of Engineers Holds Ninth Annual Convention

ON MAY 7 and 9 at the Monticello Hotel, Norfolk, Va., the American Association of Engineers held its ninth annual convention. Reports of standing and special committees covered the achievements, plans and aims of the association, and addresses full of both information and inspiration were given by government officials and others.

New officers of the association, as included in an announcement by the judges of election, are as follows: President, Webster L. Benham, Kansas City, Mo.; first vice-president, G. M. Butler, Tucson, Ariz.; second vice-president, Maurice Bein, Washington, D. C. The secretary of the association is C. E. Drayer, and the headquarters are at 63 East Adams Street, Chicago, Ill.

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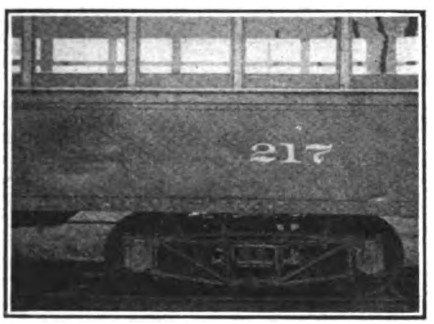
Maintenance of Equipment

Use of Supplemental Bar Strengthens Truck

THE use of an extra truss bar, supplementing the top member of the truck frame, has been found by the Buffalo & Lake Erie Traction Company to be an excellent way to prevent sagging of the truck side frame members on arch-bar trucks.



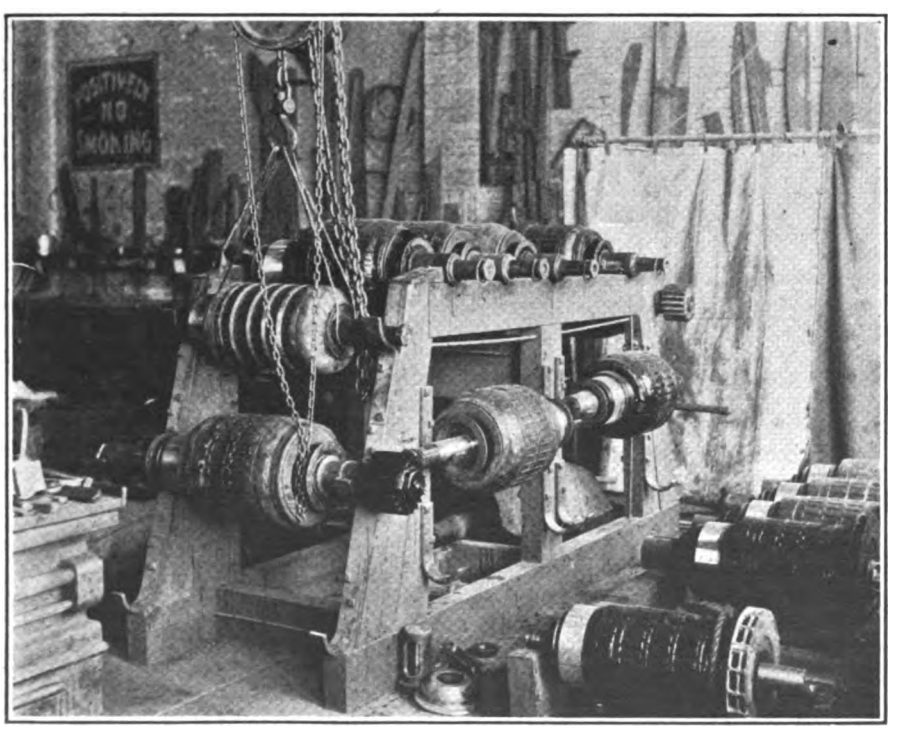
Reinforced Truck Under Low-Level Car

Considerable difficulty has been experienced because of such sagging and consequent springing out of shape of the truck frame. The trucks involved have been in hard service for some time. A ¾-in. x 3-in. steel bar was therefore bolted across the top of the truck frame on each side, as shown in the accompanying illustration. The supplemental bar is in contact with the top member of the frame over the journal boxes and bears on 1½-in. blocks at the center, thus forming a flat truss. The arrangement has proved to be a very satisfactory means to prevent springing of the truck frame and breaking of the diagonal members. All the trucks of this type are now being strengthened in the manner described.

Large Capacity Armature Rack

AN ARMATURE rack in use in the Easton shop of the Lehigh Valley Transit Company has provision for twenty-one armatures. Iron-bar stirrups are provided on the sides and ends, and the top and inside portion has grooves in the wooden framework to hold the shafts of the armatures. Four armatures are stored on each side, three on each end, five on the top and two inside the framework.

This rack is served by traveling hoists so that armatures can be picked up or installed in the rack without difficulty. Although the rack is of strong timber construction and is held together by tension rods, it can be readily picked up and moved about should it be desirable to change the location.



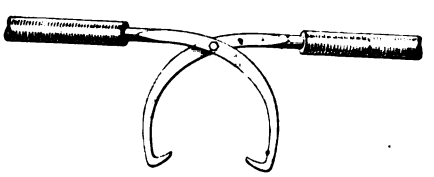
Large Capacity Armature Rack

Convenient Track Shop Kinks

By J. S. WILDER
Engineer Maintenance of Way, Municipal Railway of St. Petersburg, Fla.

THE accompanying illustration shows a type of carrying hook which we have used with great success for switch ties, etc. This is made on the ice-tong principle, with iron pipe riveted to the handle to give additional length. The hollow pipe keeps the weight down.

We have found that six or eight hacksaw blades make an excellent substitute for a wood rasp. Of course new blades cut faster, but old ones cut smoother. A bolt put through the holes at either end holds the blades together.



Carrying Hook for Ties

An old stunt which I have used frequently for fixing a screw so that it cannot be unscrewed consists of filing off the two opposite corners at the slot. When this is done a screwdriver will slip out of the slot if one tries to back the screw out, but it will not interfere with turning the screw into place if the work is properly done.

Rainy days are frequently used for making various handy tools, such as different sized screwdrivers, wood chisels, etc. These are made of round spring steel. Where conveniences for tempering are not available, we have found that hammering them rapidly and lightly and then chilling them is a very satisfactory method. Round spring steel makes excellent chisels, but considerable care is required in tempering them. They must be chilled in oil and then have the temper drawn.

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Sometimes a workman breaks a drill of a small size and has no other available for immediate use. In such cases a nail has been used by cutting off the head and hammering flat for about half its length. This is then sharpened with a file in a manner similar to that for flat bits, but the point should be made about twice as long and a little sharper. We do not bother to temper these small drills as they are made too easily and the hammering helps to harden the nail.

Oil Burner Used to Heat Cleaning Tank

BEARINGS, castings of various sorts, compressor parts, etc., are cleaned in the shops of the Buffalo & Lake Erie Traction Company by immersion in a tank of boiling Oakite metal cleaner and subsequent rinsing in another tank. Until quite recently the metal-cleaning tank was heated by natural gas, which is available at Erie, Pa.

This method has not proved entirely satisfactory, however, because variation of pressure made the natural gas an unreliable source of heat. Therefore a galvanized-iron flue was built in such a way that the heat of a Hauck oil burner could be concentrated against the lower part of the tank.

Three or four of these burners are used in the shops, and one can usually be found free when it is desired to heat the metal-cleaning vat. Good results and greater reliability have been secured from the replacement of the natural gas by this oil burner.

Gear Grease in Paper Cartridges

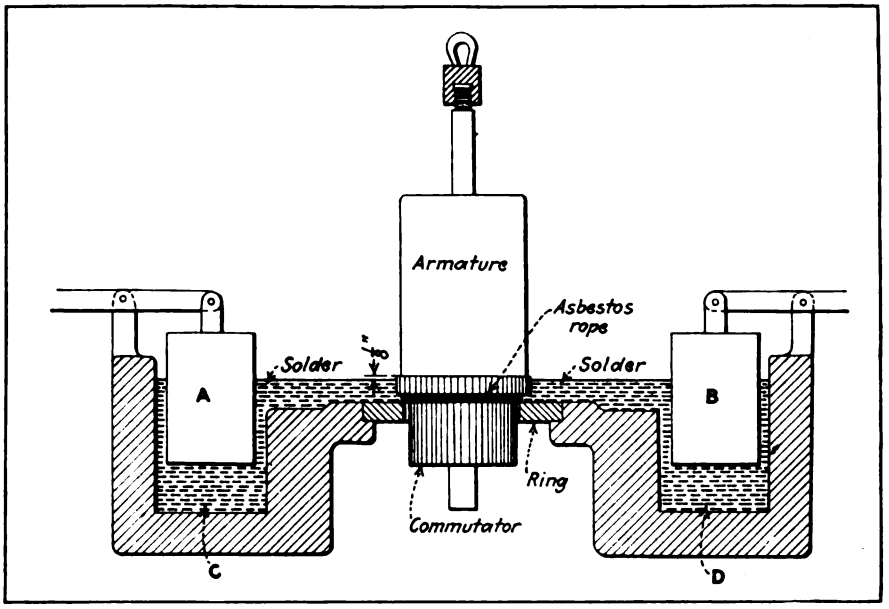
A CONVENIENT method of handling gear grease is that used in the shops of the Binghamton Railway. One pound of grease is made up into a roll about 2 in. in diameter and 8 in. long, by wrapping in a single thickness of newspaper. This paper wrapped cartridge is put right into the gears, paper and all, and it has proved to be a very handy method of applying the grease. The newspaper has no effect on the lubrication as it is ground up in the first few revolutions of the gears. No machine is used in the wrapping, which is done by an oiler during his leisure time. A supply of grease cartridges is kept on hand in the shop and their use has reduced the time spent in lubrication.

Soldering Railway Armature Coils to Commutator

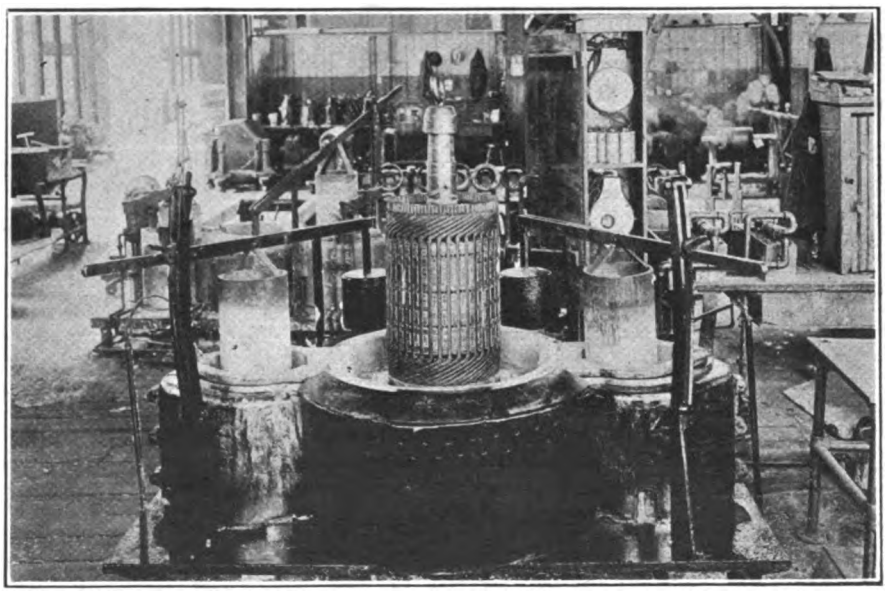
BY HARRY L. SIGNOR
Renewal Parts Engineering, Westinghouse Electric & Manufacturing Company

BEFORE armature coil leads are soldered in the commutator neck slots, dirt, oil, insulating material or paint must be removed from these parts, after which they should be tinned. A substitute for tinning, which gives very good results, is to brush the metal parts, after they have been thoroughly cleaned, with a liquid flux which is left to dry. This forms a thin coating over the cleaned surfaces. It is important in selecting a flux to see that it does not contain any acid that may get to the insulation of the coils and cause short-circuits and grounds. A good, cheap and safe flux can be made by dissolving 1½ lb. of rosin in a quart of ether or denatured alcohol.

The most common material used in soldering is the alloy known as "half and half," which is made of approximately half lead and half tin. This solder is reasonable in price, has a melting point of 180 deg. C., flows readily when heated with a hot iron, is not hard to work and takes a good hold on the metal to be soldered. Pure tin, with a melting point of 230 deg. C., can be used, but is more expensive than "half and half," requires more skill in handling be-



Section of Soldering Pot



Soldering Pot Used for End Connections to Commutator

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cause it flows very easily and rapidly, tends to spread beyond the surfaces to be soldered and is quite difficult to use on wire coils. When motor equipments are apt to be overworked and thus subjected to high temperatures and excessive speed, pure tin is used to solder the armature leads to the commutator necks and to solder the armature bands. When

Soldering Leads at the Side of the Commutator

tin is used as solder the clearance between adjacent parts should be as small as possible. For armatures operating under normal service conditions and not subjected to high temperature and unusual mechanical strains due to high speed, the "half-and-half" solder can be used with good results.

The types of soldering irons to be selected depends upon the method to be used in heating them. The most common type is one heated in a gas flame, and for ordinary work a 2-lb. or 3-lb. iron will give good results as it holds the heat a long time. Other types of iron have self-contained heaters, with a gas flame or an electric heating element.

On many properties the soldering of leads in the commutator neck is done from the top of the commutator. With this method there is a possibility of the solder working its way back of the commutator neck and short-circuiting adjacent leads, especially when pure tin solder is used.

An accompanying illustration shows a workman soldering leads at the side of the commutator, a method highly recommended. The armature should be raised about 6 in. at the pinion end so that excess solder will flow to the front end of the commutator neck, and thus reduce the possibility of short-circuiting the back of the neck.

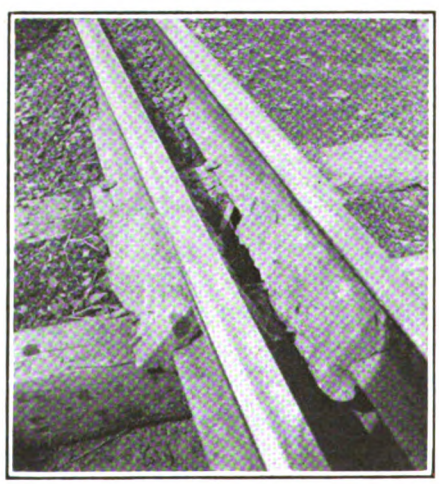
When a large number of commutators are to be treated, pot soldering is recommended. By this means all the armature leads are soldered in one operation, without the danger of any excess solder working back of the commutator neck. The commutator to be soldered should have two or three turns of asbestos rope of from $\frac{1}{8}$-in. to $\frac{1}{4}$-in. diameter wound around it close up under the neck. The commutator is then placed in the ring of the soldering pot as shown in the accompanying cross-section. Rings of different size correspond to different diameters of the commutators. The plungers *A* and *B* are forced down into the solder, causing it to rise to approximately $\frac{1}{8}$ in. from the top of the commutator neck.

After several minutes of contact the plungers *A* and *B* are raised, allowing the solder to recede back into the pots *C* and *D*. The armature can then be lifted from the ring, and the asbestos rope taken off. The armature should then be put into a lathe and the commutator neck and surface brushed or face machined.

Easy Method of Making Compromise Joints

THE accompanying illustration shows two compromise joints which have been in service for some time on the lines of the Lehigh Valley Transit Company, Allentown, Pa., and were made in a rapid and easy manner.

The two rail sections were placed end to end on the steel-foundry floor with a layer of sand underneath. The smaller section was blocked up



Compromise Joints Made by Pouring Molten Steel About Rails

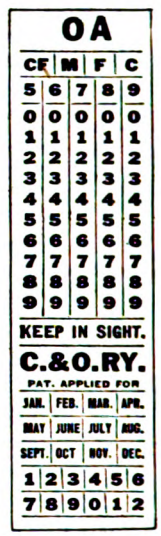
so as to bring the top into the desired location. A board was then placed on each side of the rail and molten steel poured in to make the desired joint. Holes were drilled through the web of the rail, so that the metal on the two sides is held together through these holes.

. The boards were located so that the steel when poured would not interfere with the top or gage line of the rail. The compromise joints illustrated have been in service for more than two years and are in perfect condition.

New Equipment Available

New Hat Check Saves Abuse

THE redemption department of a railway whose passenger receipts are $1,000,000 per month is said to redeem upward of 250 card tickets monthly. Card tickets usually are purchased within thirty minutes of the departure of the train. Probably all but a negligible number of these tickets are used, so that a very considerable portion of this $750 per month represented is paid in redemption vouchers for tickets on which service is rendered.



Zone Hat Check

If conductors were required to hat check all passengers in day coaches, these card tickets would be lifted, provided a form of hat check were used that could not be counterfeited, as can so easily be done with a blank form. The A. H. Pugh Printing Company, Cincinnati, Ohio, has placed on the market a zone hat check, one form of which is shown. Each check can be used to designate fifty different destinations, and by a change of the zone symbol at the top (OA in the illustration), any number of stations can be covered.

The following advantages are claimed:

1. Having the date punched, it cannot be used a second time, even though the conductor fails to lift it before the passenger leaves.

2. While perfectly simple to those holding the key, it is devised to appear quite complicated to those who might attempt to misuse it.

3. Even those who might obtain the key would be deterred by the expense necessary to counterfeit the hat check and duplicate the conductor's punch dies, besides incurring the penalties provided.

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The News of the Industry

Bondholders Agreeable

Seattle Investors Willing to Wait for the Return of Money Provided City Charges Fare that Will Pay

The City Council of Seattle has received a telegram from A. W. Leonard, president of the Puget Sound Power & Light Company, at present in Boston, expressing willingness on the part of the Old Colony Trust Company, trustee for the holders of the bonds of the Municipal Street Railway, to co-operate with the City Council and Mayor E. J. Brown "in any way consistent with sound principles," provided a fare is established by the city "which will return earnings adequate to cover the obligation of the present bonds."

Mr. Leonard said in part:

I am pleased to report willingness on the part of the trustee to co-operate with you in any way consistent with sound business principles.

I do find, however, a very strong reluctance on the part of the trustee to consider any suggestion whatever along the above lines until a rate of fare is established which will return earnings adequate to cover the obligations of the present bonds.

After such earnings are again established, showing the city's good faith, I believe it would be possible for you to secure favorable consideration along lines desired in the resolution, no intimation having been made before I left Seattle as to whether the city could suggest to the trustee that by his acceptance he would accomplish the desire expressed in the resolution.

I, of course, have been unable to make any definite statement to the trustee covering your ideas relative to reduced annual payments.

As a result of an interview with representatives of the trustee and others interested, I feel justified in suggesting the appointment of a committee representing the city to confer with the trustee in Boston and am sure such committee would be met in full spirit of co-operation in the desire, if possible, to reach some mutually satisfactory solution, as the situation will eventually resolve into the question of what proposition the city can legally make, and what the trustee can legally accept.

I would recommend that the committee include among others the Mayor, corporation counsel and superintendent of public utilities.

It will be recalled that the plea of the city was for the adoption of some practicable plan under which payment of the principal of the bonds might be extended over a longer period than was contemplated in the original purchase agreement.

The City Council has referred the message to the utilities committee. Presentation by the city of terms on which it would agree to refund the securities issued to purchase the municipal system is suggested as the first step in negotiations looking to that end. Every member of the City Council has gone on record in favor of opening negotiations with the holders of the street railway bonds for an extension of time and a resolution was unanimously passed proposing that negotiations be opened. One of the plans which may be suggested for paying the bonds will be the semi-annual payment of principal, instead of annual, as at present.

Mayor E. J. Brown states that it is doubtful if an increase in fares would be wise, even in view of the language of Mr. Leonard's telegram, which suggested that the city "show its good faith" by charging a sufficient rate of fare to meet the existing bonds and other charges.

The Mayor said:

If we can have a 4 per cent interest rate on bonds running for thirty years, it would make an ideal condition and would make it possible to retain the 5-cent fare.

The Council is now considering an ordinance which would increase the present 5-cent fare, under which the system has been losing $4,000 to $5,000 daily, to 10 cents cash, or 8½ cents token. Mayor Brown is strongly opposed to such an ordinance, and it is possible that he may veto the measure after it is passed by the Council. In that event the putting of the increase into effect would be delayed at least thirty days to permit the ordinance to be passed over his veto. A majority of the Council members favor the passage of the increased-fare ordinance immediately. They want this done before negotiations are opened with the bondholders.

Bus Service Proposed for Canton

A dispute has developed over the plan of the Northern Ohio Traction & Light Company to install bus service in Canton. The idea was to put the buses on two routes as provided for by a resolution passed by the Council. In good faith the company ordered six buses of the type used in Akron for operation on what is known as the Gibbs Avenue route and the Fulton Road route. The company is now awaiting the court decision as to whether or not the buses shall be placed in service. When the Mayor refused to grant the company a license to operate it applied to the court for a permanent injunction. The case was tried a few days ago and taken under advisement. The excuse offered by the Mayor in court for his refusal to license the buses was that the charter under which the Northern Ohio Traction & Light Company is operating did not permit it to run buses. The six buses ordered seat twenty-four passengers each and driver. They are being built by the G. C. Kuhlman Car Company, Cleveland, and cost approximately $8,500 each. They are painted orange and are identical with the Akron buses except that they are even more up to date. The bodies are mounted on White chassis.

East Liverpool Rides Again

Paving Assessment Removed and Seven-Cent Fare Allowed in Controversy with Employees

Railway service has been restored in East Liverpool, Ohio. A tie-up there of nearly a year was ended on April 16 when the City Council enacted an ordinance granting concessions to the Steubenville, East Liverpool & Beaver Valley Traction Company. The passage of the ordinance followed an agreement reached between the employees and traction officials. According to the agreement the company is granted a 7-cent city fare with a 1-cent transfer. The company is also granted a five-year exemption from street paving assessments.

The controversy in Steubenville and East Liverpool had its beginning early in 1922. It was then that C. A. Smith, general manager of the company, notified the employees that when the wage contract expired on May 1 the company would deal with the men as individuals and not with any representatives of any "so-called labor union." Overtures were made to the railway, but the officials remained firm, with the result that the men walked out. Operation on all the company's lines in Columbiana, Hancock and Beaver Counties was tied up on May 1 and service was suspended on all lines in Jefferson County on May 4.

Shortly after the walkout became effective conferences were called at Steubenville, East Liverpool and Wellsville and attended by citizens, public officials and representatives of the men, but no settlement was reached. Meetings were also held in the cities of Wellsville and East Liverpool, but no great progress was made toward arbitration. One of the reasons for inaction was that a suggested member of the proposed board of arbitration was a member of Division 285 of the Amalgamated. The city of Steubenville, however, enforced its ordinance compelling arbitration. The board of arbitration there consisted of one member selected by the employees, one by the company and the remaining three appointed by the Common Pleas Judge of Jefferson City. It met at Steubenville on May 24, but the attempt at arbitration failed.

Only once up to this time did the company try to operate its cars. This effort was made at East Liverpool on May 4, but it was followed by so much disorder that this incident terminated for the time being all efforts to restore service.

Whether the car riders in Steubenville were more anxious than riders

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elsewhere to have the railway operate or whether the attempts made in Steubenville toward a settlement were more constructive than those made elsewhere, at any rate on July 10, 1922, a conference was held which resulted in the resumption of service in Jefferson County. At this final meeting in Steubenville the company did deal with the union. The wage contract signed by the men represented a cut of 5 to 8 per cent.

Meanwhile conditions remained at a standstill in East Liverpool. In the fall of 1922 the company proposed an ordinance which provided for an increase in fares and the placing of the East Liverpool situation in the hands of the State Public Utilities Commission. On Nov. 7 voters of East Liverpool defeated the railway ordinance by a big majority. The company had hoped that the passage of the ordinance would be a step toward a solution of the matter, but the defeat of the measure practically brought the matter back to the status of affairs at the inception of the tie-up.

Later a councilmanic ordinance which provided also for a fare increase met the same fate as the railway ordinance. The vote at the special election on Feb. 27 of this year was in this case 2,227 for and 2,527 against passage. The ordinance voted on called for a 7-cent city fare, a 10-cent intercity fare and a 1-cent transfer. When traction officials learned the result of the election they declared that it appeared that the people of East Liverpool did not want electric railway service. Further, they said that the company would make no effort to operate until the people showed a desire for such operation. Meanwhile interurban cars of the company had been operating outside of the East Liverpool city limits, non-union men being in charge of them.

Although at the annual meeting of the company it was stated that the strike of the employees was not discussed, shortly thereafter came word that a settlement was near at hand. The end came on April 16 after a period of 350 days. General Manager Smith announced that service would be restored immediately, and within a day cars were in use on the entire division.

City Free to Renew Attempt to Take Over Railway

On the ground that the United States Circuit Court of Appeals had authority finally to pass on the case in its legal status, the United States Supreme Court on May 7 dismissed the appeal of William R. Begg and Arthur C. Hume, receivers of the Manhattan & Queens Traction Corporation, against the city of New York and others. Future proceedings, if taken by another remedy at law, may properly be considered by it, the Supreme Court held.

Receivers were appointed for the railway when the line was only partly completed. The receivers applied to the United States District Court for an injunction against the city, alleging that the city, through its Board of Estimate & Apportionment, was threatening to adopt a resolution declaring a forfeiture of franchise and of the completed part of the line because of the failure to complete within the prescribed time. The District Court granted a temporary injunction and after a hearing made the injunction permanent. The Circuit Court of Appeals reversed this decree and ordered the injunction dissolved, whereupon the receivers appealed to the Supreme Court.

The effect of the decision is to open the way to the city, if it so desires, to renew the steps taken by it to secure the forfeiture of the franchise of the company.

Home Rule Bill Fails

Hylan's Home Rule Measures Defeated —Uncompromising Attitude Responsible

Only the absolutely uncompromising attitude of the Democratic administration at Albany in respect to regulation of service and capitalization prevented the passage of a bill during the closing hours of the legislative session which adjourned on May 4 giving to the city of New York home rule over the transit situation. The Assembly defeated almost the entire administration program by a party vote.

Working night and day the Legislature before adjournment dumped more than 700 bills into the Executive Chamber.

Five important amendments to the public service commission law were passed, however, and are now in the hands of the Governor. These bills include:

The Walker bill (Senate Print No. 1,291) fixing the price of gas in New York City at $1 per 1,000 ft. and prescribing a standard of 650 B.t.u. per 100 cu.ft.

The O'Brien bill (Senate Print No. 1,837) amending section 65 public service commission law, prohibiting gas corporations from charging for service, equipment or apparatus.

The Ryan bill (Senate Print No. 2,247) amending subdivision 1, section 49, public service commission law, by providing that commission may fix maximum rate or charge for any common carrier, or street railroad, notwithstanding that a higher rate or charge has been heretofore authorized by general or special statute. Provision for temporary increase or decrease in rates is striken out. There are other changes.

The Knight bill (Senate Print No. 2,353) amending various sections of the public service commission law relative to verification and filing of annual reports of corporations engaged in public service operations.

The Kaufmann bill (Assembly Print No. 1,848) adding a new section 53-a to the public service commission law requiring electrification of railroads in New York City.

The Legislature also passed for the second time the Ferris amendment to section 7 of Article VII of the constitution, which authorizes the use of not to exceed 3 per cent of the lands of the forest preserve for the building of transmission lines and the erection of power and generating stations for electrical development of state-owned water powers. This is, perhaps, the most important measure passed by the Legislature in many years in relation to development of water power, as without such amendment to the constitution any development of St. Lawrence power could not be carried across the Adirondack preserve. The amendment will go to the people for ratification at the general election in November.

Extension of Menominee Franchise Is Sought

The Menominee & Marinette Light & Traction Company is seeking a renewal of its electric light and power, street railway and gas franchises in Menominee, Mich. The franchises have been drawn up by the franchise committee, but in their present form are not considered fair or practicable by the company.

The electric light and power franchise of the company expired on March 25, 1921, its gas franchise expired on Feb. 28, 1923, and its railway franchise expired on April 7, 1923.

J. P. Pulliam, vice-president and general manager of the company, said recently to the Council:

> It may be urged that the company is violating the law in occupying the streets, alleys and public places of this city without a franchise. No law is being violated by the company in so doing. Such occupancy is a matter of sufferance on the part of the city. At any time that the city feels like taking the full responsibility of saying to the company that it no longer wants it to furnish light, heat, power and street railway services and no longer to occupy the streets, you have the right to do so and the company will be compelled to obey. The law of the State of Michigan has clothed you with that power.
>
> The company feels that the franchise as a whole is unsatisfactory and unworkable and the company would be doing a gross injustice to itself if it were to accede to the terms of the franchise.

Another Erie Canal Contract Award

The second contract for the electrification of the old Erie Canal bed in Rochester, N. Y., was advertised to be let by the city Board of Contract on May 9. The project, which includes the installation of rapid transit interurban passenger and freight service on the site of the abandoned canal, has been described in various issues of the ELECTRIC RAILWAY JOURNAL. The second contract is for the work between Court Street and the Rochester & Eastern Railway crossing in Brighton. The City Engineering Department estimates the cost of this installation at $1,800,000. The initial contract for the first section of the line was awarded some time ago and the work is being pushed rapidly.

Pittsburgh Wage Negotiations Continue

The receivers of the Pittsburgh Railways and the wage committee of motormen and conductors met again on May 8, but reached no agreement as to the amount of the increase in pay to be granted. This was the first conference with Edward McMorrow, Chicago, general executive board member of the Amalgamated. Another meeting was set for May 10.

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Des Moines Men Seek 70-Cent Rate

Union employees of the Des Moines City Railway, Des Moines, Iowa, have asked the company to submit the question of an increase in wages to a board of arbitration. The agreement governing wages to be paid the men expired on March 1 of this year and the men demand a rate of 70 cents an hour. When Des Moines cars were put back in service in October, 1921, after a shutdown of seven weeks, the men accepted a cut in wages of 7 cents an hour. They now claim that in comparison with other wage scales they are not receiving proper compensation. The agreement between the company and the men provides that questions as to wage scales which cannot be settled otherwise will be submitted to a board of three arbiters, one representing each side and a third chosen by the two others. The men have named their business agent, Ben J. Wiley, as their representative, but no choice has yet been made by the company.

Erie Employees Receive Ten per Cent Increase

The threatened strike by the employees of the Buffalo & Lake Erie Traction Company, Erie, Pa., was recently averted by the amicable settlement of the wage controversy. The company granted a 10 per cent increase, which amounts to 5 cents an hour for the older men. The previous scale in cents per hour was 42, 46 and 50. This has been increased 10 per cent, with the operation of one-man cars paying 5 cents additional. The men had demanded a maximum of 65 cents for two-man cars and 75 cents for one-man cars.

New Jersey Men Seek 30 per Cent Advance

Wage demands which would increase the present pay of platform men, maintenance of way men, shop men and cleaners by 30 per cent have been prepared for presentation to the Public Service Railway, Newark, to become effective at the expiration of the present working agreement between the company and its employees which terminates on Aug. 1.

The wage demands are for the following increases:

First three months, 46 to 61 cents an hour.

Next nine months, 48 to 63 cents an hour.

Thereafter, 50 to 65 cents an hour.

Operators of one-man cars would be raised from 55 to 80 cents an hour.

The demands also include increases for men working as extras, pending the obtaining of a full-time job. These men now get a guarantee of $20 a week. The increase sought is $25, with the working day reduced from thirteen to twelve hours and with a full day's pay for those employed on runs of from six to nine hours.

Embodied in the demands will be a request of the men for one day off a week.

The agreement now in force was entered into by the company and the men on June 22, 1921, following a vote of the men to accept a wage cut of approximately 10 per cent from Aug. 1 of that year. The agreement was to run two years. The new scale meant a 5-cent an hour reduction in the salary of all platform men, their rate at the time being 51 cents an hour for the first three months of service, 53 cents for the next nine months and 55 cents an hour thereafter. Operators of one-man cars received 5 cents an hour extra.

Chicago Surface Men Demand 80-Cent Rate

Negotiations have been opened between Division 241, employees of the Chicago Surface Lines, and Henry A. Blair, president of the company, on demands formulated by the division at a regular meeting held on May 7. The new demands were presented to Mr. Blair on May 10, and negotiations were started immediately. Meetings will be held daily if necessary until an agreement is reached.

Under the new demands the maximum hourly pay would be increased from 70 cents to 80 cents. In addition to the wage increase the men voted to demand one day off duty in every seven and to require the company to discard all one-man cars, which are being placed on outlying lines in increasing numbers by the company.

No strike ballot has been polled, and it is unlikely one will be taken unless negotiations fail.

Although the "L" has received notice from Division 308 regarding the expiration of the present contract, no new demands have been received by that company from the men. Whatever action is taken by the surface men is likely to be followed by the "L" men.

Wage Arbitration in Prospect in Grand Rapids

The employees of the Grand Rapids Railway, Grand Rapids, Mich., are seeking an increase in wages to 60 cents, with 65 cents for operators of one-man cars. The company feels that this is unreasonable. Arbitration appears to be ahead as the only way out. The offer of the company to the men was 48 cents an hour for the first three months served, which is recognized as the apprentice period, and 50 cents an hour thereafter with 55 cents an hour for safety car operators. This scale, the company has explained, was arrived at after a thorough analysis of its financial condition and ability to pay without being compelled to increase the present rate of fare.

L. J. DeLamater, vice-president and general manager of the company, said recently:

> Inasmuch as the majority of our cars will be operated by employees who will receive the 55 cents an hour rate we feel and know that we have offered the very limit without punishing the car riders of the city and under the existing conditions we can only ask, if necessary, for an arbitration of the matter, which we will doubtless do, as provided for in Section 32 of the franchise we are operating under, this being the section that in large part was drafted by the union leaders. Under the existing conditions I am sure our position must be acknowledged as at least fair, if not more than fair.

Three-Day Strike in Lawrence

The strike of the employees of the Eastern Massachusetts Street Railway at Lawrence was settled shortly after 10 p.m. on May 8 when the men voted to return to work in the morning, pending arbitration of the questions in dispute.

The strikers had asked for an increase in wages amounting to 35 per cent, for an eight-hour day instead of a nine-hour day as at present, and the application of the seniority rule to all employees. The road has agreed to arbitrate all these demands, except the application of the seniority rule to the miscellaneous men, and the strikers have accepted this agreement.

The settlement was reached as a result of the mediation of W. H. Mahon, national president of the Amalgamated. The 150 men who went on strike had been declared outlaws by John F. Reardon, local Amalgamated committee man for Massachusetts.

One of the new clauses provides that in case the company decides to operate buses, the same working conditions and agreements will apply to the men on the buses as on the street cars.

Five-Cent Increase for Akron Men

Platform men of the Northern Ohio Traction & Light Company, Akron, Ohio, voted on May 7 to accept an increase of 5 cents an hour. The vote followed an offer of the company, and there was very little objection to accepting. The wage increase makes the new wage scale for trainmen on this system:

City: First year, 48 cents; second year, 50 cents; third year and thereafter 53 cents.

Suburban: First year, 49 cents; second year, 51 cents; third year and thereafter 54 cents.

Interurban: First year, 53 cents; second year, 55 cents; third year and thereafter, 58 cents.

The contract was signed on May 8. It dates from May 1, however.

Fresno Men Receive Increase of Two Cents an Hour

Trainmen of the Fresno Traction Company, Fresno, Calif., received a pay increase of 2 cents an hour effective April 16. The new scale is as follows: First year men, 49 cents an hour; second year men, 50 cents; third year men, 51 cents, and fourth year men, 53 cents an hour. Men operating one-man cars will receive 4 cents an hour in addition to the above scale. The average working day is 9½ hours.

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Mayor Against Michigan Measure Defining Joint Operating Rights

The so-called Lee bill was introduced recently into the Michigan State Legislature by Representative Lee. The purpose of the bill is to give the State Public Utilities Commission power to order electric railways to connect their tracks physically for joint use and to confer upon the commission the power to determine the rental to be charged each of two railways for the right to operate over the tracks of the other.

The Mayor of Detroit and Corporation Counsel Wilcox say the bill is the first step in a movement to take away from the city of Detroit the right to control its streets with respect to the operation of the cars of the municipal railway system as provided by the state home rule act.

Mayor Doremus regards the measure as endangering the work of the board of arbitration recently appointed by the Detroit United Railway and the city of Detroit to fix the rentals that the city shall charge the Detroit United Railway for the privilege of operating interurban cars into the city of Detroit over the lines of the municipal railway. This board is reported as practically ready to render its decision.

It is argued in favor of the bill that if Detroit bars the D.U.R. interurban cars from entering the city, the people of Port Huron and other Michigan cities traveling to Detroit by interurban would have to transfer to city cars at the Detroit city limits.

The opposition to the bill points out, on the other hand, that the question of barring the D.U.R. interurbans from the streets of Detroit was voted down by a large majority when the question was recently submitted to a referendum of the people of Detroit.

Canal Abandonment Plans Advance Another Step

The long talked-of scheme of using the bed of the old Morris Canal for a high-speed electric railway line connecting Newark, N. J. and suburban communities, was advanced another step recently when Governor Silzer named five men to the committee which will study the problem.

The men selected by the Governor are C. C. Vermeule, who was for many years topographical and consulting engineer for the State Geological Survey; E. D. Duffield, president of the Prudential Insurance Company; S. P. Leeds of Atlantic City; A. W. Drake of the American Telephone & Telegraph Company, and W. O. Morgan. The latter is well known in the electric railway industry, having been in turn connected with the Greensboro (N. C.) Electric Company, the Sheboygan (Wis.) Railway & Electric Company, the Empire United Railways of Syracuse, N. Y., and the Buffalo, Lockport & Rochester Railway. Other members of the committee are to be selected by various municipalities through which the canal passes.

No definite plans have yet been agreed upon for the use of the canal as an electric line. In a statement made a few days ago T. N. McCarter, president of Public Service Railway, said that his company would be interested in using a portion of the old waterway for rapid transit purposes. The part that would be so used, however, is comparatively short and would have more the character of a subway in the city of Newark than an interurban line.

At the same time the plan to change the location of the Hudson & Manhattan Railroad station in Newark has again been brought forward. It is proposed to extend the railroad underground to a point opposite the Public Service Terminal and establish a direct connection with the lower level of that structure. Many of the passengers desiring to change from the tube trains to street cars would then transfer without going out of doors. The plan now talked of is essentially the same one that was proposed some years ago, but abandoned on account of the war.

London Underground Officials Visit United States

J. C. Mitchell, secretary and treasurer of the London Underground System; A. Rozier, superintendent of rolling stock of the London General Omnibus Company; E. Boys, secretary of the London Suburban Traction Company, and Ivor Fraser, publicity manager of the London Underground System, are on a visit to the United States. They arrived on May 4 on the *Mauretania* and expect to return on the *Aquitania* on June 12.

They plan to study railway problems and transportation by bus, and started on May 9 on a tour of cities in the East and the Middle West which will include in the order named Albany, Montreal, Toronto, Buffalo, Cleveland, Detroit, Chicago, St. Louis, Cincinnati, Pittsburgh, Washington, Baltimore and Philadelphia. They expect to return to New York about May 30 and will then spend a week studying conditions in and around New York.

It is under Mr. Fraser's direction that the excellent work in bettering public relations in London has been done for the so-called Underground group, reference to which has been made many times in the ELECTRIC RAILWAY JOURNAL. This work, it will be recalled, has included the advertising of the lines, one of the most important features of which has been the use of posters reproduced from time to time in these pages. Mr. Fraser's principal object is to learn all that he can in the short time at his disposal about the relations of the railways with the public. He has expressed very keen interest in the work of the State committees on public utility information. The other gentlemen in the party will concentrate on the particular phases of railway work in which they specialize. In speaking of bus operation in London Mr. Fraser said that the remarkable fact was that there seemed to be no limit to the bus patronage. No sooner were additional buses installed than their capacity was almost immediately exceeded. He said there appeared to be no saturation point in sight. On his program is included a stop over at Atlantic City to attend the sessions at the convention of the Associated Advertising Clubs of the World.

News Notes

Ten-Cent Increase for Cedar Rapids Men.—Effective May 1, a wage increase of 10 cents an hour was granted to all employees of the Cedar Rapids & Marion City Railway, Cedar Rapids, Iowa. This makes the maximum for men with six months service 50 cents an hour. The increase affects all employees in Cedar Rapids, Marion and Kenwood Park.

Serious Accident on Cuban Road.—Twenty-five persons are reported to have been killed and more than fifty injured in a head-on collision on May 6, between Hershey Electric Railway trains near Camasi, Province of Matanzas. The trains were rounding a curve at high speed when they crashed. Fire started immediately in the wreckage and a number of the victims were burned to death in the blazing coaches.

Tacoma Sued on Account of Municipal Railway.—The United States government has filed suit in the Federal Court at Tacoma, Wash., against the city of Tacoma for $232,398, alleged to be due the United States Shipping Board for extensions and improvements on the Municipal Street Railway during the war. The suit, which is a bill in equity, follows a demand of Mayor A. V. Fawcett that the government either cancel the debt or determine its status in court.

Wage Advance in Sioux City.—Employees of the Sioux City Gas & Electric Company, Sioux City, Iowa, have accepted the proposal of the company for an increase of approximately 7 per cent in wages. The new scale went into effect on May 1. Under the new agreement first-year men receive 45 cents an hour, second-year men 47 cents an hour and third-year men and over 50 cents. This is an increase from the present scale of 42, 44 and 48 cents an hour. The men demanded a 20 per cent increase.

Bill Ousting Commission Killed.—Senate Bill No. 23, introduced by Senator Bender of Cleveland in the General Assembly, calling for the abolition of the State Public Utilities Commission, was, on Mr. Bender's own motion, killed in the Senate utilities committee recently. Not an individual in the entire state of Ohio came to support the bill, while investment bankers, chambers of commerce and other organizations of business men flooded the committee with their protests against it. Consequently Mr. Bender made a motion to postpone the bill indefinitely.

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Financial and Corporate

$316,423,557 P. R. T. Value

Figures Revised as of May 1, 1923, Were Submitted to Commission at Hearing on May 4

Valuation proceedings were conducted on May 4 before Commissioner Clement of the Pennsylvania Board. E. D. Booker, of Philadelphia Rapid Transit counsel, conducted the cross-examination of W. K. Myers, vice-president in charge of finance, and A. E. Hibner, valuation engineer.

The company at the same time submitted to the Public Service Commission a new figure on the valuation of its property, bringing the June 30, 1919, valuation up to date in restating that valuation as of May 1, 1923, at $316,423,557.

The company's valuation engineer, A. E. Hibner, testified that he made an investigation of the trend of prices since the June 30, 1919, valuation, and obtained a reproduction cost of the P. R. T. property as of May 1, 1923, including all overheads of $316,423,557.

Mr. Hibner explained the difference between the trend of prices shown by the company's price curve and that prepared by the city's expert, Robert M. Feustel. According to Mr. Hibner, Mr. Feustel's trend is composed largely of the all-commodities index prepared by the U. S. Bureau of Labor, and consequently reflects the abnormally low prices that have prevailed in the last three years for farm products. He explained that the prices of manufactured products such as power plant and substation equipment and cars are not reflected in the all-commodities index. He testified that there were other inaccuracies in the figures of the city's expert, among which was the price of structural steel erected for the first quarter of 1922, which Mr. Feustel based upon a price of $55 per ton. The company's expert explained that this was the price prevailing prior to the war and that he obtained a price of $70 per ton from the books of a large local structural steel fabricator.

The company's valuation engineer also considered as inaccurate the city's trend figure of 52 per cent for lumber, as the price quoted by the Lumbermen's Service Bureau of Philadelphia for the first quarter of 1922 showed that the average price of four sizes of yellow pine lumber was 77 per cent as at June 30, 1919.

The low price used for structural steel erected and for lumber, together with the low rate given to labor, resulted in the city's trend of the cost on buildings being low.

A reappraisal of the company's land by J. A. Patterson, William Levis and Edwin C. Hunter, the company's real estate experts, showed the right-of-way to have a value at May 1, 1923, of $2,326,334 compared with the June 30, 1919, appraisal of $2,021,242, and other land used in electric railway service to have a value of $8,371,458 compared with the June 30, 1919, appraisal of $6,179,074.

On the same day the railway submitted to the commission through its vice-president of finance, W. K. Myers, its budget of estimated financial results from operation for the year 1923 compared with 1922 actual.

The passenger revenue for 1923 is estimated at $44,000,000 as compared with $41,759,000 actual for 1922. This is an increase of 5.37 per cent.

Mr. Myers stated that the estimate of passenger revenue is based on a careful study of statistics relating to the normal annual increase in passengers during the last twenty years, and the general economic condition in the latter part of 1922, as compared with the beginning of the year.

The renewal and depreciation reserve appropriation is stated at $8,560,400. The same sum was appropriated for the years 1921 and 1922. The estimated expenditures for the renewal and depreciation reserve is stated at $8,835,500. The balance in the renewal and depreciation reserve as of Dec. 31, 1922, was $4,737,993; the estimated balance in the reserve at Dec. 31, 1923, is stated at $4,462,893.

In explaining the estimated cost of extensions and betterments for the year 1923, Mr. Myers stated that he only included such construction as the company felt sure would be completed during the year. No estimate was included for the major portion of the crosstown lines, the proposed bus line on Roosevelt Boulevard and Broad Street, the trackless trolley on Oregon Avenue or the Southern carhouse.

Mr. Myers said: "While the company hopes to get started on all of these improvements during the year 1923, we as yet have no definite assurance that we can do so, and for that reason I have not included their estimated costs in this tabulation."

$109,468 Surplus for Toronto

Transportation Commission Makes Public Results of First Sixteen Months of Municipal Operation

H. H. COUZENS, general manager of the Toronto Transportation Commission, on April 17 sent to the board of control and the City Council of Toronto, Ont., a statement of the accounts showing the result of the first sixteen months of the commission's operation of the lines formerly embraced in the system of the Toronto Railway. The period covered is from Sept. 1, 1921, to Dec. 31, 1922. The statement is not intended to be a railway operating report, but was prepared in order to reply to points raised by the City Council.

The gross revenue for the sixteen months of operation amounted to $15,723,482. The expenses of operation, including the cost of electrical energy, totaled $10,968,614, leaving net income of $4,754,867. Interest on and redemption of debt, together with depreciation, absorbed $3,493,610. Reserves for unredeemed tickets, workmen's compensation and public liability were $575,000. Reserves for contingencies were $437,569. Organization expenses were $139,218. Thus there was left a surplus of $109,468 for the period under review.

Passengers Carried and Fares

During the period under review 249,015,476 passengers were carried. The average rate of fare (based on the tickets sold and cash fares), equalled 6.165 cents. Traffic was adversely affected until the fall of 1922 by the rehabilitation work under way, and the consequent disorganization of the service. Since then, however, there has been a marked increased in the number of revenue passengers carried. This is shown by the following figures for the four months ended Dec. 31, 1921, and 1922:

1921	1922	Increase (1922 over 1921)
61,870,213	65,447,506	3,577,293

Mr. Couzens says that this improvement has been maintained to date.

An analysis of the component items of the cost, expressed as fractions of the average fare, is as follows:

	Per Passenger, Cents	Per Cent
Maintenance of trackwork including overhead and buildings	0.290	= 4.62
Maintenance of equipment	0.628	= 10.01
Cost of power	0.602	= 9.61
Conducting transportation (i.e., the expenses of operating the cars) excluding maintenance	2.499	= 39.85
General and miscellaneous expenses	0.386	= 6.15
Interest on and redemption of capital and depreciation	1.403	= 22.38
Reserves	0.406	= 6.49
Organization expenses	0.056	= .89
Total	6.270	= 100

The difference between the total cost of 6.27 cents and the average fare paid per revenue passenger, 6.165 cents, represents the sundry revenue from sources other than those obtained from passengers.

Mr. Couzens explains that before the work of rehabilitation was commenced, it was estimated that at least three years would be required to rehabilitate the property and bring the service to

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TORONTO TRANSPORTATION COMMISSION REVENUE ACCOUNT FOR THE SIXTEEN MONTHS ENDED DEC. 31, 1922.

SECTION I—SHOWING NET INCOME FROM OPERATIONS

EXPENDITURE

Cost of electric current including operation and maintenance of substations	$1,499,606
Expenses of operation, maintenance, repairs, administration and taxes, including accrued charges	9,469,009
Net income available for fixed charges, carried to Section II	4,754,867
	$15,723,482

SECTION II—SHOWING DISPOSITION OF NET INCOME

Interest	$2,588,181	
Less: Interest on idle funds	532,506	
		$2,055,676
Redemption of debenture debt (repayment of capital)		425,108
Depreciation		1,012,828
Organization expenses		139,218
Reserve for unredeemed tickets		175,000
Reserve for workmen's compensation and public liability		400,000
Reserve for contingencies		437,569
Net income carried to surplus account		109,468
		$4,754,867

standard, but that while little more than one-half of this period has gone, the progress made has been such that, provided no unforeseen circumstances arise, the work will probably be substantially completed this year.

The principal work done to the end of the year 1922 includes the following:

TRACKWORK

Extensions	40 miles
Total rehabilitation	49 miles
Repaired and welded	31 miles

NEW ROLLING STOCK

The following were delivered as at the end of 1922:

Cars	262
Buses (gasoline)	eight double deck three single deck
Trolley buses	four single deck

It is explained that the gasoline and trolley bus services were started partly as an experiment in order to see what the result would be under climatic conditions peculiar to Toronto and in order to give service in districts which could not be properly served by street cars at present. According to Mr. Couzens the results have justified expectations, and "while not in our opinion the most economical and suitable for mass transportation purposes, buses will, we are confident, fill a useful place in the general plan of transportation."

One complete carhouse and yard at Eglington, two large extensions of carhouses and yards, one at St. Clair and the other at Danforth, and one yard extension at Russell have all been constructed.

Mr. Couzens says that pending the conclusion of the hearing of the appeal against the decision of the majority of the arbitrators in the Toronto Railway purchase case it is perhaps not desirable to go into details of the award, but that the amount of the award is very greatly in excess of the value of the assets transferred to the commission for incorporation in the unified system.

In discussing the question of fares Mr. Couzens says that the figures show that the results do not justify a fare reduction. On this point he says in part:

As has been pointed out, the average fare on the system is 6.165 cents per passenger. When considering the question of fares and comparing them with those previously in force, the following obvious facts are often overlooked:

1. The area served by the commission with one fare is practically 35 square miles as against 17 in the case of the Toronto Railway, i.e., more than double the area.

2. Prior to the date when the service was unified, there were four systems operating in the city (each with a separate fare) as follows: Toronto Railway; Toronto & York Radials, three separate divisions, each charging a separate fare; Toronto Civic Railway, four divisions, each charging a separate fare; Toronto Suburban Railway.

Thus a passenger, other than those riding in the central section of the city, was required to pay more than one fare, with the additional inconvenience of transferring from one system to another.

In the case of all of the foregoing, excepting the Toronto Suburban, service is now given at a single fare over the whole of these lines as well as over the extensions laid by the commission. In the case of the Toronto Suburban Railway, however, service in most of the area is given, to a great extent by the commission's buses in West Toronto, and in most of the remaining area by street car lines operated by the commission.

It is, therefore, clear that many passengers today are carried at practically the same rate of fare as formerly, and have a service already substantially improved which will be still further improved when rehabilitation is completed and the new system operating at maximum efficiency.

With a universal fare every extension added to the system increases the cost without a corresponding increase in the revenue, as it means carrying the passengers a greater distance for the same fare. The extensions made were necessary, however, in order to give the service to which car users were already entitled.

An analysis of fares in 607 cities on this continent shows that fares range from 5 to 10 cents. Of this total more than 40 per cent are higher than in Toronto at present, and more than 30 per cent are the same as in Toronto. It will, therefore, be seen that more than 70 per cent of all these cities are paying as high or a higher rate than Toronto, yet in all cases they have the advantage of systems constructed in pre-war days, the majority having the benefit of the much lower cost of materials which obtain at any time in the United States, and at the same time the vast majority paying lower wages than in Toronto.

In some cases with systems constructed at low pre-war prices and paying lower wages, the 5-cent fare is in force. In Toronto, with a large arbitration award, a rebuilding program which had of necessity to be carried out at times when prices are high, a system that cannot be efficiently and economically operated until rehabilitation is completed, it is obvious that a higher fare is necessary.

As a direct illustration Mr. Couzens points to the case of the Montreal Tramways. He says that here is a long-established and well-organized enterprise, operated efficiently, but that the fare is the same as in Toronto, while the trainman's rate of wage in Toronto is 25 per cent higher than in Montreal, and in other grades the difference is even more marked.

In considering these accounts, Mr. Couzens says it must be borne in mind that the figures are of necessity in some particulars approximate only, due to the following:

1. Provision has been made for the amount of the award as issued by the majority of the arbitration board which was formed to determine the price to be paid by the city for the property of the Toronto Railway. There is also included interest on the amount of the award as from Sept. 1, 1921. The city has lodged an appeal, the final outcome of which has not been determined.

2. The figures included in the cost of electrical energy are tentative, as the accounts are subject to review based on the cost of power supplied by the Hydro-Electric Power Commission of Ontario through the Toronto-Niagara Power Company and the Toronto Hydro-Electric System.

3. The figures are not yet available covering the operation of the city section of the Metropolitan Division of the Toronto & York Radials from the date on which the "Clean-up Deal" became effective, to the time when the T. T. C. commenced to operate from Farnham Avenue to the North City limits on Yonge Street.

The provision for depreciation cannot be finally determined pending the settlement of the appeal in connection with the arbitrators' award. After the amount of the award is finally settled, the same must be divided into sub-totals covering the various groups of assets which have different years of useful life.

There are other items yet to be adjusted which are correlated and cannot yet be finally determined.

With respect to these matters Mr. Couzens says that in the interest of sound finance adequate provision has been made in the accounts to cover all reasonable contingencies in respect to the matters still subject to possible adjustment.

Injunction Invoked in St. John

The New Brunswick Power Company is seeking an injunction against the building of a competitive power distribution system in St. John. According to the *Financial Post*, Toronto, E. N. Sanderson has presented a new offer to the City Council to sell the common stock of the company to the city for $305,000. This offer was summarily refused.

Despite the fact that two of the city commissioners admit the building of a duplicate system is unwise, preparations for the construction of the system have been resumed. The Mayor says he has a mandate from the people to go through with the construction of the duplicate power distribution system.

Mr. Sanderson, who is president of the Federal Light & Traction Company, has offered to distribute the hydro-electric current from the Musquash provincial station for two years at stipulated rates. This offer, like over a dozen others, has been rejected.

Oakland Terminal Lines to Be Sold

On application of the Mercantile Trust Company and the Union Trust Company, San Francisco, Calif., Judge James G. Quinn at Oakland has entered a decree of foreclosure against the San Francisco-Oakland Terminal Railways and has appointed Joseph P. Lanktree, 500 Broadway, Oakland, commissioner to conduct the sale of the properties. The trust companies were acting in behalf of the holders of securities of the company on which interest has been in default since 1919. It is expected that the properties will be bought in by the representatives of the committee of the bondholders.

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Critical Period Ahead

San Francisco Non-Partisan Citizens' Agency Concerned for Future Municipal Railway

In the analysis of the finances of the San Francisco Municipal Railway, the San Francisco bureau of governmental research in its monthly publication, the *City*, said in the January, 1922, issue that "the critical period in Municipal Railway affairs is to come, with the supervisors contemplating, and committed in part to, a $1,600,000 expenditure program out of the depreciation fund, which will leave nothing for depreciation purposes."

$2,115,000 OF WORK ORDERED

Since that time various extensions and construction work, as well as bus lines, have been recommended, and the supervisors have ordered work requiring an expenditure of at least $2,115,000.

An analysis published in the February, 1923, issue of the *City* contains the following:

The capital expenditures involved in the extensions the supervisors have embarked upon, including equipment, total $1,165,000. An additional $200,000 is required immediately, according to the city engineer, for an addition to the Potrero barn, and for the city's share of track repairs on lower Market Street. Further, the city engineer states that an additional $750,000 must be provided for a shop and barn, including land for same, if the Sunset and Ocean View extensions are built and operated.

The total unencumbered balance in the depreciation fund to cover these proposed expenditures, which total $2,115,000, is $1,105,000. Although the gross set aside in the depreciation fund is averaging $45,000 per month, or $540,000 per year, the future net accumulation to the fund will probably not exceed $290,000 per year. Taking account of the $1,000,000 minimum depreciation reserve recommended by the city engineer, the program embarked upon by the board is approximately $2,009,000 in excess of the present available depreciation fund balance.

In the opinion of the bureau the depreciation reserve is being erroneously considered, first, as a gross amount set aside instead of the net amount actually available, and, second, as a surplus fund available for expenditures for any desirable project. The depreciation fund is not a surplus fund, and was purposely set apart from surplus funds to avoid this very confusion. The surpluses from operations, which have totaled over $2,900,000 for the period 1913-1922 inclusive, have practically all been expended, approximately $1,560,000 of such expenditures being for additions and betterments and advances to the city's general fund on account of Twin Peaks and Stockton Street tunnel costs.

A proper charge to cover depreciation is in exactly the same category as any operating charge. Expenditures required for depreciation, however, are cumulative and deferred; the replacement and renewals to offset depreciation and obsolescence are not required until original units of plant or equipment reach the end of their economical service. When such time comes the burden of replacement or renewal is usually too great to be borne out of the then current operating revenues of the property; if the funds have not been set aside as the depreciation has accrued, it may be difficult and costly, or even impossible, to provide such funds.

Following publication of the annual report of the Municipal Railway for the year ended June 30, 1922 (abstracted in ELECTRIC RAILWAY JOURNAL, March 3, 1923, page 384) the *City* contained further reference to the subject of depreciation:

The depreciation reserve is also of interest, from the standpoint of continued financial integrity of the system. The $1,603,000 reserve as of June 30 was probably no larger than actually required for accrued depreciation of the property. As shown by the income account, a gross of $3,463,774 (18 per cent of gross revenues) has been set up in the depreciation reserve since the start of operations in 1912. The disposition of this amount is not shown in the printed financial statement, but it is estimated, using approximations, that $1,100,000 has been used for bond redemption, $250,000 for accident claims, $450,000 for wage increases and $210,000, net, for additions, betterments, advances, etc. The June 30 balance has been reduced, as of Jan. 31, to less than $1,150,000; the next balance sheet will record an important shrinkage in this item.

The statements show that all surpluses of the earlier profitable years have been expended, and that part of the depreciation reserve has been diverted to operating and additions. The universal policy of retaining part of surplus as "insurance" against future emergencies and losing years has not been followed. On the other hand, with the surpluses expended, there is a continually strong pressure to disburse the balances remaining in the depreciation reserve for additional extensions.

First Surplus Since Service-at-Cost Became Effective

The growth of population and general business development are reflected in the annual report of the Memphis (Tenn.) Street Railway for 1922, just turned over to Commissioner Horace Johnson by T. H. Tutwiler, receiver. For the first time since the company has been operating on its cost-of-service plan, approved by the Public Utilities Commission, its report shows a surplus for the past year above cost of operation and the 6½ per cent allowed the stockholders on their investment. The surplus amounted to $63,675 and cut the deficit of $200,771, piled up prior to January, 1922, to $137,096.

The entire revenue of the company from all sources amounted to $3,153,195. The cost of service during this time was $3,098,519. This included the expenditures for maintenance, operation, taxes, renewal and reserve fund, a return of $786,707 to the stockholders and $12,751 interest on the deficit. There were 44,481,903 passengers on all cars of the company during the past year, and a total of 7,618,914 car-miles were traversed.

Auction Sales in New York.—At the public auction rooms in New York on May 9 the following electric railway securities were sold: 202 shares Nova Scotia Tramways & Power Company, Ltd., ordinary shares, $15 per share; $5,000 Cleveland, Elyria & Western Railway extended 7 per cent certificates, 64⅜ per cent.

Another Brooklyn City Dividend.—The board of directors of the Brooklyn City Railroad on May 8 declared a regular quarterly dividend of 20 cents a share on the outstanding capital stock, payable on June 1, to stockholders of record at the close of business on May 19, 1923.

Road Sold to Representative of First Mortgage Bondholders.—The property of the Montgomery Transit Company has been sold to Nicholas Larzelere, Norristown, Pa., attorney for the bondholders, for $150,000, the amount of the first bond issue, of which the Norristown Trust Company is trustee. The sale was decreed on foreclosure proceedings. The line reaches Norristown by agreement with the Reading Traction Company, Reading, Pa. The road is about 12 miles long.

Debenture Bonds Offered.—Stroud & Company, Inc., Otis & Company, Howe, Snow & Bertles, Inc., and R. E. Wilsey & Company are offering a new issue of $1,500,000 Tide Water Power Company, Wilmington, N. C., fifteen-year 7 per cent sinking fund gold debenture bonds due Oct. 1, 1937, at 97 and interest to yield over 7.30 per cent. The bonds are redeemable as a whole or in part at the option of the company on six weeks' notice up to and including Oct. 1, 1927, at 110 and accrued interest, the redemption price decreasing 1 per cent for each year thereafter. Earnings available for interest charges on the debenture bonds for the year ended June 30, 1922, were equal to over 3.8 times the annual requirements.

Receivership Said to Be Ahead of Interurban.—A receivership is threatened for the Oregon Electric Railway, operating into the heart of the Willamette Valley from Portland, Ore., because of the apparent inability of the company to meet the interest due on $2,000,000 of bonds. The company has sixty days grace, but no promise of payment has been made. W. E. Turner, president, states that the company is unable to pay the interest because of the unsatisfactory financial condition of the road. The interest is a semi-annual payment of $50,000. The plight of the road is directly traceable, it is claimed, to the competition of buses and automobile trucks and to the privately owned automobiles in use on the main-traveled highways of the county. The company recently placed in effect reduced fares, making the round-trip tickets from Portland to Salem 50 cents lower than heretofore. Even this reduction has failed materially to stimulate traffic.

Little Rock Bonds on 6.45 Per Cent Basis.—Harris, Forbes & Company, Bonbright & Company and Tucker, Anthony & Company, New York, N. Y., are offering at 94½ and interest, yielding about 6.45 per cent, $2,500,000 of Arkansas Central Power Company first lien and refunding mortgage gold bonds, due 1948. Issuance of the securities is subject to authorization by the Arkansas Railroad Commission. As stated in the ELECTRIC RAILWAY JOURNAL for May 5 the Arkansas Central Power Company, incorporated in April, 1923, has taken over the physical property formerly owned by Little Rock Railway & Electric Company, and now does the entire commercial electric power and light and street railway business in Little Rock, Ark., also providing all electricity commercially distributed, directly and indirectly, in North Little Rock. The bankers explain that the railway system has for many years produced substantial profits, but that the electric power and light business is steadily increasing, the relative importance of the latter being shown by the fact that more than two-thirds of the net earnings for the twelve months ended Feb. 28, 1923, were derived from the sale of electricity.

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Traffic and Transportation

Sorry Situation in Youngstown

Street Railway Commissioner So Describes Failure of Public to Respond to New Fare Plan

Harry Engle, street railway commissioner at Youngstown, Ohio, is visibly disappointed at the way things have been going in Youngstown since the sale of the weekly pass was discontinued. The change in fares has not had the stimulating effect on traffic which Mr. Engle anticipated. He wants the public to have the facts so that "they will not be surprised when it shortly becomes necessary to inaugurate a higher rate of fare."

It will be recalled that the sale of the weekly pass good over the lines of the Youngstown Municipal Railway was discontinued on April 1. The new rate of fare adopted for a trial period was 7 cents cash, three tickets for 20 cents, and 1 cent for a transfer. The rate previously in effect was 9 cents cash, six tickets for 50 cents, 1 cent for a transfer and an unlimited ride weekly pass for $1.25.

According to Mr. Engle's estimate the operation of the line in April will show a net deficit of $28,000. He sees an 8-cent fare ahead. Mr. Engle's lament at the way things are going is, perhaps, best expressed in his own words. In a letter to the Council on May 2 he said:

> You will recall that the present fare scheme was adopted on the basis of an eight weeks' trial. Without figuring too closely I have rather assumed that it was a two months' trial, involving the months of April and May. You will further recall that the resolution adopting the present fare scheme provided that if it were not successful, the company at the end of the trial period should have the right to adopt a new rate of fare, to wit: seven tickets for 50 cents, 8 cents cash and 1 cent for a transfer.
>
> Detailed figures for the operation during April will not be available for many days, but it is now possible to make an estimate of the situation which will be quite accurate. My estimate of the gross earnings for the month of April is $129,000. My estimate of the total car-miles operated for the month is 392,760, and on the basis of an operating cost of 40 cents a mile, it is reasonable to assume that the total cost of the operation of the property for the month of April will be about $157,100. It thus appears that the operation of the cars during April will show a net deficit of about $28,000.
>
> I am very sorry that people generally have not more thoroughly appreciated the reduction of car fare which was provided for them. We all know that the new rate of fare was a reduction and that the application of this fare would have a tendency to decrease our income, but I also know that we all felt that the reduction of fare to our car riders would have the happy effect of stimulating the car riding habit to a point where an increased number of patrons would make up for the decrease in the revenue.
>
> It thus becomes readily apparent that the present fare scheme is not a success and it is inevitable, therefore, that an increase of car fare will follow on June 1. This is a very sorry situation, but the people are bringing it upon themselves. If people will not take advantage of the service which we are providing for them, it can have no other effect than that of increasing the car fare for those who ride on the cars.
>
> I shall bring this situation to the attention of Council on next Monday night, but I thought the members of your committee should be apprised of the situation first. Further, I am sincerely of the opinion that the public should be told the facts of the situation, so that they will not be surprised when it shortly becomes necessary to inaugurate a higher rate of fare.

At the Council meeting on May 8 consideration of the matter was put over.

De Luxe Bus Service Started in Milwaukee

De luxe motor bus service was started in Milwaukee, Wis., on May 2 by the Wisconsin Motor Bus Lines, a subsidiary of the Milwaukee Electric Railway & Light Company. The company placed in operation on that date ten twenty-five-passenger, single-deck, type "J" Fifth Avenue coaches and one fifty-two-passenger, double-deck, type "L" Fifth Avenue coach. Announcement was made at the same time that nine additional double-deck buses now on order with the Fifth Avenue Coach Company are expected very shortly and will be placed in service as quickly as received, replacing or supplementing the single-deck buses. The route chosen follows some of the finest streets in Milwaukee, tapping the exclusive east and west side residential districts and passing along Lake Michigan and through the downtown business district.

Montreal to Study Service Improvement

The Montreal Tramways Commission has instituted studies of ways and means to meet the traffic revival which has taken place in Montreal during recent months. J. Rowland Bibbins, consulting engineer, Washington, D. C., has been retained by the commission to supervise these studies and subsequently to recommend proposed plans of service betterment.

Montreal is moving rapidly into a city of the million-population class with relatively short haul, resulting from dense settlement. While the riding habit had temporarily declined, it is again on the increase in spite of the increasing use of automobiles, which have multiplied five times in six years.

The plan of the city has tended to heavy traffic concentration on a few main streets, most of them narrow, with the result that, for a city of this size, the transit system is operating with unusual density and concentration of loading. Moreover, Montreal has to struggle in winter with excessive snowfall and in summer with a great volume of transient motor traffic during the vacation months. These circumstances have produced traffic conditions of growing severity, requiring more effective methods of relief in the future.

Eight-Cent Fare Asked

Buffalo Company Sees Increase as Only Way Out of Present Intolerable Condition

The International Railway, Buffalo, N. Y., has applied to the Public Service Commission for permission to increase its rate of fare on the city lines from 7 cents, or four tokens for 25 cents, to 8 cents, or four tokens for 30 cents. In a letter addressed to the City Council Herbert G. Tulley, president of the company, explains that the increase has been made necessary because of losses totalling more than $5,000,000 sustained since the start of the strike of platform employees on June 1, 1922.

President Tulley says that the strike would not have occurred except for the assurance given to the men by Mayor Frank X. Schwab that they would win. Even at the present time the company is suffering a loss in gross revenues at the rate of more than $1,700,000 a year. The earnings thus lost would, if enjoyed by the company, be available to carry out paving desired by the municipal authorities.

It is pointed out that the International now pays 3 per cent of its gross earnings to the city of Buffalo for the right to carry passengers. Mr. Tulley charges that the Mayor continues to permit the illegal operation of jitneys, which, through the resulting loss in the company's gross earnings, decrease the city's own revenues more than $50,000 a year. Mr. Tulley says:

> The International has endeavored to cooperate to meet the city's service-at-cost views, but since the necessary legislation was not obtained, and the city still encourages jitney competition, the company, to avoid decreasing the service to a point of inconveniencing the public, is obliged to appeal to the Public Service Commission for relief.

Henry W. Killeen of counsel for the International said that the 8-cent fare asked by the company will be made part of the present fare proceedings now before the State Public Service Commission. The City Council already has petitioned the commission for the restoration of the 5-cent fare in Buffalo and in connection with these proceedings the commission has been taking testimony at a series of hearings in Buffalo on the value of the physical properties of the International. The company places a valuation of $96,000,000 on its properties within the city of Buffalo.

Competitive Bus Routes Not Permitted

Applications for certificates of convenience and necessity for the operation of bus lines in the city of Buffalo, N. Y., have been denied by the Public Service Commission. The applications denied were those made by the Buffalo Jitney Owners' Association, the Motor Bus Drivers' Union and Ernest K. Jaggard. In its decision denying the applications for permits to operate buses in Buffalo, the commission holds that all the twenty-one lines or routes, if operated,

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would be in competition with existing lines of the International Railway. Under such conditions, the commission says it cannot grant the necessary certificates.

"The principal purpose of the Legislature in requiring certificates of public convenience and necessity was to prevent just such ruinous competition as would exist in this case," says the report of the commission. The memorandum then cites various decisions to substantiate this view.

It also is set forth in the report of the commission that the petitioners "have no funds with which to finance the enterprise and have no definite plans for procuring such funds."

Railway to Seek Bus Rights at Once

Early action is planned by the New York State Railways in the matter of the installation of an auxiliary bus line to tap recently built-up sections on Rochester's west side. After a recent inspection of the proposed route by railway and city officials and residents of the section through which the line will run, the railway announced its intention to apply to the City Council on May 8 for permission to operate.

The tentative route extends from Genesee Street through Genesee Park Boulevard to Chili Avenue to Garfield Street to West Avenue, there connecting with the Main Street West car line. An extension of this line from West Avenue through the new subway to Gates Center via the Buffalo road is under consideration. Application for permission to proceed with this extension will be made to the Gates Center town authorities when the route is finally decided upon.

Four or five buses will be required for the proposed line, according to James F. Hamilton, president of the railway. All bus operations of the company will be conducted by the Rochester Co-ordinated Bus Lines, Inc., a recently organized subsidiary.

The Common Council is expected to act favorably upon the grant of an ordinance for Dewey Avenue bus operations by the company when the matter comes up. No opposition to the plan was expressed at a recent hearing. This line is an extension of the Dewey Avenue trolley line and will operate to Britton Road in the town of Greece. The town board has already granted the necessary permission. A future extension of the line to Latta Road in Greece is planned, the railway already having a franchise for this extension.

The current fare, 7 cents cash or 6½ cents by ticket, with transfers to trolleys, will be charged within the city limits. Outside the city a 3-cent fare will be in effect.

The bus lines contemplated by the company are part of the railway's plan to provide adequate service for the rapidly growing residential sections of the city and suburbs by the use of buses as an adjunct to its railway service.

Weekly Pass Used to Welcome Shriners at Washington

One of the features of the safety-paper weekly passes of the Washington-Virginia Railway is the use of a different timely symbol surprinted on the face in red. The Shriners' convention to be held at Washington in June, therefore, enables the railway to pay a compliment to the visitors by printing their famous star and crescent on the pass which will be valid during the week of June 4-June 10. The back of the pass will also be used to advantage for a statement of some of the many famous places along the lines of the Washington-Virginia Railway. The pass is sold at $1.60, which is the cost of only four round trips between Washington and Alexandria. In consequence the pass will be a good proposition for almost any visitor who wishes to take several trips on the Mount Vernon division and then transfer his privilege to someone else.

Residents Must Accept Consequences of Abandonment

Communities where the residents desert the interurban railways and patronize motor buses to such an extent that the interurban is operated at a loss need not appeal to Ohio courts to compel the electric line to continue operating at a loss. It will do them no good. Chief Justice C. T. Marshall of the Ohio Supreme Court so ruled in an opinion handed down on May 3. This opinion was shared by six of the seven other judges, who voted to uphold the Public Utilities Commission in refusing to order the receiver of the Indiana, Columbus & Eastern Traction Company to continue operation of cars over a 12-mile stretch between Columbus and Grove City.

Another Railway Wants to Substitute Buses

The Pennsylvania-Ohio Electric Company wants to discontinue railway service in Mahoningtown and substitute a bus line in its place. To this end it has made a proposition to the Mayor and the City Council.

For several years one of the chief matters of discussion between the company and the Council has been the service to the important industrial district of New Castle known as Mahoningtown. This is the heaviest traffic line in New Castle, but service has been indifferent due in a large part to the condition of the tracks and to the large number of railroad crossings on the line. In fact, the condition of the track on Cedar Street is such that it will have to be renewed if railway service is to be continued. This renewal will cost in excess of $50,000. The company points out that manifestly it would be undesirable to expend this sum in renewing the track and paving on Cedar Street, practically all of which amount would be a direct maintenance charge against the operation of the line, unless it was decided permanently to continue service to Mahoningtown with street cars. It is further pointed out that even after such improvements have been made the delays to traffic now encountered at the railroad crossings will in no way be lessened.

In his plea to the Mayor and the Council to substitute buses for the trolley cars R. N. Graham, manager of railways of the company, said:

> Within the past few years the modern city bus has been developed to such an extent that it is a comfortable, speedy and dependable means of traffic. At the present time this company is operating four motor bus lines in the city of Youngstown, and I am perfectly safe in stating that this operation is giving the greatest satisfaction to the public and furnishes comfortable, speedy and convenient transportation to the different sections of the city which the buses serve.

Six-Cent Fare Privilege Extended.—Mayor Ainslie of Richmond, Va., has approved the ordinance passed previously by the City Council to extend the 6-cent fare privileges to the Virginia Railway & Power Company for a period of six months. The company has filed its official acceptance of the terms of the ordinance. The extension was granted upon the contingency of a settlement being reached between the city and the company upon the question of a blanket franchise. Within a month, it is believed, City Attorney Cannon will be prepared to advise the committee as to the rights and privileges of both the city and the company in the settlement of the problem.

Agreement Reached on Providence Loop Plan.—An eight-loop plan cutting all crosstown railway lines and looping them at Dorrance Street has been agreed upon by the members of the joint standing committee on railroads and representatives of the United Electric Railways, Providence, R. I. No definite time was fixed for the new arrangement to become effective, but it will be put into operation as soon as possible. Under the plan, all fares can be collected from the passenger upon entering the car on inbound trips and upon leaving the car on outbound runs. This particular feature, it is hoped, will greatly decrease delays in car traffic downtown.

Hattiesburg Joins Weekly Pass Brigade. — The Hattiesburg Traction Company, Hattiesburg, Miss., a Cities Service property, has joined the users of the unlimited-ride weekly pass. This makes almost twoscore weekly pass installations. The pass was started on April 23 at $1 against a one-zone fare of 5 cents and a two-zone fare of 8½ cents ticket and 10 cents cash. In addition to this encouragement to greater patronage, D. E. Byerly, general manager, advises that the rail is to be relaid on two lines and that the rolling stock will be spruced up to make the ride-selling campaign as effective as possible. The local press gave the plan a liberal send-off. Arrangements are also being made for co-operative publicity by merchants and railway. The pass was installed following an analysis of conditions by Walter Jackson.

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Book Reviews

Engineering Economics—First Principles

By J. C. L. Fish, Professor of Railroad Engineering, Stanford University. Second Edition. McGraw-Hill Book Company, Inc., New York, N. Y.

Graduates of engineering colleges are criticised for their lack of knowledge of the economic side of their profession. There is warrant for this criticism, but not as much as formerly, because the technical schools, realizing the lack, have been improving their courses to include financial considerations. The field being comparatively new, the literature of economics with special relation to the need of engineering students is only in process of development. Here is where Professor Fish's book fits in, although this does not imply that its field is limited to the technical school. It would do no practicing engineer any harm to review the subject by reading this interesting, comprehensive and original book.

The above three adjectives have been chosen to characterize "Engineering Economics" for the following reasons: The treatment is interesting because it is logical, it relates its statements with illustrations drawn from the every-day life of the engineer, and its style is crisp and clear. In other words, the author leaves no doubt in the reader's mind as to what he intended to say.

The comprehensiveness of the text is suggested by the following partial list of topics: Analysis of problem of investment; interest; practical analysis of first cost; business units; business statistics; valuation; errors in estimating, and engineering reports. Supplementing the regular chapters are appendixes containing such things as sample articles of incorporation, tables of formulas and values for use in economic computation, questions and problems, and an extensive bibliography, sufficient to keep a studious engineer busy for a lifetime.

From the standpoint of originality, this book is striking in its typographical make-up, different type faces being used to emphasize the definitions, illustrations, etc. Paragraphs are numbered so as to indicate the chapters in which they occur and the order in those chapters. For example, paragraph 1321 is the twenty-first paragraph in chapter 13. Similarly figures are numbered to correspond with the paragraphs in which they occur, and the order in which they occur in those paragraphs. For example, Fig. 1324b is the second figure given to illustrate Par. 1324. Formulas are numbered like figures, but the numbers are placed in parentheses to the right of the formulas.

Although the present book is a second edition, it is virtually a new work, based on the discovery, by the author, that the fundamental problem of engineering economics is choice of investment, and not choice of structure as he assumed in writing the earlier book. Starting, therefore, with the problem of the capitalist, large or small, who desires to place his money to the best advantage, the author shows step by step how all engineering economics is an application of sound investment principles.

Thermal Stresses in Steel Car Wheels

Technological Paper No. 235, United States Bureau of Standards. Copies obtainable from Superintendent of Documents, Government Printing Office, Washington, D. C.

An investigation of the stresses induced in steel car wheels from heating the tread has been carried out at the Bureau of Standards in a manner approximating severe service conditions. A large number of rolled, forged and cast steel wheels both new and worn were tested. In the tests the wheels were mounted on a hollow water-cooled axle and the treads were heated by passing an electric current through a soft steel resistor which encircled the wheels. The results of the investigation show how the wheels are deformed from high tread temperature, giving the magnitude and distribution of stresses throughout the wheels. The new data can be used to advantage in considering the question of proposed changes of design and manufacturing practice.

Preparation, Transportation and Combustion of Powdered Coal

Bulletin 217, Bureau of Mines. By John Blizard. Published through the courtesy of the Canadian Department of Mines by the United States Bureau of Mines, Washington, D. C.

The interest in the burning of pulverized fuel in power plants is of recent development, although it can hardly be said of recent origin. For the past two or three years, however, rapid progress has been made until today the subject is one of foremost importance in the power-plant design field. Mr. Blizard's treatise comes along just in time to be of great assistance in this field. It is as nearly up-to-date a compilation of present practice as could be expected, although if written today it would make a still more impressive showing for this method of firing boilers. It contains more than 125 pages of illustrations and text, mostly descriptive, and is fully indexed.

Year Book of American Engineering Standards Committee for 1923

Published by the committee, 29 West Thirty-ninth Street, New York City.

The 1923 year book of the A.E.S.C. points out that there are 205 national bodies co-operating in its work through officially accredited representatives. The number of national organizations on the main committee is now thirty-three. On sectional committees there are 917 individuals serving. The dues paid by the members of the main committee are not sufficient to support its work, and a new plan of sustaining memberships has been worked out. A total of 121 projects now have an official status before the committee, in twenty-six of which the American Electric Railway Association is co-operating.

The year book contains a detailed statement of the work of the committee to date, an outline of its purpose, organization, method of work, etc.; lists of the standards approved during 1922 and before the committee on Jan. 1, 1923 (forty-five in number); the constitution of the committee; a complete list of the standardization projects cross-indexed so as to indicate the co-operating organizations; a financial statement, and other items of interest.

Rate Making for Public Utilities

By Lamar Lyndon. McGraw-Hill Book Company, Inc., New York, N. Y. 201 pages.

This latest addition to the literature on rate making was written, according to the author, because none of the works published "seems to cover certain essential features, nor are the present treatises adapted for the reading of engineers, municipal authorities, bankers and business men, generally, who desire to be informed on this subject." These works only state that because of the opposing decisions of courts and commissions, "a conclusion is hardly to be reached on any but a few of the questions involved."

This book appears to give the author's interpretation of certain of the mooted questions of valuation. Many of his statements indicate unfamiliarity with ordinary financial practices. Operating and fixed charges frequently are confused in the text. The author favors original cost as a basis of value, in preference to the cost of reproduction. In the course of the text, several citations are given from commission and other decisions, none of which, however, is recent, nearly all being more than ten years old.

The treatment of depreciation, in general, is good, and is substantially in agreement with recent opinion. Many readers will disagree with the chapter on "Intangibles," as the author favors elimination of some items included in ordinary valuation work. In sharp contrast with the remainder of the book, which in general takes the non-utility point of view, is the theory advanced by the author of allowing the utility to capitalize operating losses. This is not confined to early losses during the building up of business, but advocates continuing this capitalization in all years when a profit is not earned.

Little space is given to the actual problems of rate making, and the few examples included are not conclusive. There is no general discussion of the various theories advanced for rate making.

While, for the sake of noting a different viewpoint, this book may be worth the reading by the experienced engineer or lawyer who is familiar with utility valuation and rate making problems, it lends itself but poorly to its stated purpose of informing the layman on these questions.

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Personal Items

New International Vice-President

Mr. Mack Has Worked Up from Ranks —Oldest Official in Point of Years of Service

H. L. Mack, who has been elected vice-president in charge of engineering of the International Railway, Buffalo, N. Y., and a director of the company, has been associated with traction lines in Buffalo since 1890. The position to which Mr. Mack has been elected is a new one with the company. He will make his headquarters in the Littell Building, Buffalo.

Mr. Mack was born in Lawrenceburg, Ind., in 1865. He received his education in a rural school. His first job on a railroad was with the Big Four in 1881 as a section worker. A year later he held a similar position with the Cincinnati Southern. From 1888 to 1889 he was a lineman for the Western Union Telegraph Company on the Big Four. He next served with the Bell Telephone Company, Cincinnati, in a similar position from 1889 to 1890.

In 1890 Mr. Mack became a lineman for the Cincinnati (Ohio) Street Railway in charge of a line wagon. He held that position for two years, when he went to Buffalo to work for the old Buffalo Street Railway, which was taken over by the International Railway. Mr. Mack's first position with the traction lines in Buffalo was in charge of repair and maintenance of overhead lines.

Two years after entering the service of the company at Buffalo the maintenance and construction departments were consolidated, and Mr. Mack was made supervisor of the merged departments, which included conduits, cables, etc. In 1910 Mr. Mack had his jurisdiction extended to cover tracks and line and he has held that position ever since. With his promotion to the position of vice-president in charge of engineering, Mr. Mack will have complete supervision over all mechanical and electrical departments. In 1915 he took over the bridge and building departments.

During the thirty-three years that Mr. Mack has been associated with the traction lines in Buffalo, he has had a large part in the work of electrifying all the local and interurban lines of the company. When he went to Buffalo there were fewer than 90 miles of lines operated by electricity. Horse cars were still in use on the rest of the system. Now the International Railway has more than 475 miles of electrified lines. Mr. Mack had complete supervision over the construction of the new Buffalo-Niagara Falls high-speed interurban line and other building projects of the International Railway, including the new substation in North Division Street.

W. F. McDanel

W. F. McDanel Succeeds D. D. McMahon with Beaver Valley Company

W. F. McDanel has been appointed cashier of the Beaver Valley Traction Company, New Brighton, Pa., to succeed D. D. McMahon, resigned. Mr. McDanel was born in 1897 at New Brighton, Pa. He was graduated from the New Brighton public schools and then entered Washington & Jefferson College in 1916. He left college and enlisted in the United States Army Air Service in 1918, and served until January, 1919, when he was honorably discharged as lieutenant. From 1919 until November, 1920, he served in the traffic department of the Pittsburgh Railways. He was then employed as assistant dispatcher by the Beaver Valley Traction Company, in which position he served until May 1 of this year.

Mr. McMahon was born in Birkenhead, England, on April 23, 1890. He was educated at St. Wilfrid's College, North Staffordshire. Mr. McMahon entered the service of Lever Brothers, Port Sunlight, England, in 1918 as a clerk. He came to America in 1909. His first work for the Beaver Valley Traction Company was as a conductor. In 1911 he was promoted to cashier, in which position he served until 1915, when he was granted leave of absence to join the British army, which service he entered as a private. At the time of his discharge in 1920 he had been promoted to Captain of Infantry. Mr. McMahon was wounded twice during his term of service; the first wound, which was due to a piece of shell lodging in his neck, invalided him for more than ten months. In 1920 he resumed his duties with the Beaver Valley Traction Company, but resigned on May 1, 1923, to accept a position as outdoor supervisor for the Liverpool & North Wales Steamship Company, Liverpool, England.

D. D. McMahon

Alabama Public Service Commission Appoints Engineers

Announcement has been made of the signing of a contract, with the approval of Governor William W. Brandon of Alabama whereby I. F. McDonnell, consulting engineer for the Alabama Public Service Commission for several years, and C. VanDenberg, principal assistant to Mr. McDonnell, will devote their entire time to the work of the commission. The commission has announced the appointment of Conrad H. Ohme of Birmingham as inspector and supervisor attached to the department of engineering. Mr. Ohme has had wide experience as an engineer, having been engaged in civil, mining and supervising engineering for many years. He has devoted much time, it is stated, to the construction of water works, sewer systems and power plants, also streets and municipal public service plants. Among others he supervised the construction of the power dam for the Tallassee cotton mills.

Rawson Collier Joins Dwight P. Robinson & Company Staff

Rawson Collier, until recently general sales manager of the Central Hudson Gas & Electric Company, Poughkeepsie, N. Y., has joined the organization of Dwight P. Robinson & Company, Inc., engineers and constructors, of New York.

Mr. Collier was for five years a member of the firm of Collier & Brown, consulting engineers, Atlanta, leaving this firm to become connected with the Georgia Railway & Electric Company. Here his work covered sixteen years, during which time he was connected with practically every department in the company. At the time of leaving he was general sales manager of the company. Mr. Collier was graduated from the Massachusetts Institute of Technology.

E. J. Nash is now acting superintendent and purchasing agent of the Butte (Mont.) Electric Railway. J. S. Wathey was formerly superintendent and purchasing agent.

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Mr. Burke Made Manager at Keokuk

Walter H. Burke has been appointed to the position of manager of the Keokuk Electric Company, which does the railway, light and power and gas business in Keokuk, Iowa. The Keokuk company is under the general management of Stone & Webster, Inc., Boston, Mass., and Mr. Burke has been located in the home office of that organization for several years in connection with matters pertaining to the southwestern group of companies under Stone & Webster management.

Mr. Burke was graduated from the University of Maine with the class of 1906 and entered the employ of the General Electric Company. Following his service with that company, he held various operating positions as assistant to the manager of the street railway and light and power property at Dallas, Tex., and assistant general superintendent of light and power of the Milwaukee Electric Railway & Light Company.

W. H. Burke

Mr. Burke is a member of the American Electric Railway Association and is active in the affairs of that association. He is also a member of the New England Street Railway Club and various other clubs, and has been a frequent contributor to the technical press, particularly on subjects pertaining to economic phases of the public utility industry.

H. B. Terrell succeeds W. E. Casey as claim agent of the Southwestern Gas & Electric Company, Texarkana, Ark.

T. P. Pinckard, who recently succeeded G. R. Cottrelle as president of the Windsor, Essex & Lake Shore Rapid Railway, Kingsville, Ont., has long been engaged in engineering and utility activities. He joined the forces of the Westinghouse Electric & Manufacturing Company in 1905 at its Baltimore sales office after completing the apprenticeship course at East Pittsburgh. In 1907 he secured a transfer to the Kansas City sales office of the company. Three years later he severed connections with the Westinghouse Company and became sales manager of the Peoria Gas & Electric Company, Peoria, Ill. Prior to assuming the presidency of the Windsor, Essex & Lake Shore Rapid Railway he was associated with the Burling Engineering & Construction Company, New York City, Windsor Gas Company and the Dominion Traction & Lighting Company.

Judge Parsons Appointed to New York Commission

Governor Smith shortly before the adjournment of the New York State Legislature transmitted to the Senate the nomination of James A. Parsons, Hornell, as public service commissioner to succeed Charles G. Blakeslee, Binghamton, whose term of office expired on Feb. 1, 1923. Judge Parsons served for a number of years as a Deputy Attorney-General, was executive counsel during a portion of Governor Smith's first term and occupied that position at the time of his appointment. The appointment was immediately confirmed. It is anticipated Judge Parsons will continue to act as counsel to the Governor until disposition has been made of the thirty-day bills, when he will assume the duties of his new office. The term of office of public service commissioner is ten years.

M. P. Randall is assistant treasurer of the Alabama Power Company, Birmingham, Ala. J. A. Shepherd, auditor, formerly performed the duties for both officerships. F. P. Cummings is now commercial manager instead of F. D. Mahoney.

Charles H. Bigelow, for the last ten years chief mechanical engineer for the Millville Manufacturing Company at Millville, N. J., has resigned to accept the position of plant engineer for the Spicer Manufacturing Corporation, South Plainfield, N. J., makers of universal joints and clutches for automobiles. Mr. Bigelow was formerly connected with the Boston Elevated Railway and was one of the original members of the American Electric Railway Engineering Association, in which he has always held his membership.

Leon C. Bradley of Birmingham has been made director of the Bureau of Public Utility Information of Alabama, according to the announcement of the committee. Mr. Bradley has been connected for a number of years with daily newspapers in Birmingham and Tuscaloosa. He was one of the founders of the Tuscaloosa *News* in 1910 and served as business manager and later as editor of that newspaper. At the time the United States entered the World War he was city editor of the Birmingham *Age-Herald.* For more than a year Mr. Bradley has been connected with the Alabama Polytechnic Institute, serving as publicity director in the Greater Auburn Campaign, and more recently as secretary and treasurer of the Auburn Alumni Association and as a member of the faculty of that institution.

T. J. Hanrahan has succeeded George H. Hunter as master mechanic of the Pacific Coast Railway, San Luis Obispo, Calif.

W. W. Trench, assistant secretary of the General Electric Company, has been appointed secretary of the various committees which will administer the Charles A. Coffin Foundation, a fund of $400,000 which has been created by the board of directors of the General Electric Company, the income from which, approximately $20,000 a year, is to be employed in making awards for meritorious service in the electrical field.

E. A. Bradner Heads New Mexico Association

E. A. Bradner was recently elected president of the New Mexico Public Utilities Association. Mr. Bradner has been identified with public service corporations for more than thirty years. Starting as an arc-light trimmer, he has held all intermediate positions up to that of manager, which office he now occupies with the Las Vegas Light & Power Company and the Las Vegas Transit Company For a number of years Mr. Bradner was chief engineer and superintendent of the Grays Harbor Railway & Light Company, Grays Harbor, Wash, and later became manager of the central station at Hobart, Okla., holding this position until 1919.

E. A. Bradner

E. A. Grove succeeds N. P. Hansen as roadmaster of the Grand River Valley Railway, Grand Junction, Col.

J. E. Hester, master mechanic of the Anderson shops of the Union Traction Company, has resigned to accept a position with the Indiana Public Service Company at Scottsburg, Ind. He will have charge of the shops at that place. Mr. Hester has been connected with the Union Traction Company, Anderson, Ind., in the mechanical department in various capacities since September, 1900. He has held the position as master mechanic for the past five years.

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Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Coal Consumers Should Make Purchases Now

Rate of Reduction of Both Hard and Soft Coal Greater than Last Year, but Stocks on Hand Low

The present situation in regard to the production of anthracite coal may be briefly outlined as follows: The strike in the anthracite field was settled in the middle of September, 1922, and by the end of the month, with all the mines in full operation, maximum production was reached. The average weekly production since the first week in October has been approximately 2,000,000 tons, which is the highest weekly average sustained over the same number of consecutive weeks in any year for which figures are available. The report of the Geological Survey of April 28 shows that the cumulative output during the present calendar year, from Jan. 1 to April 28, is 31,602,000 net tons, an increase of 45 per cent over the production in the corresponding period of 1922.

A somewhat similar situation prevails in regard to soft coal production. During the period of suspension in the unionized bituminous fields (April 1 to Aug. 16, 1922) the non-union mines were producing at the rate of 5,000,000 tons per week. With the resumption of work in the unionized fields, total production increased rapidly, until by the first week in October shipments had reached 10,500,000 tons per week. This weekly average continued until the first of April, 1923. Since that date there has been a slight decline attributable to a change in market conditions in certain sections of the country.

Figures published by the United States Geological Survey show that the cumulative production in the calendar year, from Jan. 1 to April 21, exceeds by 29,000,000 tons the production during the same period in 1922. The average weekly production for April of this year has been about 10,000,000 tons.

As a result of the five months strike anthracite stocks were practically exhausted. Government reports show that on Oct. 1, 1922, a selected list of retail dealers had on hand less than 13 per cent of the supply usually carried on that date. Despite the record production maintained during the winter, conditions on March 1 had but slightly improved. As a matter of fact, supplies on hand on March 1 were about equal to those on hand Oct. 1, 1922, about seven days' margin.

Figures for supplies in the hands of dealers on April 1 are not available nor are there any statistics showing supplies in the hands of the householder. Rationing of domestic anthracite coal was necessary throughout the winter, however, and as there has been little opportunity to accumulate a surplus, it can be confidently stated that the householders' bins are bare.

In anticipation of the strike, stocks of bituminous coal on hand April 1, 1922, were the highest on record, being in excess of 63,000,000 tons. As a result of the strike and with production from the non-union mines insufficient to meet consumption, stocks were so heavily drawn upon during the summer that on Sept. 1 they had been reduced to 22,000,000 tons, the lowest level on record except that of June 1, 1920, when only 20,000,000 tons were on hand. With resumption of mining, the stocks gradually increased and on Feb. 1, 1923, there were on hand 38,000,000 tons. Since that date, however, there has been a decrease. The report of March 1 showed 36,000,000 tons, and it is believed that there has been a further decline since March 1. Stocks are lower today than at the corresponding period in any year of which there is a record.

Policy of Buying

A report on general conditions in the coal trade issued by the Federal Fuel Distributor on April 1 shows that in many producing fields the mines were idle, due to "no markets." This condition, coupled with the fact that users' stocks are being drawn upon, indicates that the consumer is holding back his purchases.

As a matter of insurance, as a help in the transportation difficulty and in order to assist in stabilizing the working time of the miners, the Coal Commission suggests the immediate purchase and storage of coal. Purchases as far as possible should be made through regular channels, in order to avoid duplication of orders and prevent a runaway market.

It should also be borne in mind that the present contract in the anthracite region expires Aug. 31, 1923, and while it may be expected a new agreement will be consummated, there is even then a possibility that production may be curtailed during negotiations which precede the final reaching of a contract. The best insurance against a strike is coal in the bins of the householder.

The great value of storing coal to meet emergencies threatening the usual processes of industry was fully demonstrated in 1922, and this lesson may well be applied in 1923. As an evidence of what can be done in storing bituminous coal, the figures of last year may be reviewed. On April 1, 1922, when the strike began, there was in storage over 63,000,000 tons. On March 1 of this year the Geological Survey reports 36,000,000 tons. This figure should be increased by Sept. 1 to above 65,000,000 or 70,000,000 tons.

Cement Production Increase Shown

At the meeting of the Chamber of Commerce of the United States in New York, May 8, Frederick W. Kelley, president of the Portland Cement Association, outlined the benefits which have resulted from having uniform specifications. The manufacture of Portland cement in this country began about fifty years ago, and has grown by leaps and bounds since that time. In 1892, about twenty years after manufacture began here, the annual production was in the neighborhood of 500,000 bbl. In 1902 it was 17,000,000, and last year about 115,000,000. It is estimated that the maximum production capacity is nearly 150,000,000 bbl.

From 1885 until 1903 the only standards for testing cement were those determined by the American Society of Civil Engineers. However, many engineers felt it incumbent upon themselves to add new details here and there, so that there was really no uniform standard at all. A comparison was made in 1898 of ninety-one different sets of specifications for Portland cement and it was found that no two were alike.

The cement specifications of the American Society for Testing Materials were first adopted in 1902, and progress in that direction continued until in 1921 a single standard had been generally accepted throughout the United States. Membership in the Portland Cement Association now depends on adherence to that standard, and poor quality product has been almost eliminated.

Manufacture is now much more widely distributed than used to be the case, and factories are therefore nearer to their markets. In 1902 Portland cement was made at sixty-five factories in nineteen states, 65 per cent of the production being in the Lehigh Valley of Pennsylvania. In 1922, 118 factories in twenty-seven states were making cement, and only 27 per cent of the product came from the Lehigh Valley.

Metal, Coal and Material Prices

Metals—New York	May 11, 1923
Copper, electrolytic, cents per lb.	16.06
Copper wire base, cents per lb.	19.50
Lead, cents per lb.	7.25
Zinc, cents per lb.	7.225
Tin, Straits, cents per lb.	43.75
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	6.375
Somerset mine run, Boston, net tons	2.75
Pittsburgh mine run, Pittsburgh, net tons	2.00
Franklin, Ill., screenings, Chicago, net tons	1.875
Central, Ill., screenings, Chicago, net tons	1.575
Kansas screenings, Kansas City, net tons	2.625
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.	7.75
Weatherproof wire base, N. Y., cents per lb.	19.25
Cement, Chicago net prices, without bags	$2.70
Linseed oil (5-bbl. lots), N. Y., per gal.	$1.21
White lead, (100-lb. keg), N.Y., cents per lb.	13.375
Turpentine, (bbl. lots), N.Y., per gal.	$1.24

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Rolling Stock

Wisconsin Public Service Corporation, Manitowoc, Wis., has received a new city car from the St. Louis Car Company for use on its Manitowoc lines.

Toronto Transportation Committee will purchase cars to the value of $1,660,000 this year. It will also purchase snow-fighting equipment and buses to the value of $90,000, a total for rolling stock of $1,750,000.

Memphis Street Railway, it is reported, will award contracts within the next two months for forty new cars. This is an expenditure provided for as part of the rehabilitation work to be carried out under the improvement program following the discharge of the receivers.

Manitowoc & Northern Railway, Manitowoc, Wis., has added to its equipment two new one-man interurban cars built by the St. Louis Car Company. The cars weigh 15 tons each. They will replace in service older cars which have been sold to the Evanston Street Railway, Evanston, Ill.

Niagara Junction Railroad, Niagara Falls, has purchased two electric locomotives from the Westinghouse Electric & Manufacturing Company, increasing the total number now in service to five. Each of the new locomotives will weigh 43 tons, and will be equipped with four Westinghouse type 552-FA-17 motors rated at 65 hp., and having HLF control. The railroad originally intended to purchase one locomotive weighing approximately 81 tons, but later decided that with two locomotives a more flexible service could be rendered. This railroad operates on 600 volts direct current, drawing its power from an overhead trolley wire by a wheel and pole or pantograph.

Track and Roadway

Milwaukee Electric Railway & Light Company will install about 5,000 thermit joints this year. This is the approximate number installed during 1922.

Jacksonville, Fla.—The City Commission, although refusing to approve or disapprove the plan, has by a vote of three to two adopted a revised draft of Commissioner St. Elmo W. Acosta's resolution seeking a popular vote on the question of whether the city of Jacksonville shall build and operate an electric railway to Pablo Beach, either by bond issue or from the earnings of the electric plant.

Indiana Service Corporation, Fort Wayne, Ind., has started the work of double tracking its line south on Calhoun Street from Pontiac Street. The double-tracking has been made necessary by the great growth in the southern part of the city, and by the erection of the $1,000,000 south side high school on Calhoun Street about eight blocks south of Pontiac Street. The board of public works granted permission for the work as soon as the traction company broached the project.

Pittsburgh Railways in a petition filed in the Federal court has asked for permission to spend $189,510 to rehabilitate double tracks in Brownsville Road through the Boroughs of Mount Oliver, Knoxville, Carrick and Brentwood. Another petition asked for permission to purchase an automobile truck tower for the repair of trolley wires in the East End district at a cost of $4,500.

Detroit United Railway is expecting to build about 1¼ miles of track this year in Flint, Mich., to reach the Durant automobile plant. It is also expecting to build 1.05 miles of second track near Flint, with the addition of an interlocker where the tracks cross the Père Marquette Railway lines. The track on Packard Street, Ann Arbor, is also to be reconstructed for about a half mile. Seventy-pound A.S.C.E. rail will be used on cedar ties on a gravel foundation, with cement from the bottom of the tie to the top of the rail, and the joints will be welded. Recent construction by the company has included a change of track over the Rouge River bridge in Wayne County, near Detroit, and on the West Jefferson Street bridge in Detroit. The cost of these two pieces of construction was about $60,000 total.

Shops and Buildings

Eastern Wisconsin Electric Company, Sheboygan, Wis., has purchased ground for an addition to its steam generating plant at Sheboygan, upon which it is proposed to expend $180,000.

San Diego (Calif.) Electric Railway has made application to the City Council for permission to extend its Woolman Avenue line to Imperial Avenue at Thirty-ninth Street from its present terminus at Woolman and Thirtieth Street. It is understood the company desires the franchise so that it can abandon the Imperial Avenue line beyond Thirty-second Street. At present both the Imperial Avenue and Woolman Avenue routes are operated over the same line as far as Twenty-fifth and Imperial.

New Incorporations

San Antonio & Rio Grande Valley Traction Company, Falfurrias, Tex., has been organized by V. P. Williams of Dallas and associates for the purpose of building and operating an electric railway between Falfurrias to a point on the St. Louis, Brownsville & Mexican Railroad near McAllen, about 60 miles. It is planned ultimately to extend the line to Point Isabel, on the Gulf Coast, and to San Antonio. According to Mr. Williams financial arrangements for building the first section of the road have been made.

Trade Notes

E. W. Rockafellow, for a number of years general supply sales manager of the Western Electric Company, has become a vice-president of the National Pole Company, Escanaba, Mich., and will represent that company at 220 Broadway, New York.

S. P. Wright & Company, district representatives of the Conveyors Corporation of America, 326 West Madison Street, Chicago, have moved their offices from 109 East Broadway, Butte, to 812 East Iron Street, Butte. The Wright organization handles the sales of American Steam Jet Ash Conveyors in the State of Montana.

Johns-Pratt Company, Hartford, Conn., manufacturer of Noark fuses, meter service and protective devices, cutout bases, fuse accessories, vulcabeston packing and insulating parts, and Johns-Pratt molded insulation, has established an export division with office at 30 Church Street, New York City. E. Wilhelm Droosten and W. L. Urquhart, who have had extensive experience in handling export business of electrical manufacturers, will be in charge of this division.

Ross F. Hayes has resigned as general sales manager of the Curtain Supply Company to engage in the railway supply business, with office at 2 Rector Street, New York City. He is now Eastern representative of the Henry Giessel Company, Chicago, manufacturers of water coolers for service on railway passenger cars and locomotives; the Protecto Manufacturing Company, Chicago, manufacturers of metal-bound weather stripping; the Anti-Freezer Company, Chicago, manufacturers of "The Anti-Freezer" for prevention of freeze-ups in air-brake systems, and other manufacturers engaged in building car fittings and other devices for use in the electric railway field.

New Advertising Literature

Golden Anderson Valve Specialty Company, Pittsburgh, Pa., has issued an illustrated booklet describing its patent cushion valves of various types, such as triple-acting non-return valves, plain non-return valve, quick-closing emergency-trip valves, combined throttle and automatic engine-stop valves, steam pressure reducing valves, etc.

Crouse-Hinds Company, Syracuse, N. Y., has issued catalog No. 2,000, on condulets. This is a new publication which supersedes all previous catalogs and bulletins. Its more than 700 pages are replete with information on fittings for every conceivable situation, including many for use on railway cars. The book is fully indexed in terms of catalog numbers and names of articles, and there is also a picture index. It is flexibly bound and is furnished with a thumb index.

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Did You Receive the April Issue?

New Rolling Stock Delivered

Every Electric Railway Official interested in rolling stock and its equipment will again find Brill Magazine of valuable assistance in keeping in touch with the types of cars and trucks delivered to and placed in service by various electric railways.

Commencing with the April issue distributed last month Brill Magazine will be published quarterly and mailed gratis to those electric railway officials interested. If you did not receive the April number, it will be sent you promptly upon receipt of an expression of your interest in receiving copies regularly.

THE J. G. BRILL COMPANY
PHILADELPHIA, PA.

AMERICAN CAR CO. ST. LOUIS MO. — G.C. KUHLMAN CAR CO. CLEVELAND, OHIO. — WASON MANF'G CO. SPRINGFIELD, MASS.

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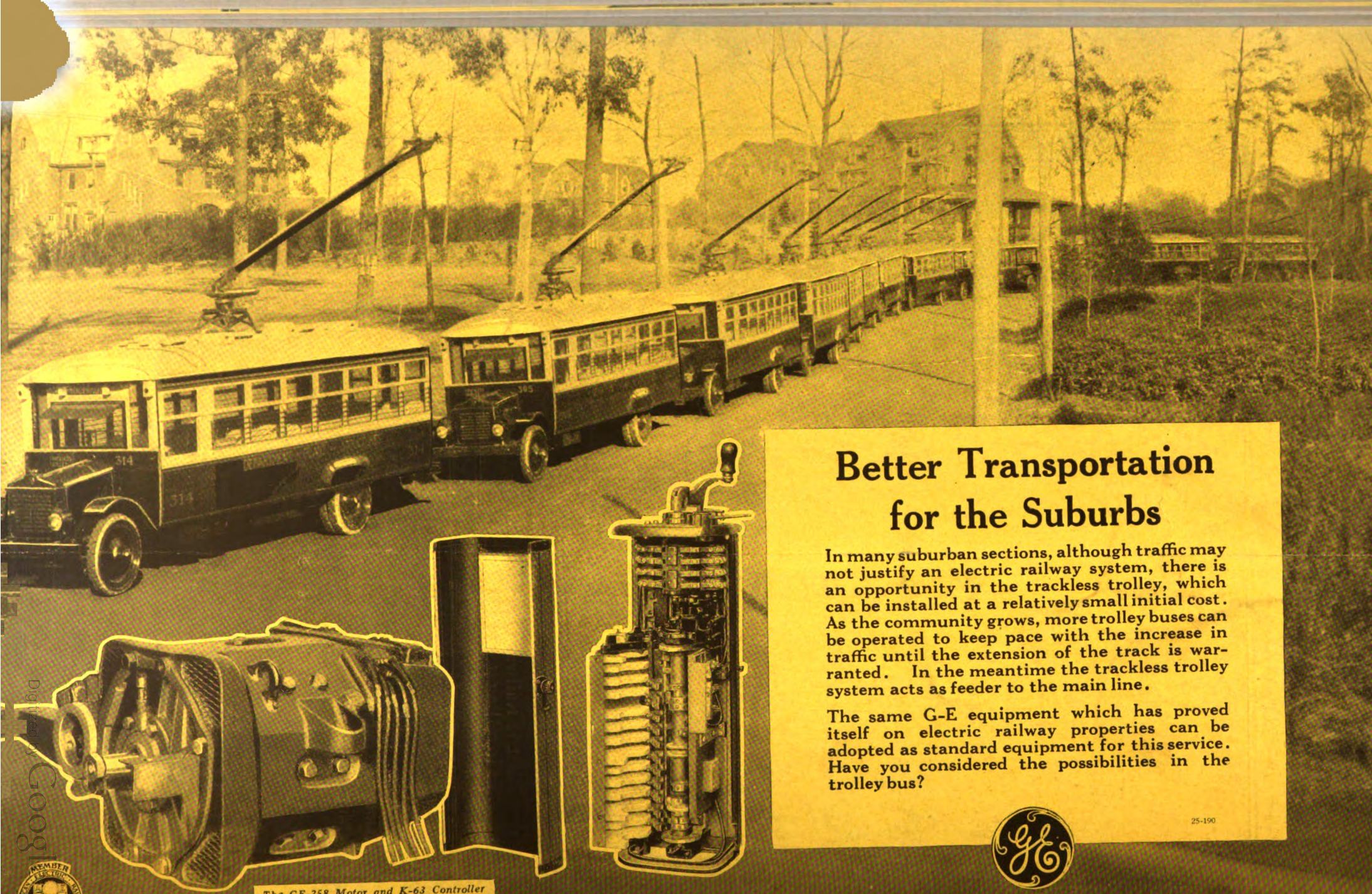

Better Transportation for the Suburbs

In many suburban sections, although traffic may not justify an electric railway system, there is an opportunity in the trackless trolley, which can be installed at a relatively small initial cost. As the community grows, more trolley buses can be operated to keep pace with the increase in traffic until the extension of the track is warranted. In the meantime the trackless trolley system acts as feeder to the main line.

The same G-E equipment which has proved itself on electric railway properties can be adopted as standard equipment for this service. Have you considered the possibilities in the trolley bus?

25-190

The GE-258 Motor and K-63 Controller are successfully driving many of the trolley buses now in service.

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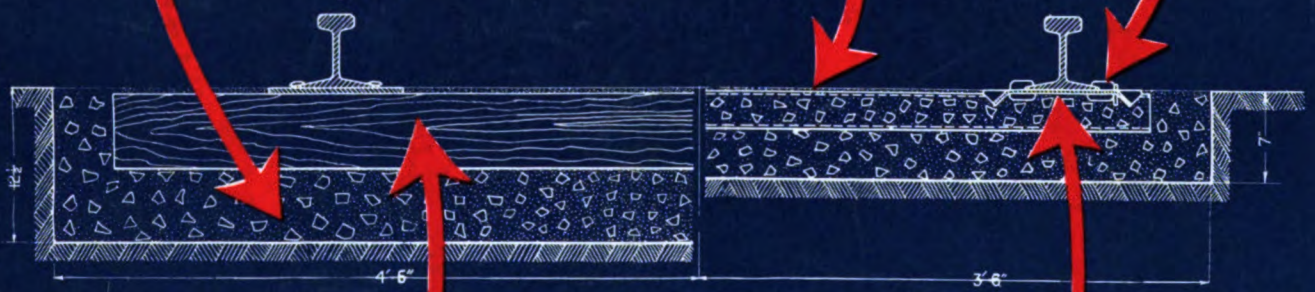
GENERAL ELECTRIC

McGraw-Hill Company, Inc. • May 19, 1923 • Twenty Cents per Copy

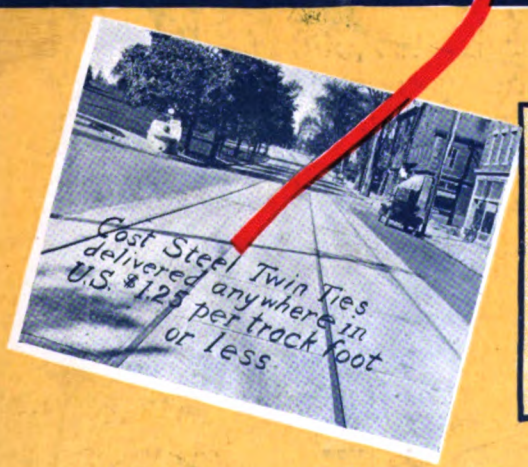
MONTHLY MAINTENANCE ISSUE

ELECTRIC RAILWAY JOURNAL

Comparative Cross Section



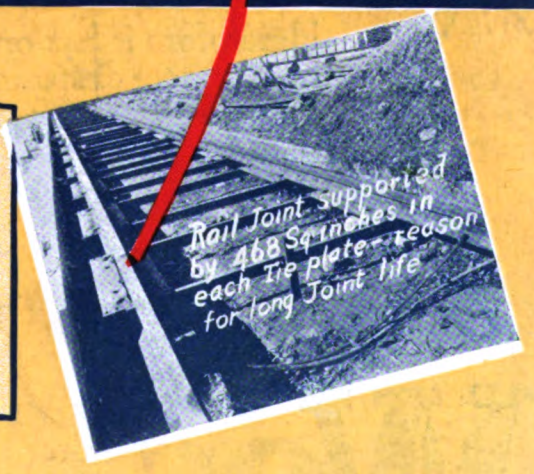
Type D Track Oak Ties in 9'0 | 6"×8"×8'0" Trench | Standard Steel Tie Construction Steel Twin Ties in 7'0 Trench



NOTHING pays better dividends than an investment in good track construction. And with Twin Ties the cost per foot is often less than with conventional designs.

Have your secretary write today for complete descriptive matter and delivered price.

THE INTERNATIONAL STEEL TIE CO.
Cleveland



Steel Twin Tie Track

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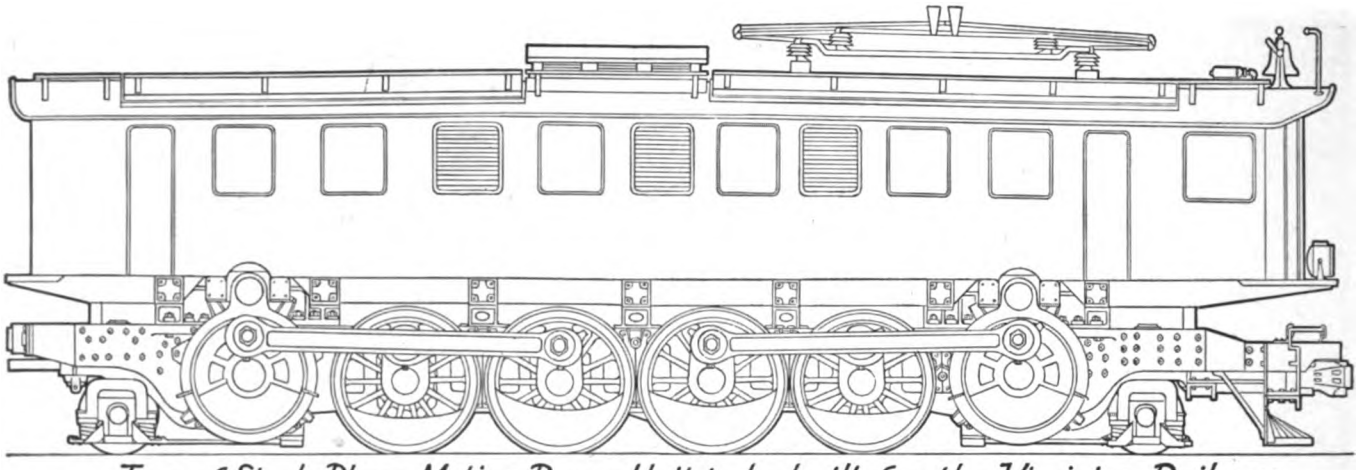

Type of Single-Phase Motive-Power Unit to be built for the Virginian Railway

The Largest Electrification Contract Ever Placed

To increase its track capacity and to secure important operating economies, the Virginian Railway will electrify 213 track miles of its route lying between Roanoke, Va., and Mullens, W. Va.

The Alternating-Current Single-Phase System Will Be Used

By this electrification heavier tonnage trains will be handled on the 2-per cent grades at 14 miles per hour requiring, at maximum, 20,000 horsepower of energy for the electric locomotive.

Heretofore it has only been possible to concentrate 7,000 horsepower of steam locomotives to handle heavy-tonnage trains over the 2-per cent grades at 7 miles per hour.

Westinghouse Electric & Manufacturing Co.
East Pittsburgh, Pa.

Westinghouse

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New York, Saturday, May 19, 1923

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Company, Inc.

HENRY W. BLAKE and HARRY L. BROWN, *Editors*

Volume 61
Number 20

Surveys Bring Out Especially Valuable Information

DESCRIPTIONS of current methods and equipment serve a particularly useful purpose when the best features are thus pointed out and made available for adoption by companies which are doing this work less efficiently. In order to visualize and draw conclusions as to the relative value of different practices it is desirable to have many of them described side by side so that the advantages and disadvantages may be picked out readily. With this idea in mind, the ELECTRIC RAILWAY JOURNAL has planned and is publishing a number of articles giving information obtained through a broad survey of methods and equipment used for performing certain operations or maintaining unit parts of the car, line or track.

A survey of the painting practices used by electric railways was published in the Feb. 24 issue. A survey of the methods and equipment used for removing wheels appeared in the March 17 issue, from which it was possible to draw almost complete conclusions on how gear blanks might be standardized to meet all requirements. A third article dealing with truck overhauling is published in this issue. It is believed that such articles are among the most valuable pieces of work the paper can do. They require a great deal of labor and are very expensive to prepare. They are worth special study by the reader.

Good Savings by Improvements in the Old Shop

IN COLLECTING the information relating to methods and equipment used in truck-overhauling work, special attention was given to obtaining the ideas of foremen regarding needed improvements. If a new shop were to be constructed these men felt that a number of improvements should be incorporated, but there seemed to be a lack of progressiveness in working out savings that could be made in the present shop by adopting better methods and tools. This attitude may be partly accounted for by the experience these men have had in various efforts to convince the management that improvements in the old shop would produce a substantial return on the investment.

Many operating officials consider the shops a necessary expense and look with little sympathy on any proposal to put more money into these facilities. The situation in regard to improvements is better when it comes to building an entirely new shop, for then the management wants to incorporate all the latest methods and equipment. But managements not contemplating new shops may well give special heed to the requests with respect to small improvements in present facilities on the part of their men who are constantly studying mechanical maintenance work, for a dollar saved in the shop is a dollar added to net just as much as though it were a dollar increase in revenue. And there is much room for reducing shop costs on the average road.

For example, changes have been made in old shops that have produced surprising results in reduction of time and labor required in overhauling trucks. One shop installed two overhead traveling cranes to serve the truck shop. One of these cranes operates underneath the other and the supporting runways are entirely separate from the original building construction. Thus the strengthening of the building in general was not necessary. Another shop has installed a system of air and gas piping with convenient outlets. Many pieces of work formerly done with hand tools can now be done by special tools, with a great saving of expense. For example, nuts previously removed with hammer and chisel are now removed by the cutting torch.

Orderliness and System in the Truck Shop

THE truck-overhauling shop of any electric railway is a busy spot. The general impression that one carries away from visits to most of these is one of disorder. Truck parts are found scattered over the floor, grease and dirt are everywhere. To move about one must jump over various parts and the visitor feels much safer at a distance. Is all this necessary? The exceptions prove that it is not. Without doubt one of the least expensive improvements that can be made, and still one that will produce important results, is that of systematizing the work and maintaining an orderly truck shop.

Fix a definite location for performing certain work. Take whitewash and mark off the sections on the floor where the work is to be done. See that aisles and passageways are clearly marked and that this space is not encroached upon by the other overhauling work. Use a liberal amount of sawdust over the floor and have it replaced frequently. Have definite places for all tools and see that they are kept in their places when not in use. Arrange the equipment with the idea of expediting the work and plan the various operations for the convenience of the men who do the work.

Men do more work with less effort if confusion is avoided by convenient arrangement. It takes less time and effort to handle material once than to handle it twice. A little thought may produce a better arrangement, speed up the work, and at the same time produce better work. Is there a chance for improvement along this line in your truck shop?

Concentration of Work a Reason for New Shops

AMONG the older shops, especially those in large cities, the consolidation of properties has given the equipment maintenance department a number of shops of which none is particularly suited to the overall maintenance requirements of the present company. In order to use the facilities to the best advantage with-

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out extensive changes, it is a common practice to do different classes of work at the several shops. Thus truck overhauling is done at one shop, wheel and axle work at a second, motor repairs at a third, etc. While this uses the individual shop facilities to the best advantage, still it requires a large amount of handling and transporting of equipment. It also leads to a schedule for overhauling equipment which provides for different parts to be overhauled at separate times. This is inefficient as it requires a duplication of some parts of the dismantling and assembling work. The tendency is to do all overhauling of equipment together with painting and car body repairs at one time.

Thus the plan has been in all recent shop layouts to center at one location all the shop facilities for a property. Where the shop work must at present be done at scattered locations this is an added reason for investigating the saving possible with a new shop.

A Good Workman May, or May Not, Make a Good Foreman

FOREMEN are usually promoted from the ranks, a wide-awake management being always on the alert to detect in the workers those characteristics which are needed for the job higher up. The result is on the whole fairly satisfactory, but there is always a likelihood that a man will be promoted simply because he has been a good workman and has a pleasing personality. These virtues are not enough; in fact, while desirable they are not essential. What is essential is the ability to get men to produce and to work harmoniously. This quality is possessed by comparatively few, and is worthy of careful search.

The growing realization of the importance of the foreman is the cause behind the classes in foremanship which are now so common. The war played a part in this, because the rapid expansion of manufacturing produced an abnormal demand for foremen. They had to be made over night. The state and federal boards of vocational education have also influenced the movement. Elsewhere in this issue is an account of a foreman class held in El Paso, Tex., the results of which are typical of what is being done or can be done almost anywhere. Such undertakings either give the foremen a better appreciation of their opportunity or emphasize their unfitness for it. They also tend to bring out the foreman "timber" among the men.

Will Defacement of Cars Disappear with Finer Materials?

STREET railway men know to their sorrow that there is in every community a certain element which seems to take special delight in defacing and damaging public conveyances. There is no real motive behind this. Such vandals destroy simply for their own amusement, without reason. The tendency in the past has been to forestall this kind of vandalism by sacrificing appearance in favor of indestructible material. Usually it has resulted in a less attractive design if not in one which is actually less comfortable for the passenger. This has minimized the maintenance expense, but it has not prevented thoughtless defacement.

An entirely new thought is introduced by the experience of a Mid-Western company. Some time ago this railway commenced de luxe bus operation. The fittings, finish and equipment were selected with a view to elegance of appearance and luxurious comfort. Deep-cushioned seats were upholstered in genuine leather and nickeled fittings used. Some apprehension was felt concerning the way these expensive trimmings would fare at the hands of the general public. Since the inauguration of this service, however, there has not been a single act of vandalism. On the contrary, the public seems to have taken special pains to preserve these attractive fittings.

Is there not a lesson in this situation for electric railways? If experience shows that a satisfactory and attractive interior cannot be made of indestructible materials, why not make one of such good materials that people will be inspired to preserve their fineness? The use of plush seats in the new safety cars of the Chicago, North Shore & Milwaukee Railroad, noted in last week's JOURNAL, is a step in this direction, but only a step. The interior of the new London Underground cars pictured in the JOURNAL for May 5 carried the idea much further. And one American railway is working on plans for new interurban cars that will be finished with plate glass windows and the luxurious upholstery associated with the limousine. Of course, the primary object in each case is to popularize the service, but it is not too much to hope that at the same time vandalism will not be a deterrent to car development.

Seattle System Did Better in 1922

OF MORE than passing interest is the annual report of the Seattle Municipal Railway for the calendar year 1922, presented elsewhere in this issue.

Beginning with the first day of complete city operation, fares were increased by the elimination of cut-rate tickets. A straight 5-cent fare continued for less than sixteen months, when the cash fare was raised to 10 cents, with tokens sold at four for 25 cents. Within six months, on Jan. 9, 1921, the token fare was raised to 8⅓ cents, which rate continued to the end of the period covered by the report.

When the property was given up by its former owners a deficit had accrued, due in no small part to the refusal of the city to allow an increase in fares sufficient to meet rising costs. The city, however, found it necessary to increase fares several times, and even then had an accumulated deficit to Dec. 31, 1922, of $877,491.

The revenue for 1922 was 1.88 per cent less than in the preceding year, being $6,228,103. This was at the rate of 40.2 cents per car-mile. Figures compiled by the American Electric Railway Association show that in 1922 the receipts of 121 urban railways were 45.7 cents per car-mile on average receipts of 6.7 cents per revenue passenger against 8.3045 cents in Seattle. Operating expenses in Seattle were at the rate of 30 cents per car-mile, which is not especially low with 28 per cent of the service given by one-man cars. The average operating expenses of the 121 roads for the same period were 32.8 cents.

That the company showed a net operating income for 1922 amounting to $761,000 after the payment of bond interest is due in large measure to the immunity from taxation enjoyed by the city-owned railway. Nor was paving a heavy expense, as $69,574 was spent in maintaining paving carried in the capital account at $3,040,218. The amount spent on this item during the year was only one-forty-fourth of the first cost, which would seem to indicate that the paving burden was borne largely by other departments of the city.

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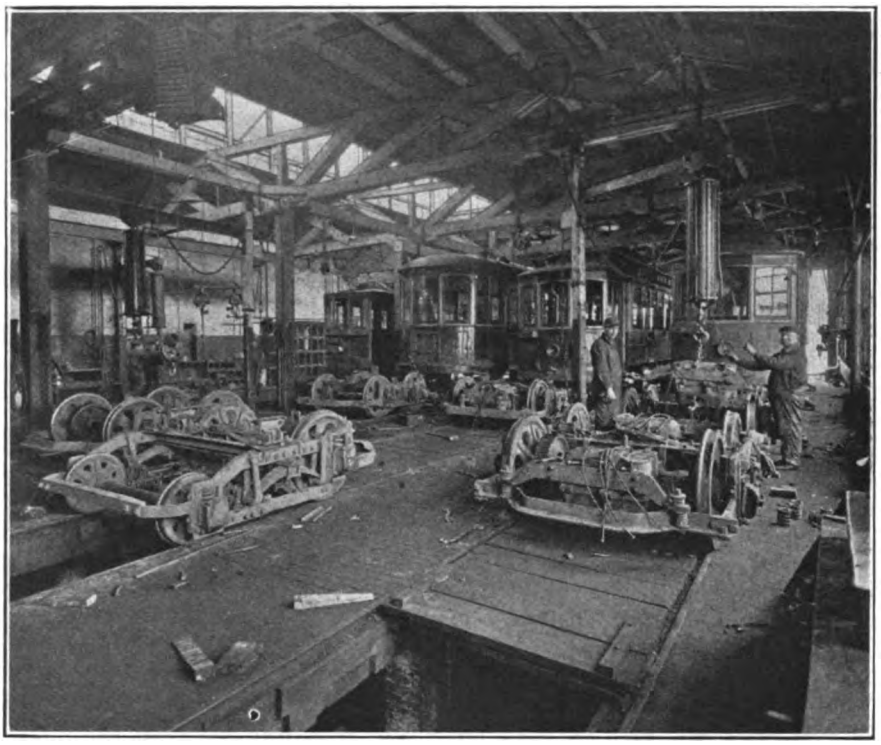
Truck Overhauling Methods

The Several Commonly Used Practices in Truck Overhaul Are Described as Result of Survey Covering Fifty Electric Railway Shops—The Best Methods to Be Followed and Most Effective Equipment to Be Used Are Discussed—Overhead Crane Provides Most Efficient Handling

THE instructions which are usually issued to a shop foreman or by shop foremen to overhauling crews regarding the work necessary in overhauling trucks can be summarized in a very few words. In effect, these are that the trucks should be overhauled in such a thorough and efficient manner that they will be placed in the best of operating condition and as nearly as possible in their original condition. For a complete overhauling, this means that the trucks must be entirely dismantled. The various parts which can be repaired again must be sent to the machine shop or blacksmith shop, all excessively worn parts replaced, and finally the trucks again assembled and made ready to be placed under cars for service. The work necessary to be done will vary with each type of truck and also quite likely with each foreman that has charge of the overhauling. Through a survey of the truck overhaul shops of more than fifty electric railways, an effort has been made to point out not only the variety of methods and equipment used, but also the most efficient practices.



Overhauling Trucks in the St. Paul Shops of the New York State Railways, Rochester. Car Bodies Are Lifted by Chain Hoists, and Jib Cranes with Air Hoists Serve the Overhauling Floor

The master mechanic of a small or medium-sized road is often forced to work at a disadvantage. He has to develop men who can be changed efficiently from one class of work to something entirely different. Generally, he lacks modern machinery and sometimes is even compelled to use machines which have been discarded by larger shops as being out of date. He has to modernize these machines as much as possible and devise attachments to make them do work never contemplated by their original designer. Yet, despite these handicaps, these master mechanics are usually required to compete with the car maintenance costs shown by very large shops, and it has been found possible for the wide-awake master mechanic to keep his costs down to remarkably low figures considering his equipment.

No two shops perhaps have the same type of machinery or follow out the same methods in overhauling. The various methods, however, can be grouped into several general classes. The methods described in this article are those which have come under observation of the JOURNAL editors while making a general survey of the subjects and which have worked out to good advantage in the particular shops where they are used.

The proper basis for truck overhauling is something that must be decided by each railway for itself. On medium-sized roads a time basis will no doubt be found most convenient, as these roads can then apportion their work and lay it out in advance so that it will not interfere with other work which the same men may be called upon to do. For large systems a mileage basis will no doubt prove the most advantageous, as it is really the mileage made by the equipment or the service through which the equipment passes that in reality determines its need for repairs. There has been a marked tendency during the last few years, however, to group the various overhauling work so that it can all be done at one time. The work necessary for overhauling the trucks, car body, electrical and brake equipment, together with the painting of a car, is then put on the same basis and all equipment is overhauled at the same time. The interval between such general overhaulings runs from one to two years. On very small systems where the cars are few they really become a part of the family. The various shop men learn their peculiarities, and the wear of the various parts and the need for repairs can be readily followed, so that with such roads there is really no necessity for any definite basis of overhauling, and the necessity for doing the work is determined by the foreman or assistant foreman of the overhauling shop.

The work of truck overhauling from the time the car is placed in the shop until it is ready to return to service may be divided in twelve general items. These are: (1) Taking measurements to determine necessary adjustments; (2) disconnecting brake rigging and motor

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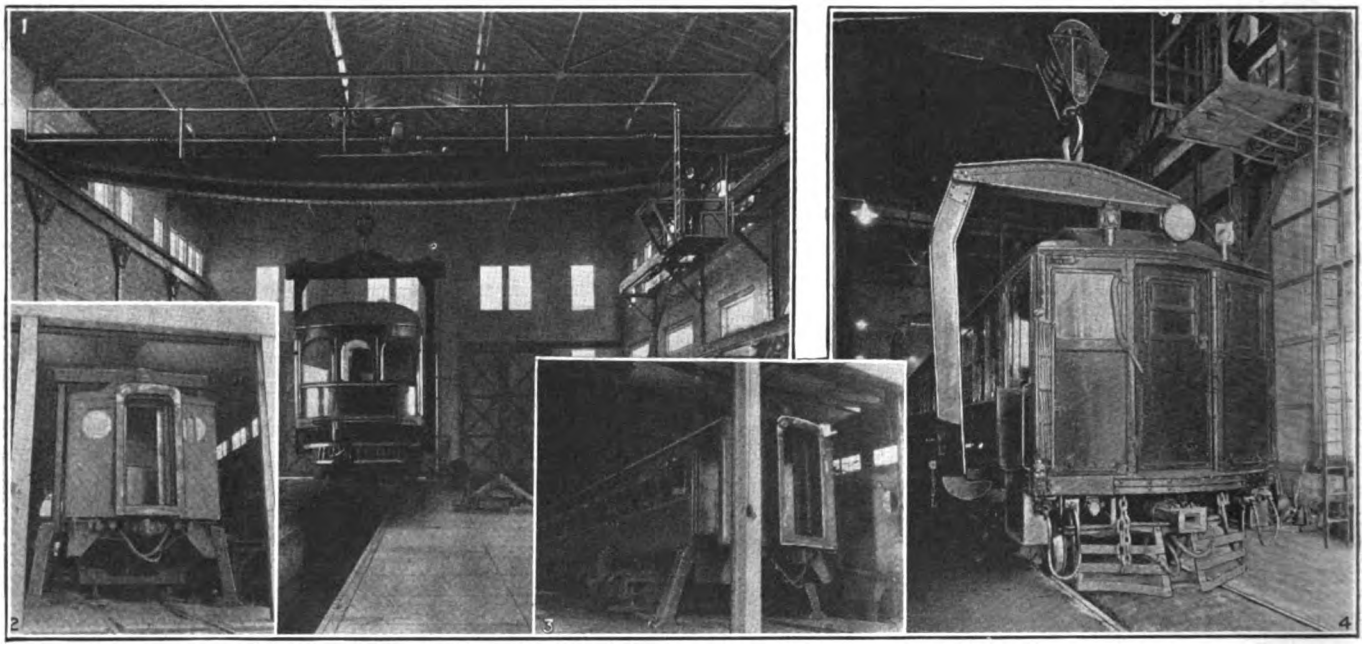
leads; (3) lifting car body from trucks; (4) placing trucks in position for overhauling; (5) inspection to determine repairs needed; (6) dismantling equipment and parts; (7) repairing various parts; (8) reassembling; (9) running trucks under car body; (10) lowering car body; (11) connecting brake rigging and motor leads, and (12) final measurements and adjustments.

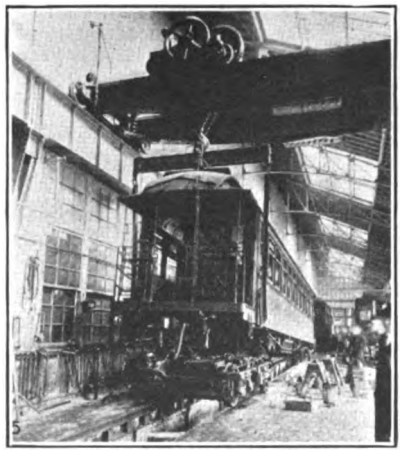
With different conditions and methods several items may be added to these. Thus where car body repairs, painting, etc., are done at the same time as the truck overhauling, and in another department, dummy or shop trucks are quite generally used. The car body is lowered onto these and moved to the carpenter shop or paint shop and is again returned to the overhauling shop when in condition to be mounted on its proper trucks. Some roads clean the trucks by some method or other before any work of dismantling is undertaken. Changes or additions to the equipment can be done to advantage while the car is in the shop for overhauling and the nature of the work may make additional operations necessary.

As soon as the car is placed in the overhauling shop various measurements should be taken to determine adjustments that will be necessary before the car is again returned to service. There seems to be no uniform practice among electric railways in regard to the person designated to do this work. It is frequently done by the shop foreman, assistant foreman, foreman of overhaulers or particular men designated to look after this detail. Cars in city service require measurements of step height, wheel guard height and side bearing height or measurements at the corners of the car body to detect weak springs or defective parts that need attention. Cars in interurban or rapid transit service require measurements of platform and coupler height. A common method is to mark these dimensions with chalk in some definite order on the truck bolster, side bearing or truck side frame. A definite location is desirable as this saves time in looking for them when they are needed. Some of the larger roads have a standard form on which to record measurements and a schedule man to follow this and other important alterations.

The disconnecting of brake rigging and motor leads is usually done by the truck overhauling crew. It is most convenient to have the car over a pit while this work is being done and most overhauling shops have pits provided. The equipment committee of the American Electric Railway Engineering Association devoted considerable time to a study of pit requirements for overhauling shops during 1920, 1921 and 1922 and its recommendations are included in the report on design of typical shop buildings presented by the building and structures committee in 1922. For shops where car bodies remain in a raised position while the trucks are being overhauled, it was considered advisable to provide individual pit space for each car overhauled, with floor space adjacent for the truck work.

One of the greatest problems of the medium-sized shop is the handling of car bodies for the removal of trucks. Information has been collected on methods and equipment used in over fifty electric railway shops. The equipment used can be grouped into six general classes. Jacks of either a mechanical, hydraulic, air or screw type were used for this work in 40 per cent of the shops visited; electric traveling cranes were used in 34 per cent of the shops; car hoists in 14 per cent, and the remaining 12 per cent





Various Methods Used for Removing Trucks from Under Car Bodies

No. 1. Raising a Connecticut Company interurban car for truck removal. A 15-ton crane spans three tracks.

No. 2. Raising a New York, Westchester & Boston car body to remove trucks.

No. 3. By use of turntables in the floor, trucks are removed at the side of the cars in the shops of the New York, Westchester & Boston Railway.

No. 4. Crane room of the Long Island Railroad where car bodies are lifted from trucks.

No. 5. Lifting one end of a car for truck removal in the Wilson Avenue shop of the Northwestern Elevated Railroad, Chicago.

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was divided among hoists operating on an I-beam or monorail; suspended hoists of a chain, hydraulic or air type and drop platforms or elevators. In this connection it is interesting to note that of three new shop designs completed this year, Boston uses a traveling crane and both Toronto and St. Louis use car hoists.

In deciding on the best type of equipment for any particular shop some of the points that should be given consideration are: Initial investment, time required for operation, adaptability to other service in the shop, convenience of operation, accident hazard and weight of cars to be handled. For handling heavy cars and equipment such as is used in interurban or rapid transit service, overhead traveling cranes or hoists mounted on I-beams or monorails are favored by most shopmen. This class of equipment has another advantage in that it can be used for handling heavy parts and dismantling or assembling of the equipment in the truck shop and thus be kept in almost continuous service. The initial cost of traveling cranes, however, is more than for the other types. Where ground conditions permit the bringing of cars in over the overhauling shop, drop jacks or elevators afford a convenient means for removing trucks.

Lifting a Car Body by Means of Two Monorail Hoists in the Harv ard Shops of the Cleveland Railway

Special Rigging Assists in Lifting Car Bodies

The accompanying illustrations show how cars are handled by the different methods. With overhead traveling cranes a special rigging is quite commonly used. This consists of a yoke extending over the top of the car body with two arms reaching to the bottom of the car. The arms have projections at the bottom to catch underneath the car body. An interesting feature of the Wilson Avenue shop of the Northwestern Elevated Railroad, Chicago, is the method used to store this rigging when not in use. The truck shop is located on the second floor on a level with the elevated structure and holes have been cut in the floor so that the two arms of the rigging can be let down through these. The only floor space occupied by this arrangement is that taken by the boom.

In most shops but one traveling crane is used and the car body is lifted one end at a time and is then let down on horses, which with the cross-supports bring the bottom of the car about 4 ft. 6 in. above the floor. A 6-in. I-beam is a convenient support where cross-beams are necessary. Instead of using the rigging just referred to the cross-beam is sometimes fitted with stirrups so that chains from the crane can be hooked in for lifting. In order to reduce the strain on the car body some shops raise the car body by three operations. One end is raised about one-half the height desired and let down on horses; the other end is then raised the full height and then a second lifting of the first end brings this to the desired height.

The New York, Westchester & Boston Railway uses an overhead crane and removes the trucks from the side of the car. A yoke rigging is attached to the crane for lifting and the car body is lowered onto heavy fabricated hinged supports which drop into position under the car sills. The track used for raising cars and also the one adjoining has hand-operated turntables of a diameter large enough to take a single truck. Before lifting the body, the car is located with the truck to be removed on this turntable. After lifting, the turntable is rotated through 90 deg. and a chain from the crane

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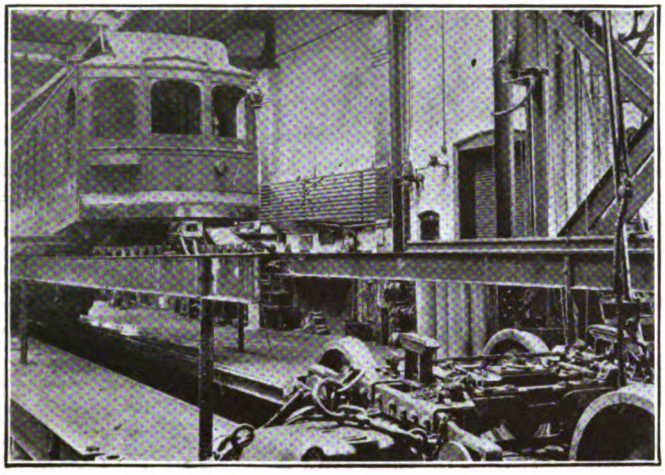

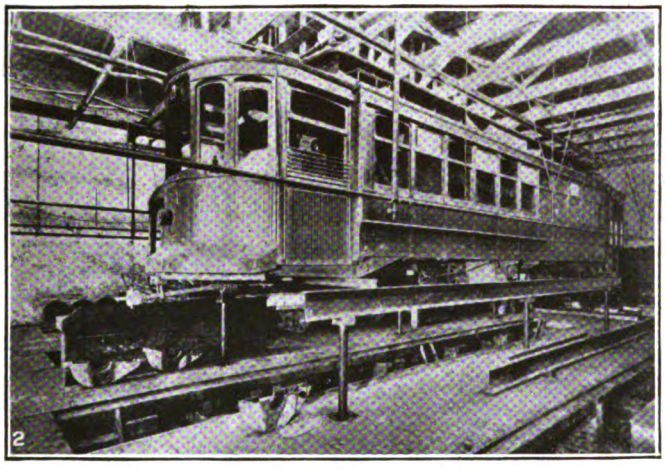

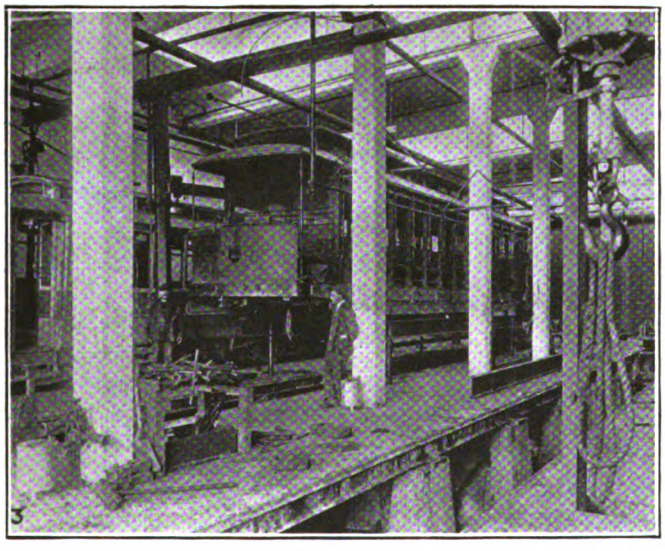

draws the truck from under the car to the adjoining track, where the truck is again swung around and drawn by the crane to a convenient point for overhauling. Trucks are replaced by reversing the operation.

The Long Island Railroad has a crane room constructed at one end of its overhauling shops. Two overhead traveling cranes are used for lifting car bodies from trucks so both ends are lifted at the same time. The trucks are moved to the overhauling tracks by an electric tractor, the two trucks of a car being hitched together. The car body is lowered onto shop trucks and then is shifted by the tractor to the body and equipment overhauling section.

Two of the shops of the Brooklyn Rapid Transit System where elevated equipment is overhauled have drop jacks. With these the trucks are lowered from underneath the car body directly into the truck-overhauling shop. Heavy hinged supports hold the car body while the truck is being removed and a shop truck placed underneath. There is sufficient space at each end of the drop jack so that either truck may be placed over this. Traveling overhead cranes serve the truck-overhauling shops.

A drop jack or elevator is used in the Throop Street shop of the Metropolitan West Side Elevated Railroad, Chicago. This elevator is of a hydraulic type and is the most powerful elevator in the city of Chicago, if not in the Middle West. It has a capacity of 100,000 lb. and is operated at a speed of about 12 ft. per minute. To remove a truck the car is run over the elevator until the truck rests on it. Hinged supports are placed underneath the car body and the elevator is lowered with the truck upon it to the overhauling shop. This shop has a raised pit track and the truck is operated by its own power from the elevator to the pit track. The shop has a mezzanine floor where shop trucks are stored. After the truck to be overhauled is removed the elevator is raised to the mezzanine floor and a shop truck is received and placed under the car body. The car is then moved so that the other truck can be similarly replaced. Shop trucks are placed underneath cars only where it is necessary to keep them in the shop over a considerable period. For the mere changing of a pair of wheels or a motor the car is held over the jack until the change is completed on the lower floor.

Car Hoists Are Favored by a Large Number of Users

The type of car hoist quite generally used by electric railways consists of two I-beams or T-rails parallel to the track. The beams are raised to lift the bodies by means of screw supports. These screws are operated simultaneously by shafts and gearing installed beneath the floor level. An electric motor is generally used to operate the hoist, but in some cases these are operated by hand. A shop arrangement quite generally favored where car hoists are used is to provide pits the length of one car and have a car hoist for each pit. Accompanying illustrations show several shops with car hoists and give a good idea of the manner in which equipment is handled. In lifting car bodies short lengths of rail or

The Car Hoist Is Popular for Use in Truck Removal

No. 1. Lifting one end of a car by use of a car hoist in the Syracuse shops of the New York State Railways.

No. 2. Car body resting on car hoist while trucks are being overhauled in the shops of the Spokane United Railways, Spokane, Wash.

No. 3. Car hoist as used in one of the shops of the Connecticut Company.

No. 4. Car hoist particularly adaptable to lifting car bodies of interurban cars.

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I-beams are usually placed across the side supports. For general overhauling the car body is ordinarily left in the raised position while the trucks are being overhauled, although the body can, of course, be lowered onto shop trucks and moved to another part of the shop.

On the smaller roads the use of jacks of various types is quite general. This method has the advantage of low first cost and can be used in shops without the necessity for special construction. Most shops already constructed would need strengthening to use some type of overhead lifting device, and in most cases there is insufficient head room for cranes. The method employing jacks requires more time, is tedious for the workmen and has a greater accident hazard than other methods.

Some shops have strengthened the overhead structure sufficiently to install hoists of either a chain, air or hydraulic type. Four of these are needed to lift a car unless some type of monorail construction is used. In general, the present design of shops determines the methods that can be used for lifting cars. For new shop construction, however, most master mechanics favor either traveling cranes or car hoists.

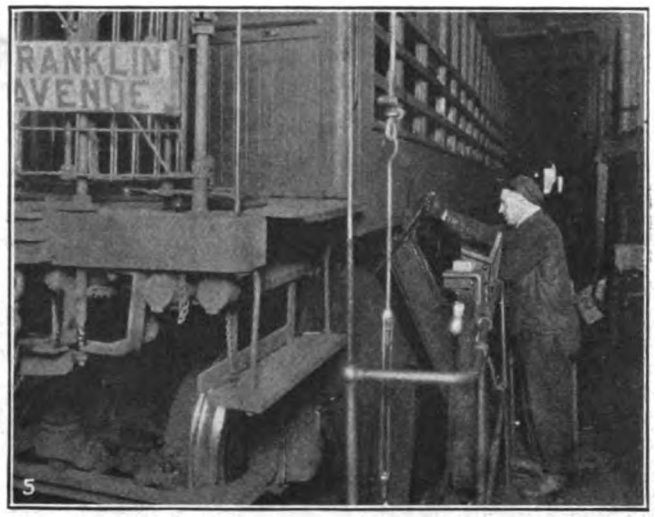
Removing Trucks from Under Car Bodies

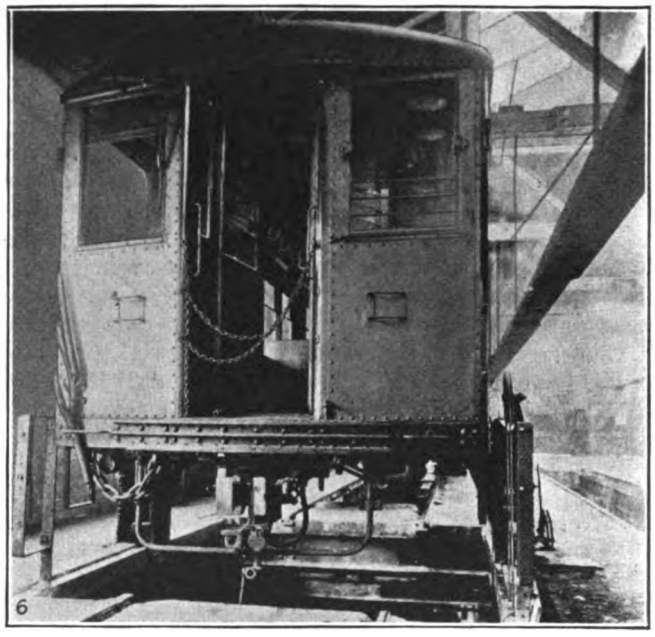
In most electric railway shops the work of truck overhauling is done on the rear of the same tracks over which the car bodies are jacked up. All that is necessary then to place trucks in position for overhauling is to run them out from under the car bodies. With light trucks these can be pushed out by hand without much effort, four to six men being used for this operation. In order to reduce the labor required for this and to overcome the necessity of taking men from other work to help push out the trucks several methods are in use.

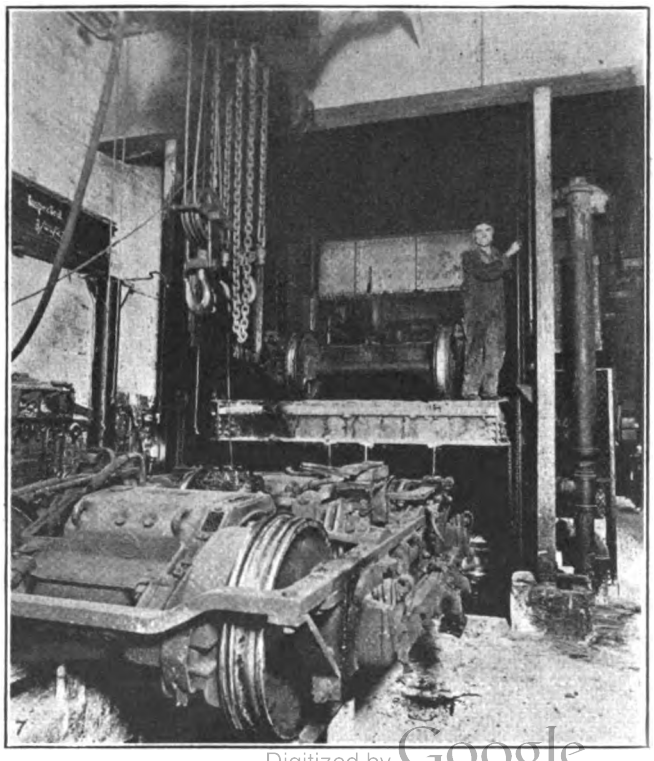
For trucks equipped with motors a common method is to use the motors on the truck to propel it. For controlling the current to the motors a number of different arrangements are used. A controller mounted in a permanent position is a common method. A portable control outfit is used in the Harvard shops of the Cleveland Railway with good results. Other railways make use of the same controller used for operating a transfer table, a car hoist or the overhead electric crane. In addition to these methods trucks are hauled out by traveling cranes or tractors.

In regard to carrying on the work on the trucks themselves, most railways favor raising the truck off the floor so that the overhaulers can do most of their work in an upright position. A common method is to place the truck on low horses, but several shops have specially constructed cradles or truck stands. One of these is described on page 853 of this issue.

The tracks in the truck overhauling shop of the Third Avenue Railway, New York City, are raised about 15 in. above the floor by placing them on wooden supports. For new shop construction a better type which accomplishes the same result is to have the floor depressed around the overhauling truck. The rails can continue then on the same level throughout the shop. Some rail-







The Jack and the Elevator in Truck-Overhaul Work

No. 5. Lowering a truck into the overhauling shop by means of a drop jack in the Thirty-sixth Street shop of the Brooklyn Rapid Transit Company.

No. 6. Metropolitan West Side Elevated car over elevator in Throop Street shops, Chicago, ready to receive shop trucks after removal of operating trucks for overhauling.

No. 7. This powerful hydraulic elevator in the shops of the Metropolitan Elevated, Chicago, has a capacity of 100,000 lb. and is operated at a speed of 12 ft. per minute.

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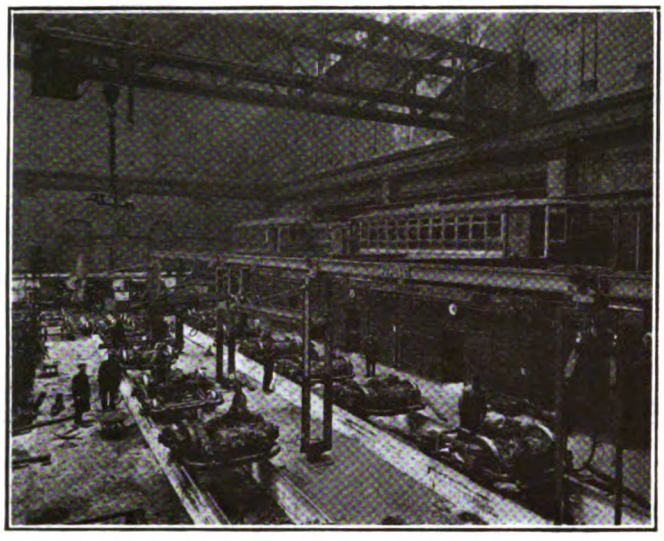


The Truck-Overhauling Tracks of the Third Avenue Railway, New York, Are Raised to a Convenient Height for Efficient Truck Overhauling

ways overhaul trucks over pits, and an accompanying illustration shows the overhauling shop of the New York State Railways in Rochester, where part of the pits are covered over. The work on the top portion of the trucks is then done on the floor level and the trucks are moved over the pits for the underside work.

In lifting trucks onto or off overhauling stands the most satisfactory method appears to be to attach the lifting rigging to the wheels. Strains to the truck frame are thus avoided. Also, where journal boxes are packed, the danger of pressing the waste away from the axles is avoided. A convenient type of lifting tackle will be described in a later issue.

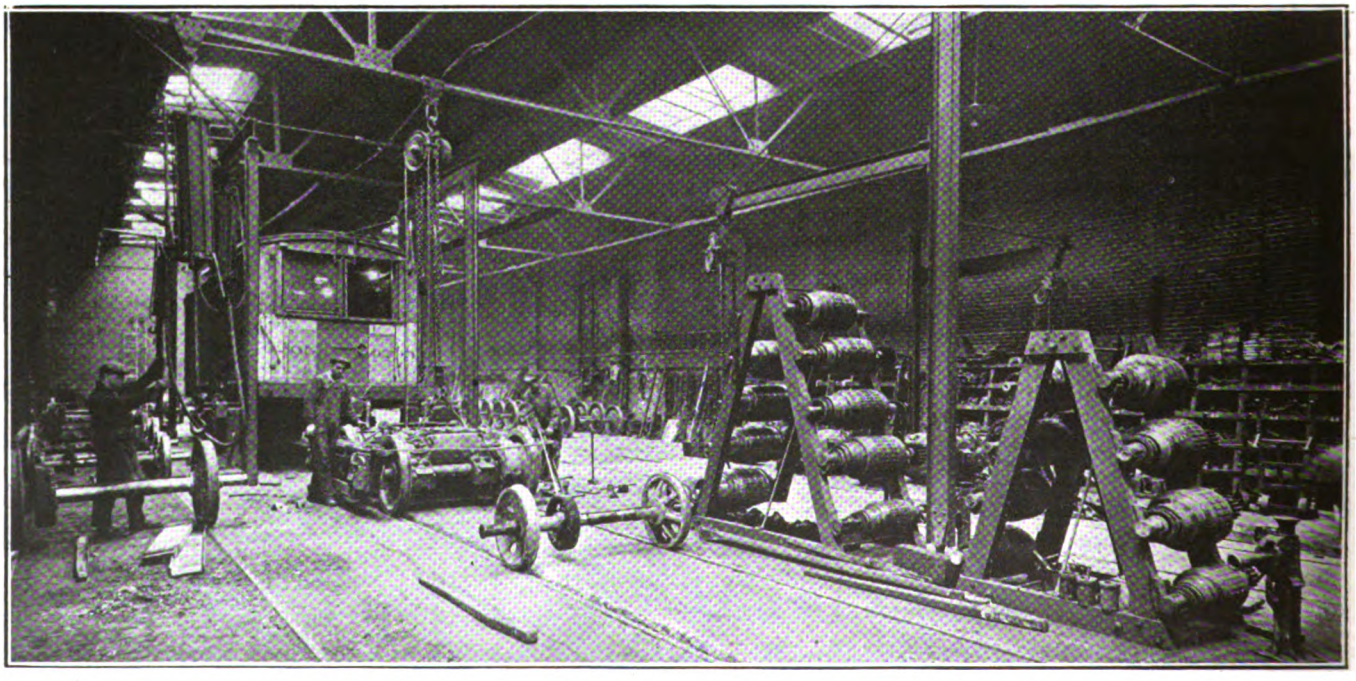
The time required for placing the trucks in position for overhauling after the car is placed in the overhauling shop was found to vary from four or five minutes to thirty minutes per car. With reference to the length of time consumed the various methods appear to follow in this order: Raising by jacks takes the longest, then separate overhead hoists, car hoists, drop jacks, monorail hoists and traveling cranes. The traveling crane method apparently takes the least time. The length of time consumed, however, varies to a considerable extent with the number of cars that are handled in a shop at one time, the weight and type of the car, etc.

In one shop where the trucks for an average of three cars per day are overhauled the following method is used: The three cars are placed on two tracks which are served by an overhead traveling crane. The foreman of overhaulers checks dimensions, while two men disconnect brake rigging and two other men disconnect the motor connections. Two men with a man in the crane then lift the car bodies one after another. The trucks are then run out under their own power and are lifted into overhauling position on stands by the crane. The entire work for the three cars is done in a little less than one-half hour, or an average of about ten minutes to a car.

An idea of the speed obtained through use of a drop jack can be obtained from the fact that in the Throop Street shop of the Metropolitan Elevated, Chicago, the time taken to change a pair of wheels from the moment the car enters until it leaves the shop is but thirty minutes. The work done during this period includes the disconnecting of the brake rigging and motor leads, the lowering of the truck into the overhauling shop and the changing of wheels and replacing of the truck under the car with proper connections so that it can be returned to service.

THE WORK OF OVERHAULING TRUCKS

The work of overhauling will vary considerably even in the same shop. One thing that is most essential for efficient work, however, is a carefully worked out system so that each man will know what parts he is expected to look after and is held responsible for. By assigning men to do a special type of work, they become expert in that line and so can do better work. They also give more attention to making good repairs if they know that they are the ones held responsible for improper workmanship which may cause detentions or accidents



Air Hoists Are Used to Lift Car Bodies in the Federal Street Shops of the New York State Railways, Rochester, N. Y.

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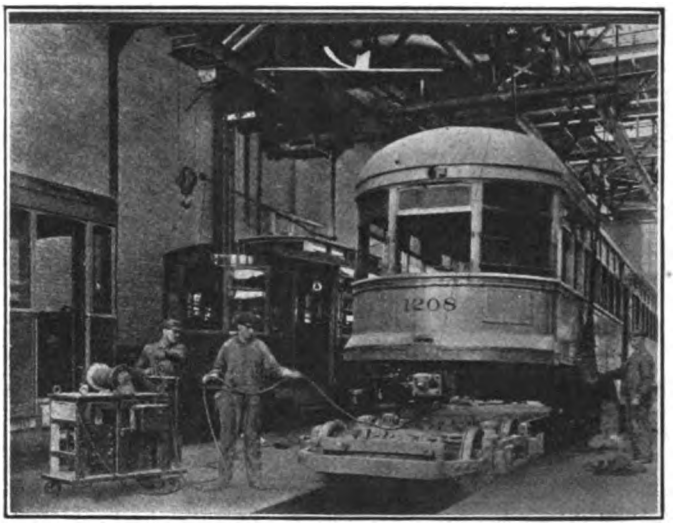
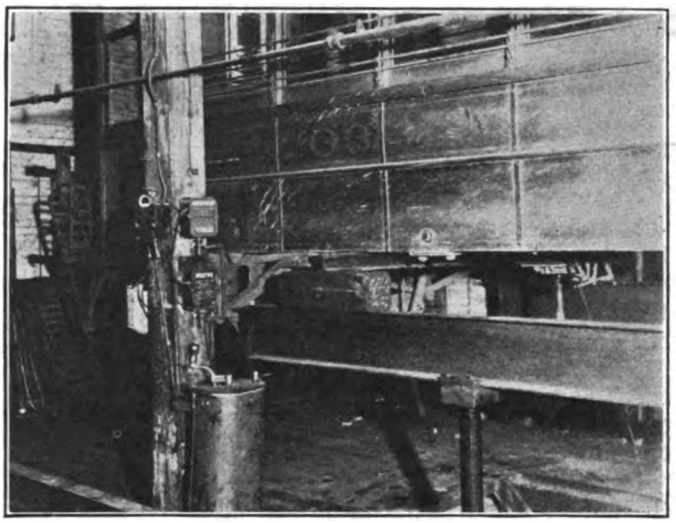


Removing Truck from Underneath Car Body with the Aid of a Portable Control Outfit in the Cleveland Railway Shops



Trucks Are Moved from Underneath Car Bodies by Their Own Power by Using the Car Hoist Controller in the Shop of the Spokane United Railway

in service. The repair of tools necessary for this particular work should also be assigned to the men using them. As an example of a method in force in one shop one man was assigned to remove all pinions and was held responsible for proper condition of his tools. Previous to the inauguration of this system wrenches for removing pinions were in the blacksmith shop most of the time. With the new system they are now always kept in good repair.

The following division of duties is used at one overhauling shop with good results. This shop averages four trucks and eight motors per day. Motor overhauling is done in a section alongside the truck overhauling. Two overhaulers and two helpers are used for overhauling the motors. One overhauler and a helper take off pinions and reinstall them, take the waste out of the bearings and fit new bearings into the housings. One overhauler cleans commutators, inspects brushholders, repairs motor wiring, installs wiring cleats, thimbles, etc., where necessary and jumps in on any wiring of fields with the other men.

The overhauling of the four trucks per day is done by four overhaulers and four helpers. These men strip the trucks and repair and replace brake rigging, bolsters, pedestals, angle frames, etc., as found necessary. One of these overhaulers is made responsible for the proper suspending of the motors when they are reinstalled.

An outline of the work done in overhauling a truck reads much like a list of truck parts, for all parts require attention. From among the instructions governing this work as issued by various companies the following points have been taken to illustrate important practices which ought to be followed more generally:

Trucks should be examined closely for loose bolts, nuts and rivets. Those in bad condition should be replaced and all tightened securely.

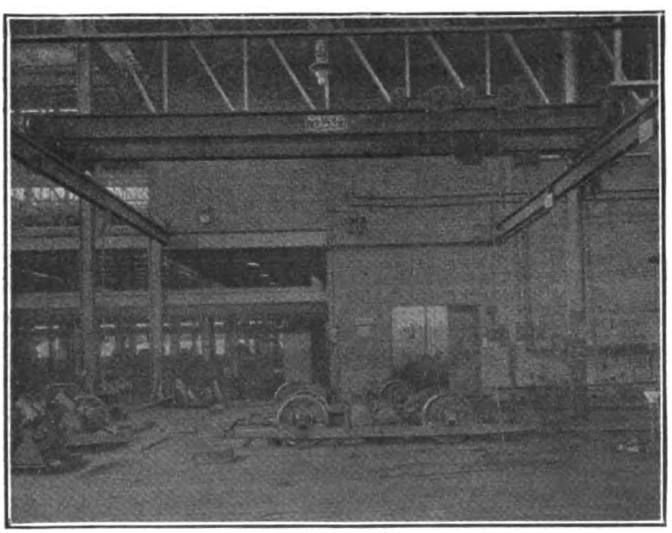
Special attention should be given to brake rigging. Cotter keys must be properly spread and brake release springs adjusted. New brake shoes and turnbuckles should be applied if these are badly worn. Prompt release of brake shoes is important and points where brake rods rub on the trucks and guides should be greased.

Truck side and center bearings should be rigidly attached to the bolster and this should be set by a standard gage.

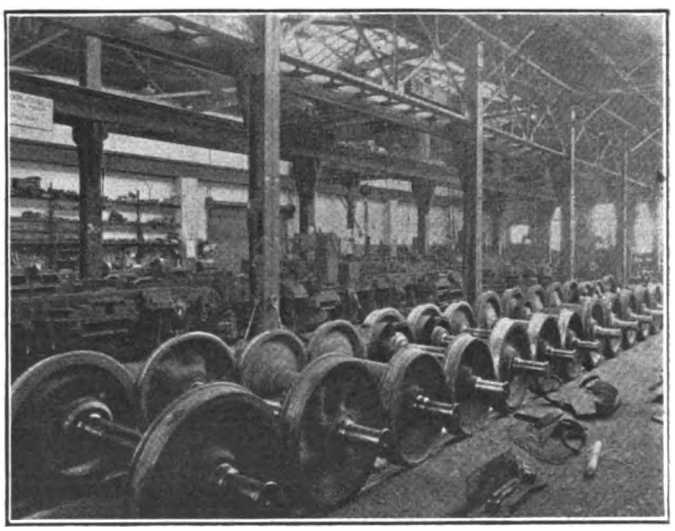
Wheels should be checked for diameter and flange wear and those with sharp or thin flanges should be either turned down or replaced.

The diameter of wheels on the same axle should be the same to prevent crowding of the rails, with a consequent destruction of flanges and an increase in train resistance.

The diameter of pairs of wheels on the same car should not vary by more than ¼ in. Otherwise there is inequality of load on the motors.



A 5-Ton Crane Operated from the Floor Serves the Truck-Overhauling Shop of the Detroit United Railway



The Truck-Overhauling Tracks of the Long Island Railroad Are Served by an Overhead Traveling Crane

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Gears and pinions should be checked and renewed if they will not last until the next overhauling.

Journal boxes, covers, bearings, plates, etc., should be inspected and removed if badly worn or broken. Journal bearings should be inspected and thin ones should be replaced.

Axles should be tested in a lathe to detect any that are bent. Any not true, badly worn, or which have made their predetermined maximum mileage, should be replaced.

Axle collars should be checked and tightened.

In collecting information on truck overhauling an attempt was made to determine the number of men required for this class of work. For shops overhauling from four to twenty cars per week an average of about one overhauler and one helper are used per car per week.

The wages paid this class of labor were found to vary through quite a wide range. For helpers from 40 cents to 60 cents per hour is paid and overhaulers receive from 60 cents to 75 cents per hour.

Many railway officials feel that motors should be sent to another department for overhauling. Better work will no doubt result from doing this in a cleaner, lighter place than the truck-overhauling shop. Most roads, however, do such work as taking off pinions, removing waste from the armature and axle bearings, fitting new bearings into the housings, cleaning commutators and brush-holders, repairing motor wiring and cleats, changing fields and painting the inside of motor shells on the floor adjacent to the truck-overhauling work. Where armatures or fields require repairs, however, these are removed and sent to the electrical department or armature room for the necessary work.

After the truck overhauling is completed, of course, the returning of the truck to the car body is taken care of by the same equipment as that used for removing it. In talking with the various men responsible for truck overhauling, all were agreed that if they were building new shops many of the methods and some of the equipment used could be replaced with more efficient methods and equipment. The use of overhead traveling cranes was favored by the majority for new shop construction, and one large railway that is now working on a design for new shops has included a very complete truck cleaning department. The method contemplates the use of large vats to be filled with lye. The trucks are cleaned by placing them in these vats in a manner similar to that used by the New York, New Haven & Hartford Railroad and the Kansas City Railways. These methods were described in the ELECTRIC RAILWAY JOURNAL for March 21, 1914, and March 19, 1921. In this new shop design it is also contemplated that provision will be made for air and gas piping so that rivets can be removed and various parts cut by an acetylene torch. Receptacles for attaching leads for electric welding are also to be included, and finally provision is to be made for repainting the trucks by a spray-painting system after overhauling and before they are reinstalled underneath car bodies. It is evident that many improvements of this character could be introduced in new shops with proper consideration to design, and no doubt some of them could be added to existing shops to advantage.

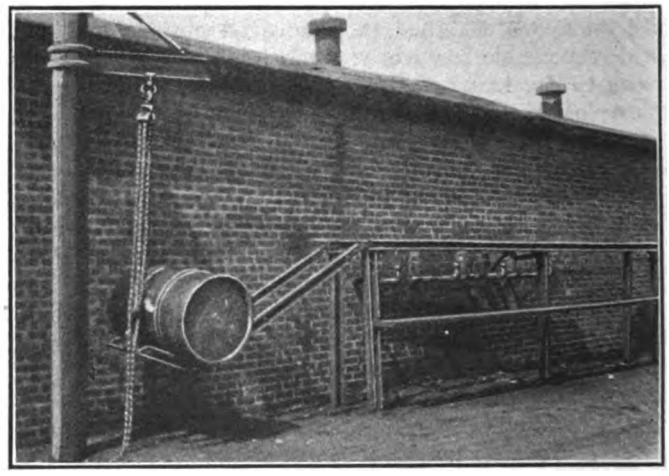
Toronto Report Shows Surplus

THE editorial comment in the last issue of this paper on the Toronto railway report erroneously referred to the return on the investment as "infinitesimal," because the "net income carried to surplus account" was only $109,468 on a basis of fixed assets of more than $34,000,000. This sum of $109,468, however, was the surplus after fixed charges, depreciation, organization expenses and various reserves had been deducted, and after $425,108 had been charged against redemption of debt (or repayment of capital). For the period covered by the report the system had an operating ratio (including taxes, but excluding depreciation) of slightly less than 68 per cent. Attention is called promptly to this error in order that readers will not be misled.

A Convenient Oil-Handling Arrangement

A SPEEDY and convenient method of emptying oil barrels has been installed at the East Twelfth Street shops of the Buffalo & Lake Erie Traction Company. The various oils used by the railway are kept in large tanks in an oil house separate from the main shop buildings. From the upper part of each tank an intake pipe runs out horizontally through the back wall of the oil house, bends upward at right angles and terminates in a screw cap. The oil is poured from the barrel through a funnel into the opening of this pipe.

On account of the height of the intake it was formerly somewhat of a problem to get the barrel into a position



Barrel Being Raised to Level of Runway

where its contents could be emptied into the funnel. To remedy this difficulty a special rack and hoist have been devised, as shown in the accompanying illustration. The rack is composed of two parallel light-weight rails about 18 in. apart, running horizontally along the back wall of the oil house and supported by several other rails of the same type set vertically in the ground. The axis of the barrel to be emptied is at right angles to the horizontal rails, and the barrel is then at such a height that there is just convenient space to introduce a funnel between the bung hole and the opening of the oil intake pipe.

An inclined approach to the rack is made by two short rail sections which are hinged to the longitudinal members at one end and rest on the ground at the other end. The ends which rest on the ground are connected by a strong tie rod under which passes the hook of a chain hoist.

A full oil barrel is placed on the lower part of the inclined section, and when the hoist is operated the rails are raised until they are on a level with the main part of the rack. The barrel can then be rolled along quite easily until it is located above the proper intake opening.

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Armature Practice on Chicago "L"

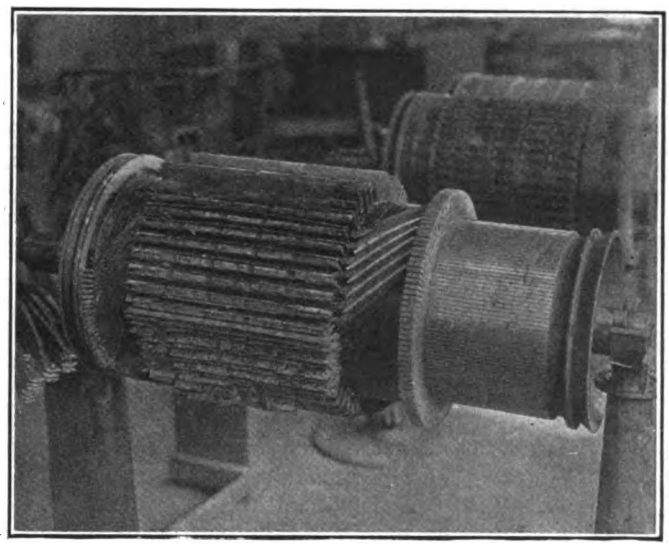
Outstanding Features of the Armature Maintenance Practice of the Chicago Elevated Lines Are Thorough Mica Insulation of the Coils, Heating to Remove Shrinkage and No Patchwork in Repairs

THE secret of proper maintenance of railway armatures lies in the correct selection of materials used in the rebuilding and the careful insulation of bars in the reconstruction. In the armature room of the Metropolitan West Side Elevated Railway shops, Chicago, the process of reconstruction has been gone into to such an extent that a very low record of armature failures has been established. The policy of "no patchwork" has been rigidly adhered to, and has resulted in a material saving of time and labor. Two especially interesting features upon which the engineers of the Elevated lay great stress are complete mica insulation of coils and reinforcement of corner insulation.

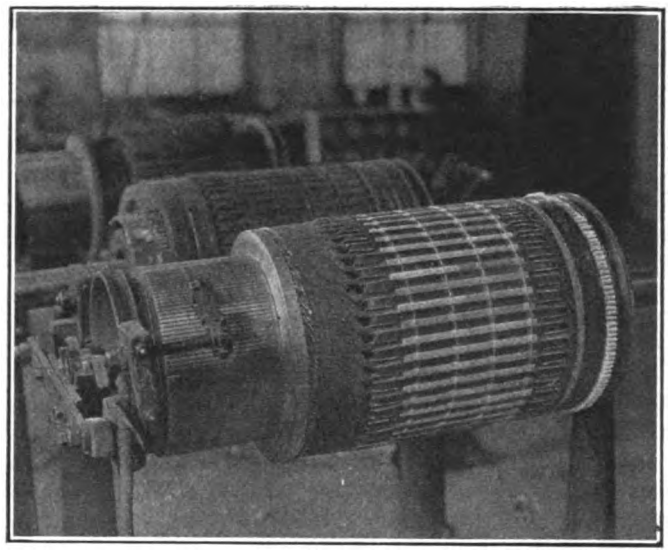
After the coils have been cleaned by the boiling process described in the ELECTRIC RAILWAY JOURNAL of March 3, 1923, page 377, they are then ready for the taping machine. Mica of 0.010 in. thickness is cut by the use of steel templets to fit the shape of the rear and front ends of the coils. Six can be cut at once, and one man working four hours can cut enough of the mica strips to supply ten armatures. These strips are sorted and then placed in a box for future use. The proper shaped mica is laid between bars of the coil and on the outside, and each is taped separately, as far as the bend.

As the coil must be compact enough to allow it to be placed in the slot of the armature and still provide mica insulation throughout, it is necessary to tape with the one-half lap process only every other bar, through the straight portion. Thus, in a three-bar coil the inside bar is left bare from bend to bend on the straight portions, while in a five-bar coil the second and fourth bars are bare. A coat of plastic insulating paint is applied to the bars and they are temporarily clamped together and placed in an oven of 300 deg. F. for one hour. Upon removal, they are pressed together in order to make a solid mass, and clamps are applied to hold the pressure. A layer of one-half-lap oiled linen tape is applied on the straight parts from bend to bend. The coil is again placed in the oven for an hour, after which a layer of one-half-lap cotton tape is applied. Painting with plastic insulating paint and a final period of one hour in the oven completely prepare the coil for use.

As can readily be seen from the foregoing, an important item in the process is the heating to remove all shrinking and dampness. To insure the absence of these factors, a final heating is given the coils just before they are placed in the core. A plan which has proved very satisfactory has been to place ten coils in the oven at once, and as one is removed to be placed in a core, it is replaced by another, thus keeping ten coils in the oven at a time.



Wood Insulators and Mica Core Insulation



Completed Armature Ready for Banding Machine

With the coils prepared in this thorough manner the next step is properly to prepare the core. Often the core has been injured in such a manner that it becomes necessary to press the laminations into shape. This should be carefully done in order to insure a first-class job. The core should also be filed to remove sharp corners and the commutator must be filed and tested for shorts. Insulation consisting of a layer of molding mica 0.025 in. thick, followed by one-half-lap cotton tape and a coat of insulating paint, is then placed on the front and rear coil supports. Insulation in the form of plate mica 0.025 in. thick is next placed in the slots. To reinforce the corners, which are the vital spots in armature construction, as practically all failures occur at this point, a special method has been followed. A piece of molding mica 2 in. x 4 in. of 0.10 in. thickness is heated and formed to the shape of the slot with a die. A piece of flexible molding mica 4½ in. x 15½ in. of 0.025 in. thickness after being formed is shellacked in

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the slots, as will be seen from the accompanying photograph. The 2-in. x 4-in. corner pieces are then placed inside the longitudinal mica troughs in such a manner as to produce a double thickness of mica insulation at the corner. The core is now completely insulated and is ready for the coils.

As previously stated, the coils are heated before being placed in the core. This fact cannot be too strongly emphasized, as the heating process is one of the most important in the reconstruction work. The coils for the first or lower layer are now placed in the slots and connections made to the commutator. In the case of the GE-55 motor, the front ends of the coils are separated from each other by wood strips $\frac{3}{16}$ in. thick and the height of the coil. These strips are curved to fit the contour of the core and are only used on the lower layer of the coil. The rear ends of the coils have previously been fitted with clips, and hard mica is placed between bars at a point where the bend comes just before the bar enters the clip. The same use of sheet mica is followed at the commutator ends of the coils. This is done to insure proper insulation at these critical points.

Steel clamps or straps are then placed about the armature at the coil ends and drawn up in order to form a compact mass of the lower level of coils. These clamps are removed after all coils are firmly drawn into position. A test for shorts with 110 volts d.c. is made of the commutator and the coils which are now in place.

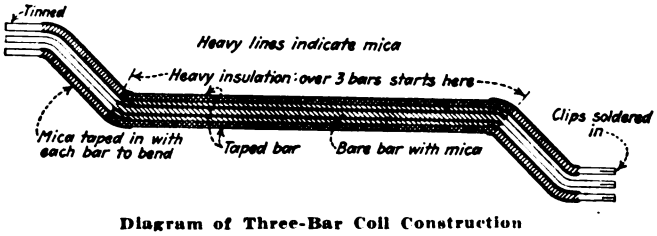

Diagram of Three-Bar Coil Construction

By the plan described, the coils up to this point have been thoroughly insulated from the core and from each other by at least one thickness of mica and in the bends and corners by at least two thicknesses. The insulation between the lower and upper coils at what are known as the coil ends is provided by means of two layers of 0.010 in. molding mica, one layer of 10 oz. duct and two coats of shellac. A ½-in. strip of 0.035-in. mica 15½ in. long is used in the slot. A break-down test of 3,000 volts a.c. for one minute is now given to the lower coils.

The upper coils are placed in the same manner as the lower coils, with the exception of the $\frac{3}{16}$-in. wood strip, which is omitted due to the lack of space. Plate mica is placed between the bars of the coils and asbestos between the rear clips, and the upper coils are soldered to the clips at the rear. However, the front or commutator end is soldered and a copper separator is placed between the leads. After the top lead is driven down, it is wedged in place with a copper slug, which is filed and soldered.

Heating of the armature to take up shrinkage is now accomplished by use of a low voltage and high amperage current which is passed through a completed coil, which consists of both the upper and lower parts. A temporary holder with carbon brushes has been erected on one of the supports to facilitate applying current to the coils for this heating process. The coils are then driven down to the slot with a ½-in. fiber drift, the mica is trimmed off, clamps are applied front and back, and the armature is placed in the oven for twelve hours at a temperature of 260 deg. F. During this period of baking the clamps are drawn down occasionally as the shrinkage is taken up in the coils.

After being removed from the oven the armature is banded on the banding lathe with mica, asbestos and leatheroid, with one layer of cotton on top, forming the insulation under the bands. One coat of amber varnish is then applied to the armature by means of a brush. From continued experiments it has been found that the most desirable and efficient way to apply the varnish is by careful use of a brush. Then the armature is again placed in the oven at 260 deg. F. and allowed to remain until the next morning. One coat of amber varnish is then applied every one and one-half hours until eight coats have been applied. The armature is then taken out of the oven and cooled.

To provide additional insulation to the commutator ends and to insure the armature against flash-over, three layers of boiled linen tape cut 0.010 in. in thickness on the bias with three coats of amber varnish are wound over the retention ring of the commutator. The armature is now ready for service.

In the opinion of the shops department of the company an armature prepared in this manner should operate without an electrical breakdown for at least ten years. On a property the size of the Metropolitan Elevated, which operates 283 motor cars with two motors per car, immunity from armature trouble is one of the greatest factors in securing low maintenance cost of equipment. Previous to this régime of the careful selection of materials and this new thorough method of insulation, it was not an unusual thing to have four armature winders with the customary helpers working overtime from four to five nights a week in order to keep enough armatures on hand to keep the road in operation. Naturally, following the installation of the new system it took time properly to rebuild and reconstruct all armatures. Now this work has practically been finished, and at present only two armature winders with the corresponding number of helpers are required to handle all the work in a comfortable fashion. Most of the work now being done is the rebuilding of armatures which have been damaged due to some mechanical defects in the shafts or spider. A group of nineteen extra armatures is kept on hand at all times immediately to replace any which may have to be removed from service. While the policy of "no patchwork" has been rigidly adhered to with profitable results, an upper coil will be replaced if damaged by some mechanical cause, such as the armature riding on the pole piece. Rigid adherence to this high-class reconstruction work has proved very profitable.

Loss of Head in Pipes

THE formula for loss of head in new, clean wrought iron pipe carrying water, given in the article on page 806 of the issue of this paper for May 12, 1923, should read as follows:

$$H = \frac{0.0319}{d^{1.16}} V^{1.9}$$

where H is the loss in head in feet per hundred feet of pipe, V is the velocity of flow in feet per second, and d is the pipe diameter in feet.

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The Asphalt Wearing Surface Being Placed Upon Completed Asphalt Concrete Base

Asphaltic Concrete Base Makes Possible Rapid Paving Program

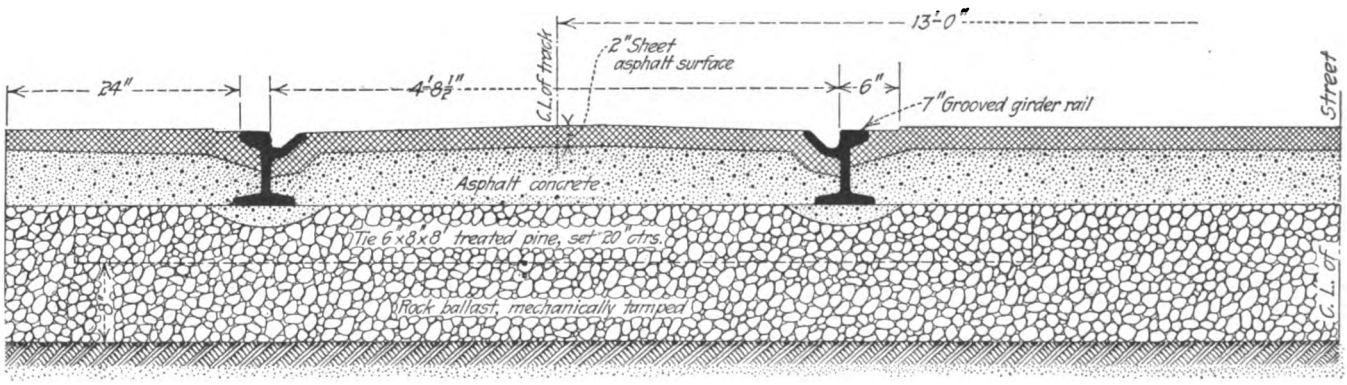
Pacific Electric Railway Abandons Hydraulic Concrete Base Because of Necessity of Keeping Track Under Traffic and Inability to Single-Track Service

By Clifford A. Elliott
Cost Engineer Pacific Electric Railway, Los Angeles, Calif.

THE Pacific Electric Railway, in operating a large mileage of local street car lines in some ten cities of southern California, has been confronted with various improvement ordinances requiring reconstructing and repairing of tracks. Such ordinances specify that the pavement in and about high-T and grooved-girder rail shall consist of 6 in. of hydraulic concrete base and 2 in. of sheet asphalt wearing surface. It has been found to be an impossibility to continue the use of this type of pavement due to street traffic, both automobile and street car, and to the inability to kill one track of a double-track line during the period of reconstruction and paving. A new type of paving was therefore necessary and the resultant type has come as an outgrowth of nine years of experimenting. It has met the approval of the municipalities where permission has been granted to substitute it for the former type.

The company is now using a type made up of an asphalt concrete base with sheet asphalt wearing surface. This type meets all requirements in that it can be successfully placed in and about the rails while the track is in service. This pavement gives a resiliency desired in the track structure, and the after results are most favorable for making repairs to the rail joints and track bonds because of the ease with which the paving material may be removed and replaced. In the old standard, when hydraulic concrete base was used, the depth of the base was 6 in., while the sheet asphalt surface was 2 in. in depth. In using this new type of base its depth is confined to 5 in. and the wearing surface depth to 2 in. The cross-section illustrating this type of pavement indicates how the asphalt concrete base is carried down beneath the base of the rail for a depth of 3 in. in order to provide additional reinforcement for the rail.

Many items enter in the selection of the proper base



Cross-section of Pacific Electric Track with Asphaltic Paving Base

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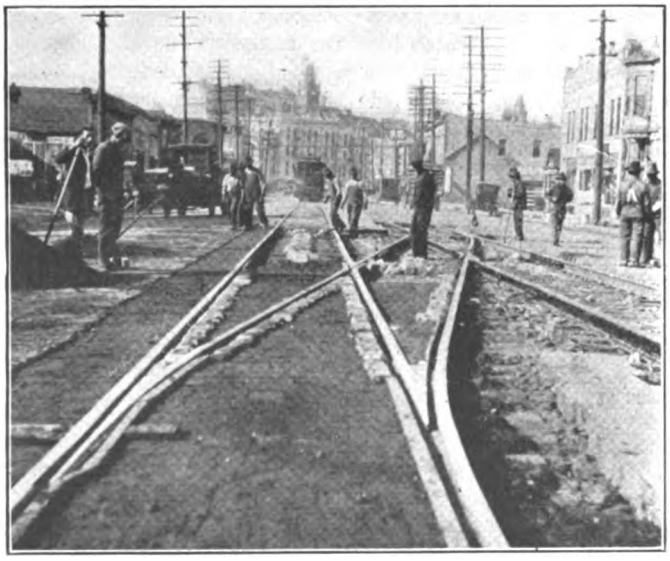
Placing and Rolling, Under Service, the Asphalt Concrete Type of Base

when a paving program is proposed, among them being the amount of interruption to traffic over the section undergoing improvement. Such interruptions cause patrons to desert the street railway line and patronize the jitney bus. Another item to be considered is the public favor the utility will gain when the municipalities see that a first-class type of pavement is being laid in the least possible time. Municipalities as a rule have a tendency to complain of the lengthy time utilized by street railways in repairing, reconstructing and paving their tracks. In support of asphaltic concrete, along these lines, it may be said that twenty-four hours after a section has been laid vehicle traffic may pass over the newly paved area, while there need be no interruption in car traffic during any stage of the construction.

A large amount of the company's trackage in the city of Los Angeles is operated jointly with the Los Angeles Railway lines and is of combination-gage construction. The Pacific Electric Railway tracks are laid to standard gage, while the third rail is laid to narrow gage—3 ft. 6 in. In the paving of tracks of this nature, as well as in snug locations and on special work, a more economical and efficient job may be obtained by the use of asphaltic concrete base than by the use of hydraulic concrete base.

In the downtown business section of this city the



Placing Asphalt Concrete Type of Base Around Special Work

engineering department, in the recent reconstruction of some of its tracks, has found it advantageous for handling track reconstruction and repaving work, where this type of pavement was used, to obtain the city's permission to close up one side of the street at a time, but not for more than one city block. These jobs were handled with a twenty-four-hour force. A number of feet of track was completely reconstructed, the ballast being machine tamped. The engineering department's paving gang, working during the night period, placed the asphaltic concrete base, while on the following day the day paving forces placed the sheet asphalt wearing surface. It was possible to handle these jobs in congested business districts of the city only in this manner. The asphalt concrete base could not be successfully rolled, in accordance with the plans for placing the base, during the daytime, as street car headway in this particular district varied from thirty seconds to two minutes, depending upon the time of day.

With reference to the proved life of this type of pavement, it has been found that a strip of like nature was laid on Main street in Visalia, Calif., in 1894, which consisted of an asphalt concrete foundation approximately 6 in. in depth, with an asphalt wearing surface a good inch in thickness. The city has expended nothing on its maintenance and in June, 1920, it was considered to be in good condition.

The Pacific Electric Railway secures its supply of this type of pavement from asphalt contract plants. It is mixed at the plant under the railway company's specifications and is purchased in terms of boxes, the approximate weight of one box of the mixture amounting to 1,000 lb. The specifications for the asphalt concrete base and asphalt wearing surface are as follows:

BITUMINOUS BASE

(a) Composition.

Bituminous base shall be composed of asphalt cement, broken stone and sand in the following proportions by weight:

	Per Cent
Asphalt cement	4½ to 6
Stone and sand:	
Passing a 10-mesh screen	20 to 30
Passing a ½-in. screen and retained on a 10-mesh screen	6 to 20
Passing a ¾-in. screen and retained on a ½-in. screen	10 to 20
Passing a 1-in. screen and retained on a ¾-in. screen	20 to 40
Passing a 2-in. screen and retained on a 1-in. screen	5 to 25

(b) Mixing.

The different sizes of stone shall be kept in at least two separate bins and 10-mesh material in a third bin. The proportioning of the various sizes shall be done by means of multiple-beam scales.

The broken stone and sand shall be heated to a temperature between 225 and 275 deg. Fahr. and shall be placed in a mixer and the required asphalt cement added.

The asphalt cement shall be prepared for use by previously heating to a temperature of not more than 325 deg. Fahr. and when used the asphalt cement shall not be colder than 285 deg. Fahr. Each batch shall be mixed at least sixty seconds, with the paddles of the mixer running at a speed of not less than seventy-five nor more than ninety revolutions per minute. In addition at least ten seconds shall be allowed on each batch for charging and emptying the mixer.

ASPHALT WEARING SURFACE

(a) Composition.

Asphalt wearing surface shall consist of a mixture of asphalt cement, stone dust and sand in the following proportions by weight:

	Per Cent
Asphalt cement	10 to 12
Sand and stone dust:	
Passing a 200-mesh screen	13 to 17
Passing an 80-mesh screen and retained on a 200-mesh screen	20 to 25
Passing a 50-mesh screen and retained on an 80-mesh screen	17 to 22
Passing a 30-mesh screen and retained on a 50-mesh screen	18 to 24
Passing a 20-mesh screen and retained on a 30-mesh screen	4 to 8
Passing a 10-mesh screen and retained on a 20-mesh screen	2 to 5

At least 15 per cent and not more than 18 per cent of the wearing surface mixture shall be stone dust of the kind and quality hereinbefore specified. Of material passing 80-mesh screen and retained on 200-mesh screen not less than 30 per cent nor more than 50 per cent shall be retained on a 100-mesh screen.

To determine the estimated amount of asphalt required per square foot of area to be placed where double-

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track right of way is figured 22 ft. wide and single-track right of way is figured 10 ft. wide, the following requirements are standard:

For asphalt concrete base with 7-in. high T-rail a finished area of about 1½ sq.ft. to a cubic foot of material is produced, while with 6-in. T-rail, the finished area is about 1¾ sq.ft. to the cubic foot of asphalt.

Where only surface asphalt paving is laid an area of approximately 6 or 6½ sq.ft. is covered to the cubic foot of asphalt.

Where the pavement consists entirely of asphalt, the area obtained from a cubic foot of asphalt depends entirely on the manner in which the track is dressed. In estimating the amount of asphalt material required, it is figured where 7-in. high T-rail is used there will be from 8¾ in. to 9 in. of pavement; where 6-in. high T-rail is laid, 8 in. to 8¼ in. of pavement.

If no paving blocks are used along the edge of the rails, the pavement is laid in two courses, each course being rolled with a 10-ton steam roller, which consequently gives manifoldly more compression in the pavement than ordinary street work.

Where paving blocks are used the bottom course is rolled before the blocks are set and the middle course is rolled with an 850-lb. hand roller, weighted down with about 200 lb. and the surface is rolled with a 6-ton roller, which adds considerably more compression than ordinary street pavement.

Overhead Line Notes from Detroit

Municipal Street Railway Department Is Making Many Investigations with a View to Reducing Maintenance Costs—One Feature Is a Plunger Type of Hanger —Records Show Good Results with Alloy Wire

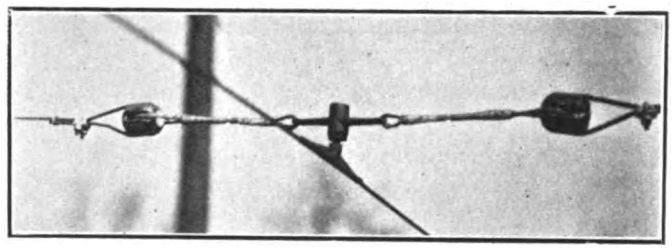
THE Detroit Municipal Railway is conducting several interesting tests of overhead line material and construction. One of these is on what is called a "test line." It is a mile long (two miles of single track) and is equipped with a large number of different hangers, pull-offs and overhead material, as well as different methods of suspension. This line has been in operation since Aug. 1, 1921. It carries a fair amount of traffic, that is, cars with about a five-minute headway. The trolley wire is hard-drawn copper. In addition, the Municipal Railway has installed a section of catenary construction over a thirteen-track steam railroad crossing. This catenary has been in service about two years and is built with a phono-electric trolley wire with copper-clad steel messenger, copper-clad steel hangers and span wires, and with all of the miscellaneous fittings copper plated. The track crosses part of a steam-railroad freight yard in which there is continuous drilling of steam locomotives. The purpose of this installation, as far as the type of material was concerned, was to determine whether this form of construction would withstand the corrosive action of the exhaust gases from the steam locomotives.

In addition, the road has been conducting some comparative tests of phono-electric and hard-drawn copper trolley wire, both in the same service. Two comparative tests have been made, one on Charlevoix Avenue, the other on Myrtle Avenue. In the latter case, the overhead wire on one track is phono-electric and on the other hard-drawn copper.

The electrical department has also been tabulating all breaks of trolley wire, saving samples of the broken wire and listing the information with data as to when and where the wire was installed, the number of wheel movements under the wire at this point, etc. This is being done to produce, if possible, actual data on the limits of economical wear, and also to determine the causes contributing to wear. The railway has also been experimenting with a number of new types of overhead appliances.

Results of These Tests

As a result of the test of the catenary construction over the steam railroad, described above, it has been found that after two years there are absolutely no signs of corrosion of any of the parts, and the electrical engineering department believes that this problem has been solved. Not quite as conclusive results have been obtained from the other experiments, due to the fact that they have not been carried on long enough, but much of interest has been recorded.



Plunger Hanger in Place

The question of trolley wire breakage has proved a serious one on the Detroit system. From May 15, 1922, to April 1, 1923, there were approximately 1,600 trolley breaks on the overhead system, each, of course, meaning a delay in traffic. As explained, each of these breaks is listed and a record is made. Four reproductions of sample records are shown. Records from the test tracks indicate far greater service from the phono-electric wire than from the hard-drawn copper wire. Thus on the Charlevoix line the records from Aug. 1, 1921, to December, 1922, show a reduction in area of the phono-electric of 3.91 per cent and of the copper of 6.64 per cent. On the Myrtle Avenue line, a reduction in area was shown for the phono-electric wire of 3 per cent and for the copper of 9 per cent. This is equivalent on the Charlevoix line to a wear of the hard-drawn copper as compared with phono-electric which is 1.7 times as great and on the Myrtle Avenue line, three times as great. Of course, the life of the two wires would show an even greater difference because phono-electric No. 00 wire has a tensile strength of 80,000 lb. per square inch, whereas the hard-drawn copper, according to the

East Bound Baker between Vermont and 12th Sept. 25, 1922 0.310 → ← 0.362 Report No. 1,008 Installed May 1918 Cause – broke at center of span Trolley movements, city cars 646,238	North Bound Curve Bates and Woodbridge Oct. 4, 1922 0.200 → ← 0.294 Report No. 1,069 Installed Oct. 1918 Cause – broke at splicer Trolley movements, D.U.R. 555,078
Beaubien between Kirby and Ferry Sept. 13, 1922 0.239 → ← 0.323 Report No. 941 Installed June 1916 Cause – broke at Clark splicer Trolley movements, city cars 1,071,252	South Bound Beaubien and Kirby Sept. 29, 1922 0.262 → ← 0.322 Report No. 1,043 Installed June 1916 Cause – broke at ear Trolley movements, city cars 1,079,700

Reproduction from Trolley Break Records

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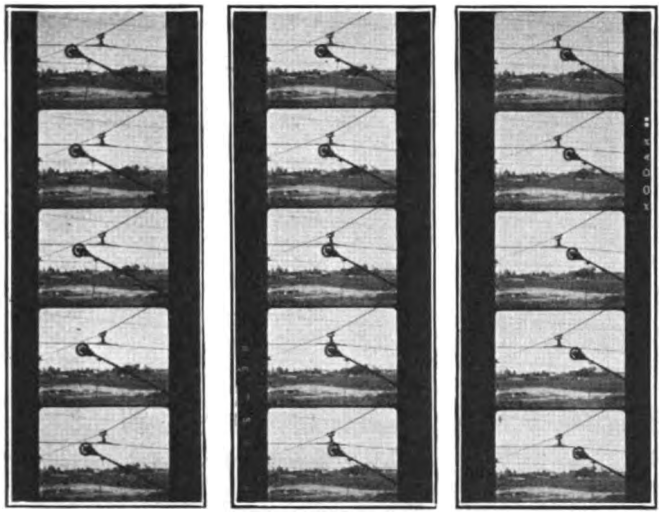


The Motion Picture Shows the Trolley Wheel in Action
(The sequence follows from top to bottom.)

A.E.R.A. specifications for trolley wire, would be expected to have a tensile strength of between 51,600 lb. and 56,000 lb. per square inch.

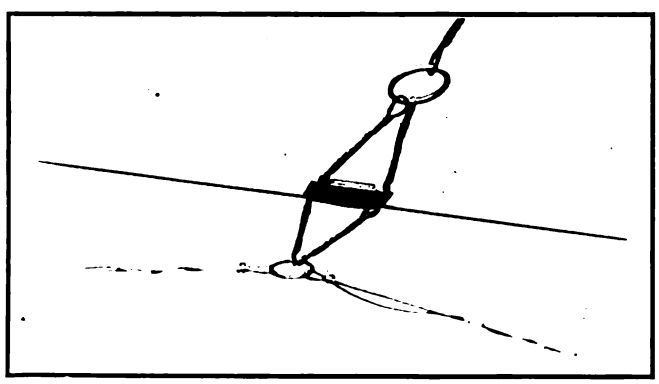
CHANGES IN LINE EQUIPMENT

While instructive so far as they go, these records of tests of trolley wire do not tell the whole story. The tests of the street railway department suggest other directions for improvement. One of these is in some more flexible means of suspension to reduce the wear of the wire under the ear, more perfect alignment at frogs, the strengthening of other overhead appliances and the protection of the overhead construction from blows from a trolley pole which becomes dewired at such critical points as strain plates.

To provide a more flexible suspension a trial is being made of a plunger hanger designed by the electrical department and manufactured by the Hackett Brass & Foundry Company, Detroit.

The first flexible hanger, installed in November, 1921, consisted of a straight plunger bolt working as a piston against a spiral spring in a brass cylinder packed with grease. It was found from experiment that this device did not give the anticipated resiliency because the trolley wire suspended from the hanger weighed about 40 lb. and the pressure of the trolley wheel against the wire was of the order of 27 lb. It will be seen that the difference was more than enough to prevent the wheel from lifting the wire.

The hangers was redesigned and a ball-and-socket joint put in the plunger, the idea being to provide a slight lateral movement, if experience proved this to be advantageous. This modified hanger was tried out for several months and the spring was removed and replaced in the hanger in such a way that the plunger was resting on the spring instead of working against the spring, thereby allowing the spring to aid the trolley wheel in lifting the trolley wire. This scheme has proved to be better than the hanger in which the plunger was working against the spring. Another hanger is being designed, having the same general characteristics as the latter as far as the spring suspension is concerned but with the ball-and-socket joint removed, as it was found that the lateral movement caused an abnormal wear on the side of the ear.



New Strain Plate and Method of Support

A view of one of these hangers in place is presented.

In an effort to determine exactly the movement of the wire under the action of the upward thrust of the trolley wheel, three series of moving pictures were taken of the passage of a trolley wheel under a hanger. These pictures are not particularly conclusive, but the electrical engineering department is not discouraged. Further efforts will be made to determine just what the effect is of the movement of an upward pressing wheel on a wire held in a partially rigid support, as well as in a flexible hanger.

STRENGTHENING THE OVERHEAD PARTS

To strengthen the overhead parts against blows from a dewired trolley, the Municipal Railway is now beginning the use of steel forgings instead of malleable iron for such parts as pull-overs, bull rings, anchor plates, etc., and is considering their use for frogs and crossings. Specifications have been prepared or are under preparation for a number of detail parts. These steel parts are galvanized to meet A.E.R.A. specification Df 2b. It is believed that steel will be more nearly immune to breakage from blows from a dewired trolley than the malleable iron now available in the market, as shown by tests of an adjustable pressed-steel spring frog which has been under test for more than a year.

In addition to the adoption of steel as a material, the design of some of the overhead parts is being changed. Thus the strain plate is being made 8 in. wide between the eyes instead of 5 in., and it is tied in to bull rings to reduce the danger of a "bootjack" pull, namely, the danger that the dewired trolley wheel and pole will catch in the acute angle usually existing between the end of the strain plate and the span wire.

A double-boss Cleveland splicer is used with the Metropolitan strain plate, instead of a solid ear. In this splicer, the wire is cut and the ends are brought through sleeves to the top of the splicer, where they are held in place by wedge collars.

A test is being made with an automatic strain plate, made by the Slaymaker Welding Company, of Detroit, in which there is a cam which permits the wire to move loosely in the strain plate in normal conditions. But if a break occurs the sudden release of tension on the trolley wire brings the cam into action and it holds the wire from slipping through the strain plate.

Another new device is the Slaymaker adjustable pressed-steel frog. In this the arms can be set at any angle. In fact, they can take their natural angle when the overhead construction is being erected. After the line is tightened up, the arms are bolted in place. One of these adjustable frogs has been in use for a year and ten more have been received and will be installed shortly.

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Carrying Safety to the Public—II*

"Safety Week" Has Proved the Best Way to Start a Campaign —Organization of the Committee in Charge Must Be Done Right—Programs, Posters and Parades Are Essential Elements

By C. W. Price
Vice-President in Charge of Public Safety, Elliott Service Company, New York City

This Monument Was Dedicated by the Children to the Memory of Those Children Who Had Lost Their Lives in Accidents

THE first "Safety Week," in 1918, marked the beginning of the successful campaign in St. Louis. During that week there was one death, as compared with twenty-four the corresponding week of the previous year. Since then practically every city which has developed organized community safety has inaugurated its campaign with a safety week.

Experience has proved that more can be done to awaken widespread interest, and by a striking demonstation to convince the people that accidents can be prevented, than can be accomplished in a year of effort along ordinary lines. The one important thing at the start off is to make the public believe that the whole community can be aroused and interested and that people can be led to stop being careless and to begin being careful.

The program of activities for a safety week campaign has been so well worked out as a result of the past five years experience that, given the proper leadership and an efficient organization, practically the same results can be achieved in any community. This is evidenced by the experience of four cities which represent practically every condition found in any city in the United States—New York, the metropolis; Washington, the residence city; Pittsburgh, the great industrial center, and Baltimore, a typical city. In each of these cities a safety week campaign was conducted during 1922, with the results shown in the accompanying table.

*The second of a series of ten articles.

Not a child was killed or even seriously injured in Washington during safety week.

An incident in the Baltimore campaign illustrates in a striking way how an intensive drive will grip the interest of automobile drivers. On Friday of the week, called "Railroad Crossing Day," all of the grade crossings of the four railroads operating within the city limits were watched by checkers and a careful note was made of the conduct of the driver of each vehicle. During the day 60,301 vehicles passed over the crossings. Only 275 failed to observe the rules of safety, or 0.4 per cent. A similar check recently made on some fifty-three railroads in various parts of the United States showed that more than 50 per cent of the drivers were found violating the rules of safety.

It has been found that these features of a safety week drive, which are the most effective in gripping the interest of the people, apply equally well, with slight modifications, to the continuous year-round campaign which follows.

It generally has been found advisable to form a temporary organization called a safety week committee to

ACCIDENTAL DEATHS

	Safety Week, 1922	Corresponding Week, 1921	Per Cent Reduction
New York	24	70	65
Baltimore	2	9	77
Pittsburgh	9	22	60
Washington	2	6	66

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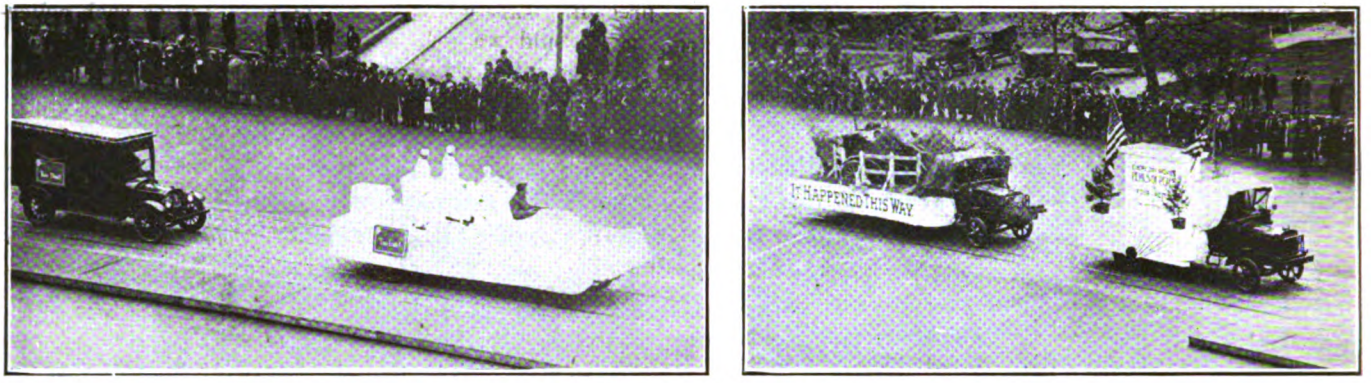


The First Prize Exhibit, by the War Department, Consisted of These Four Floats Depicting "Perils of Peace"

conduct the week's campaign, and out of the good timber discovered then to form the permanent organization.

It is highly essential that a man be selected as chairman of the committee who has a talent for leading campaigns, a man who can command the enthusiastic co-operation of large numbers of people. The second essential is that one man, in the capacity of manager or secretary, should be employed to give his entire time to directing the campaign. Such a man, if thoroughly acquainted with the experience of other cities, will be able, at a minimum cost, to organize those activities which will secure results. Most of the items on a successful program do not cost money, but cost effort in securing volunteer co-operation.

The outline which follows includes fourteen activities, each one of which occupies a vital place in the program and plays a distinct part in reaching and interesting the public:

1. *Proclamation.*—A proclamation should be issued by the mayor, setting apart the week as "Safety Week" and urging the co-operation of the people.

2. *Monument.*—First in Baltimore and then in New York, Pittsburgh and Washington, a temporary monument, beautifully designed, was erected and dedicated to the memory of the children killed by accident during the previous year. On this monument were inscribed the number and ages of the children killed and a pledge by the people that such a sacrifice would in the future be made impossible. The dedicatory services consisted of addresses by the Mayor and other prominent citizens, and a program of music. In Washington ninety-seven little children dressed in white robes, representing the number of children killed the previous year, each deposited a flower at the base of the monument. The effect has been the same in each city. It has served graphically to bring to the attention of the public the seriousness of the accident situation and has proved a most effective event to start the safety week.

3. *Safety Sunday.*—In each church on the Sunday marking the beginning of safety week the minister should be urged to preach a sermon on safety, emphasizing the duty of every Christian to help conserve life. A safety lesson should also be taught in the Sunday schools.

4. *Schools.*—The following program should be carried out in all public, parochial and private schools:

(a) A safety lesson should be taught each day from a printed lesson furnished by the safety week committee, each lesson covering some one serious hazard to children.

(b) Each child should write a letter to his parents regarding safety week, and receive a reply.

(c) Safety patrols should be appointed in each room to warn the children, especially when dismissed.

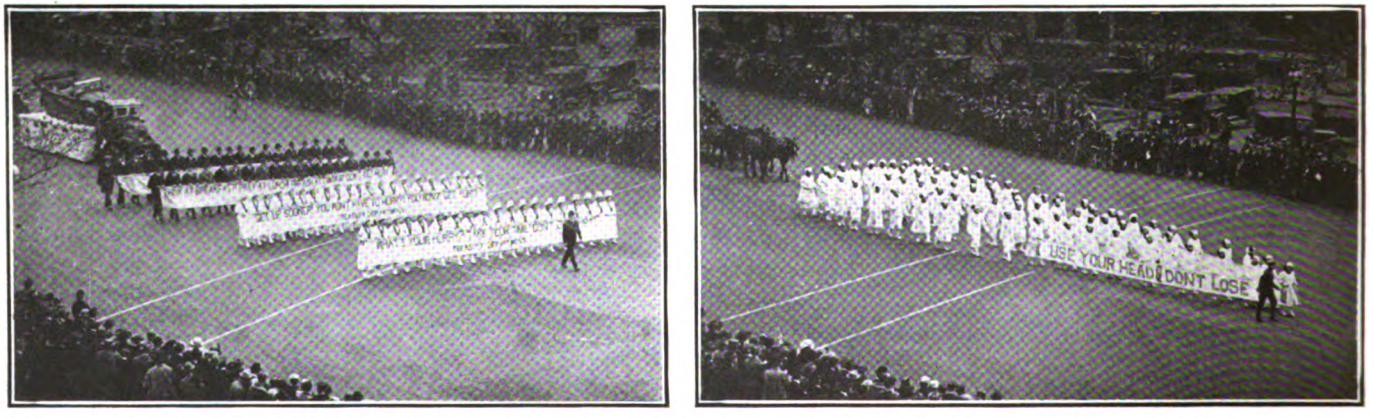
(d) Safety mass meetings should be held in all school buildings, with a speaker furnished by the speakers' committee.

(e) Safety posters should be placed in the entrance and on the outside of each building.

5. *Slogan.*—"Don't Get Hurt" has proved by far the most effective slogan that has been used. This should be given wide publicity and played up in big red letters on posters and billboards.

6. *Publicity.*—The publicity campaign should begin a month before the opening of safety week. As each feature of the campaign is developed to a point where it can be announced, an article should be prepared outlining fully the activity. By this means there will be built up in the minds of the people an adequate picture of the scope and purpose of the campaign. This is absolutely essential to securing proper co-operation.

The following will suggest the sort of material which



At Left—The Treasury Department Display Emphasized the Bad Effects of Hurry. At Right—The Girls of the Interior Department Had a Good Motto

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the publicity committee should prepare and furnish to newspapers:

Daily program (printed in a box).
News items.
Two-minute talks to mothers, signed by chief of police.
Interviews with prominent citizens.
Reports of talks given by speakers.
Picture showing hazards to children on the streets.
Daily score of accidents.

7. *Posters.*—If a safety week campaign is to be effective it must be visualized, must be so presented, that at every turn it will confront the driver and the pedestrian and remind them of safety.

This can best be accomplished by the use of posters bearing the slogan "Don't Get Hurt" printed in bright red on white paper. These posters are much less expensive than picture posters and are quite as effective.

The most striking poster display can be made by placing large posters, say 25 in. x 38 in. in size, at some 100 strategic street intersections. This can be done best by using thick sheets of heavy beaverboard arranged in

This Washington Railway & Electric Car Made a Tour of the City Each Day During Safety Week

triangular form around a lamp post or trolley pole at one of the four corners of the sidewalk. On the face of each side of the triangle a large poster, say 24 in. x 42 in., bearing the slogan "Don't Get Hurt" should be pasted. This display, if properly placed, will be seen by every driver and pedestrian. The same poster should be placed at all gasoline-filling stations, on public buildings, including schoolhouses; on vacant billboards and at highway entrances to the city.

A poster, say 18 in. x 24 in. in size, bearing the slogan should be carried on the front and rear of each street car. The co-operation of the owners of all commercial vehicles, including taxicabs, buses and trucks, should be secured so that they will carry triangular posters bearing the slogan on both sides of each vehicle.

Marking the streets at the crossings with broad white lines and with a large footprint in which is stenciled the slogan have proved to be most effective in visualizing safety.

8. *Parade.*—A spectacular parade, if properly organized, will impress large numbers of people who might not be reached by the other appeals. It should be short and snappy. Each municipal department, the principal industries, public utilities and civic bodies should be represented by floats. The one point to be emphasized is that each float should visualize in a graphic way the safety idea.

9. *Police.*—The police, if properly interested and instructed, can do much to make the streets safe during safety week. This interest can best be secured by arranging to have a speaker appear with the chief of police at one roll call at each station during the week preceding safety week. During safety week each policeman should wear a large celluloid button on which is inscribed "We are helping to make ————town safe."

10. *Industries.*—Each industry should be requested to do four things: (1) Blow the whistle at nine o'clock on the Monday morning of the safety week; (2) conduct a drive among its employees; (3) arrange for a mass meeting of employees, with a speaker from the speakers' bureau, and (4) place large posters at the entrances to the plant.

11. *Speakers' Bureau.*—A speakers' bureau, if properly directed, with a group of good speakers can do much to reach and interest the more intelligent citizens.

A printed leaflet containing data and suggestions should be furnished each speaker. It is comparatively easy to arrange for a speaker to appear before any luncheon, club or women's organization and in the larger industries before or during safety week.

12. *Motion Pictures.*—The motion picture houses should be asked to run slides with the slogan "Don't Get Hurt" and also safety films.

13. *Radio.*—Speakers should be furnished for all of the radio stations, and safety talks should be broadcast each evening.

14. *Scouts.*—The Boy Scouts and Girl Scouts delight in taking part in a safety week drive. Each scoutmaster, a few days prior to the opening of safety week, should instruct his troop regarding safety and ask each scout to pledge himself to set an example of safety, to warn others, and to save human life if the opportunity offers. Each scout should be furnished with a large button inscribed with the motto, "We are helping to make ————town safe."

A most spectacular stunt which has been used effectively in several cities is to have fifty boy scouts take the place of fifty traffic policemen for one hour at noontime on one day of the week. Boy scouts have also done effective service as guards for pedestrians, one being located on each of the four corners of the principal street intersections.

El Paso Foremen Profit by Vocational Training

BY WILLIAM ROUSE
General Foreman El Paso Electric Railway, El Paso, Tex.

UNDER the auspices of the vocational department of the El Paso public schools, in co-operation with the state and federal boards for vocational education, the El Paso Electric Railway recently conducted a successful course in foreman training. It was started Sept. 14, 1922, and ended Jan. 4, 1923, meetings being held on Monday and Friday evenings each week from 7 to 9 o'clock. In all twenty-six meetings were held.

The course was divided into two main sections: (1) Processes of operation and (2) man factors. In each section the material was analyzed to bring out the cost elements, the supervisory and managerial responsibilities of the foreman, and ways and means of obtaining the co-operation of the working force, higher standards of production, increased production and a lower cost of production.

The conference group was made up of members of the mechanical department of the railway. The company furnished a classroom and cigars for the men, and in addition paid the local portion of the salary of the conference leader who had charge of the discussions.

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The benefits which we have derived from the work are noticeable in the way in which the foremen handle their men, the way in which the men go about their work, and the way in which they co-operate with other foremen in the department.

At the completion of the course all members of the class expressed appreciation of the work and asserted that it had given them a different viewpoint as to a foreman's responsibility. Each member was given a certificate showing that he had successfully completed the course and had attended 80 per cent or more of the meetings. These certificates were distributed at a dinner given by the company in honor of the occasion, indicating that the efforts of the men to improve themselves were appreciated by the management.

Training for foremanship is essential in the electric railway industry. The experience which we have had on the El Paso property illustrates some of the general principles involved in this matter of vocational education. There have been three stages in the development of this education in this country, of which the first, the training of executives and technical experts, has received attention for a relatively long time. The second stage is concerned with the training of the working force, and is of comparatively recent development. The third stage, which is just beginning to receive attention, is the training of the man who stands between the executive and the work, namely, the foreman.

Foremanship Conference in Session, El Paso Electric Railway

The training of executives and technical experts has been done in our colleges and technical schools, and is well taken care of. Since the passage of the federal vocational education act, known as the Smith-Hughes law, rapid progress has been made in the efficient training of the working force. Today almost every city is conducting day trade schools, part-time schools and evening schools for the training of industrial workers.

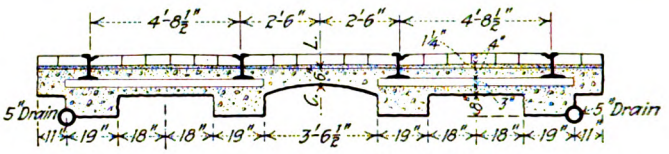
However, a chain is never stronger than its weakest link, and if we have trained executives and trained workers, then we must have trained foremen to make up an efficient industrial organization.

Industrial leaders have come to realize that the training for foremanship must be entirely different from that for executive responsibility or industrial work. The qualifications required in a good executive or an expert worker would not cover those necessary in an efficient foreman. For this reason foremanship courses are being conducted by many industrial organizations.

The method of putting on a foremanship course is to bring together a group of men having supervisory and managerial responsibility and to have them discuss their problems in accordance with the conference plan. The conference leader guides the discussion but does only enough talking to draw out the ideas for discussion.

Steel Tie Track in Youngstown Has Stood Hard Wear

SEVEN years experience with solid concrete and steel-tie construction has convinced the Youngstown Municipal Railway that this type of installation is the most satisfactory for tangent track. All new work, therefore, is being designed along these lines. Nearly



Concrete Construction with 134-Lb. Rail

9,000 ft. of double track was laid on Wilson Avenue in 1916 with monolithic steel-tie construction, and since that time almost no repairs have been needed.

The tangent track is built with 14-in. concrete foundation below the rail. International steel ties are used, together with 9-in., 134-lb. Trilby rail. The paving is of 4-in. Bessemer brick blocks laid on a 1½-in. cushion of sand. All joints are thermit welded. On curves, however, wood ties are used and the joints are not welded. A 5-in. tile drain carries off the water.

The trolley service on this track is fairly heavy, as all city cars, seventy-eight in number, pull out and pull in via Wilson Avenue. Moreover, there is a five-minute headway all day with safety cars, which drops to a two-minute headway in the rush hour, the trippers being heavy two-man cars. Prior to 1920 the all-day service also was operated with large cars, although not on such a short headway as prevails with the present safety cars.

A few joints pulled apart during the first winter after the track was laid, but since then there have been practically no joint failures on the tangent track. An exception should be noted, however, in the case of one joint exactly on the crest of a little hill, which pulls apart regularly once a year when the weather gets cold. With the monolithic construction there has been less trouble than usual because of water getting into the paving.

Since the completion of the Wilson Avenue job, track has been laid with the same type of construction on other streets, and it has proved uniformly satisfactory. A minor variation has been introduced by the use of 7-in. Trilby rail, and the depth of the trench for the foundation has been changed from 8 in. to 4 in. In some places the tile drain has been omitted. However, the monolithic construction with steel ties has been closely adhered to, and new work is being similarly designed.

Track in Good Condition After Seven Years of Service

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Equipment Maintenance Notes

Testing Car Air Reservoirs

New England Company Has Developed a Routine Procedure Which Insures Maintenance in Good Order of This Important Part of Car Equipment

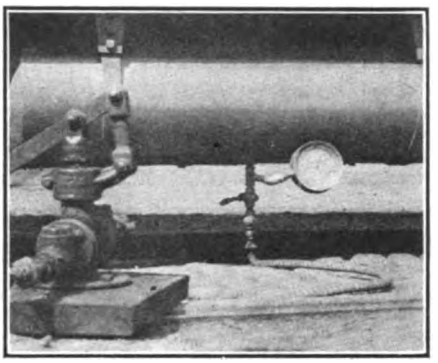
BY W. C. BOLT
Superintendent of Rolling Stock and Shops, Eastern Massachusetts Street Railway, Chelsea, Mass.

MAINTAINING car reservoirs in a safe condition is considered of sufficient importance by the Eastern Massachusetts Street Railway to warrant more than the usual superficial examination for defects. Accordingly, this company has included a hydrostatic and hammer test as a part of the regular car-overhaul schedule.

Each air tank is subjected to a water pressure test at 100 per cent above the working pressure, and the entire surface of the tank is hammer tested to determine the general condition of the shell. The test has been particularly valuable for ascertaining the condition of tanks in service for five years or longer, many such tanks having been found worn thin under the supporting straps or to have developed leaks in the seams.

Tanks with minor leaks in the seams are brazed, retested and placed back in service, provided the body is in good condition. Those with body defects, including thin shells, are renewed.

The accompanying illustrations show the apparatus used in making this test. The reservoir is disconnected from the air system and one end is plugged. A ¼ in. bent pipe, inserted at the opposite end and extending to the top inside, permits removal of all air and indicates when the tank is filled with water. The tank is filled from the bottom, through a small hand water pump connected to the city water supply.



Equipment for Testing Air Reservoir with Hydraulic Pressure

Submit to Rolling Stock Department
Chelsea Office

REPORT OF HYDRAULIC PRESSURE TESTS ON AIR RESERVOIRS

Car No. *Date*

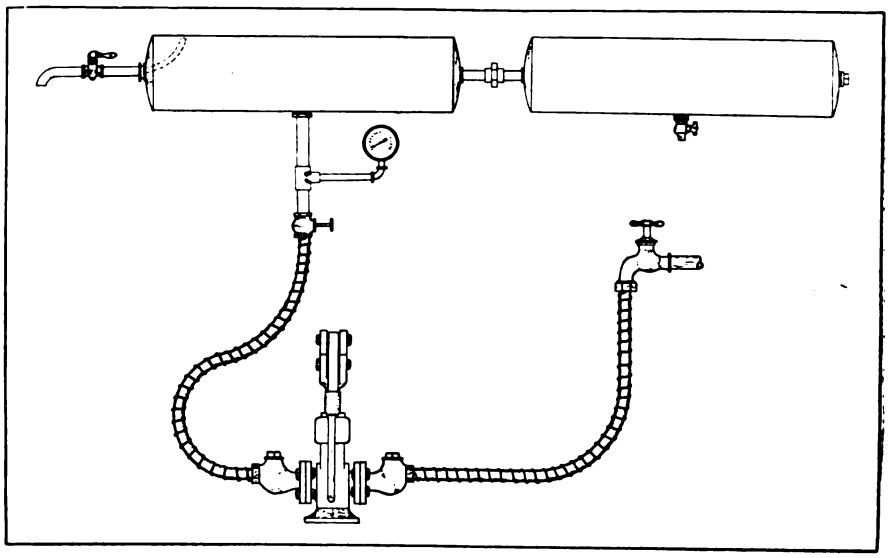
Tested at
(Shop or Carhouse)

Size Tank	Description	Working Pressure	Tested Pressure
Remarks:			
Size Tank	Description	Working Pressure	Tested Pressure
Remarks:			
Size Tank	Description	Working Pressure	Tested Pressure
Remarks:			

Signed,
Air Reservoir Inspector
Signed,
General Shop Foreman

NOTE:—Under "Remarks" state condition of tank as found by test, describe defect, if any. Indicate under this heading any tank renewal.

Form Used for Recording Results of Test



The Hydraulic Test Shown Graphically

FORM P 958

CAR NO.

NO TANKS	SIZE	DATE IN SERVICE	DATE OUT SERVICE	WORKING PRESSURE	TESTING PRESSURE	DATE TESTED	DATE TESTED	DATE TESTED

CAR RESERVOIR TEST RECORD
EASTERN MASSACHUSETTS STREET RAILWAY COMPANY

CAR NO.

DATE TESTED	DATE TESTED	DATE TESTED	DATE TESTED	DATE TESTED	DATE TESTED	DATE TESTED	DATE TESTED	DATE TESTED

CAR RESERVOIR TEST RECORD
EASTERN MASSACHUSETTS STREET RAILWAY COMPANY

Face and Back of Record Card for Reservoir Test

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After the tank has been filled, a few strokes on the hand pump build up the tank pressure to the value desired. A shut-off cock located between the pump and reservoir is then closed, maintaining the pressure on the tank until the examination by the inspector has been completed.

Reservoirs which have been tested are stenciled, indicating the shop at which the test was made, the test pressure and the date, arranged as indicated below:

150 lb.	TESTED Chelsea Shop	10-20-22

The reservoir inspector is required to submit a report, describing the condition of each tank and indicating the repairs or renewals made, and this information is recorded permanently in a card file.

Old Rails Used in Tie Construction

THE accompanying illustration shows a type of tie construction used to a limited extent by the Lehigh Valley Transit Company on its Easton division. Under this plan old rails with wooden side pieces are used as ties, and a tie is made 6 in. deep by 8 in. wide. The wooden pieces fit into the web of the rail and around the ball at the bottom. The running rail is bolted to the section of rail used in the tie, the nuts having lock washers and rail clamp pieces underneath. The wooden side pieces are bolted to the rail and are used to give a wider tamping surface.

Old Rails with Wooden Side Pieces Used in Tie Construction

This type of construction also provides for the desired resiliency and makes the operation less noisy. Another advantage of using the short side pieces is that they can be treated more readily by creosote methods than can ordinary tie sections. The short wooden pieces can be renewed without disturbing the old rail centers, and one man can remove the side pieces and install new ones without difficulty.

Three Simple Signal Systems

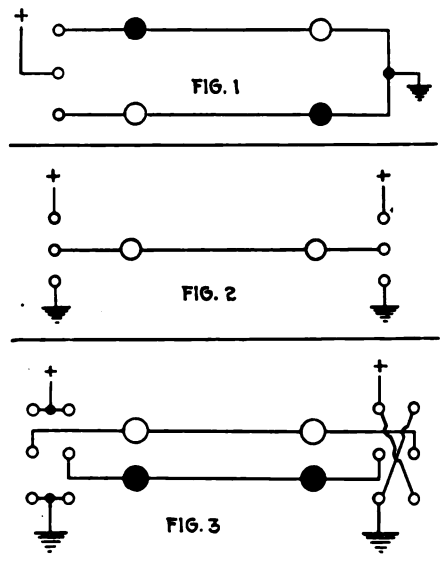
BY G. H. MCKELWAY
Distribution Engineer Brooklyn Rapid Transit Company

WHILE the use of automatic signals on electric railways has increased greatly due to the improvement of the systems on the market, yet there will always be places where manually operated signals will be useful, such as for temporary signaling, or where the first cost must be kept low. As electric railways must use electric current to operate cars and as most lighting is by means of incandescent lamps, the type of signal most easily installed and maintained is that in which the signal indications are given by the lighting and extinguishing of lamps using trolley voltage.

Because of the comparatively high voltage of the circuit, usually five or six lamps are burned in series, although the entire five or six lamps are not installed in one cluster at one end of the block but are divided, with three at one end and two at the other. The lamps at the far end of the block can thus be used to signal cars coming from that direction and those at the near end to control the movements of following cars and also to indicate to the trainmen operating the signals that the signals have acted properly at the far end.

The accompanying diagrams show three methods of connecting up such signals for the protection of cars operating over a single-track block. Fig. 1 is for use under circumstances where an inspector or station agent is located so that he can throw the switch which sets the signals at the end of the block. Each circuit is made up of red lights at one end and green lights at the other, and the lamp current is controlled by a single-pole, double-throw switch operated by the man in charge. If he cannot see the lamps at the ends of the block, one or two of the lamps from each circuit should be placed where he can see them so that he can assure himself at all times that the signals are properly set and that the lamps are burning.

The scheme shown in Fig. 2 requires but a single signal wire paralleling the trolley, and all of the lamps used are of one color, which should be either blue or white. Red lamps should not be used, as they would give a clear indication if one of the lamps should be burned out or become broken. The lamps in this scheme, as well as in the scheme shown in Fig. 3, are controlled by switches operated by the crews of the cars. If a motorman, upon reaching the signal, finds the lamps burning, indicating that the track ahead is clear, he throws the double-



Diagrams of Manually Operated Signals

Signals shown in Fig. 1 are for use where employees other than car crews are available. In Fig. 2 the circuit requires but one wire. The scheme shown in Fig. 3 insures definite indications.

throw, single-pole switch to the other position. He thus extinguishes the lights, and proceeds. When he has reached the other end and cleared the block he throws the switch at that end to its other position; which relights the lamps and indicates that another car can enter the block.

The fact that the lights, when out, may indicate either that the block is occupied or that one of the lights has gone out, and therefore that the indications are not always definite, is an objection to this plan which is overcome by the scheme shown in Fig. 3. In the latter two signal wires must be run between the ends of the block, and double-pole, double-throw switches are required. This plan, however, gives positive indications and if the lamps do not light up it is known that there is trouble in the circuit. Therefore there need be no delay before starting to make repairs.

The lamps in these circuits are operated by the train crews in the same manner as with the scheme shown in Fig. 2, except that by throwing the switch to the other position the lamps are lighted and the other circuit of lamps that were burning before the switch was changed are extinguished.

The great trouble with all systems

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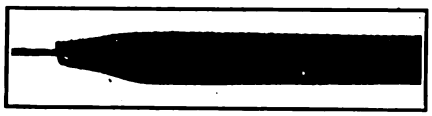
where the switches are controlled by train crews is the possibility that they may also be altered by some mischievous persons and thus give wrong indications. The only way to prevent this is to lock up the boxes containing the switches so that unauthorized persons cannot tamper with them. Train crews will then need keys to these boxes or else switch handles which can be inserted through holes in the boxes, so that the switches can be thrown while the boxes are still locked.

Protecting Guy Wires

WHERE guy wires run down to the ground it is frequently necessary to install some warning device so that persons passing will not run into them. The accompanying illustration shows a light, neat protection that has been used with beneficial results. Instead of the familiar piece of pipe or wooden boxing, the wire is protected in this



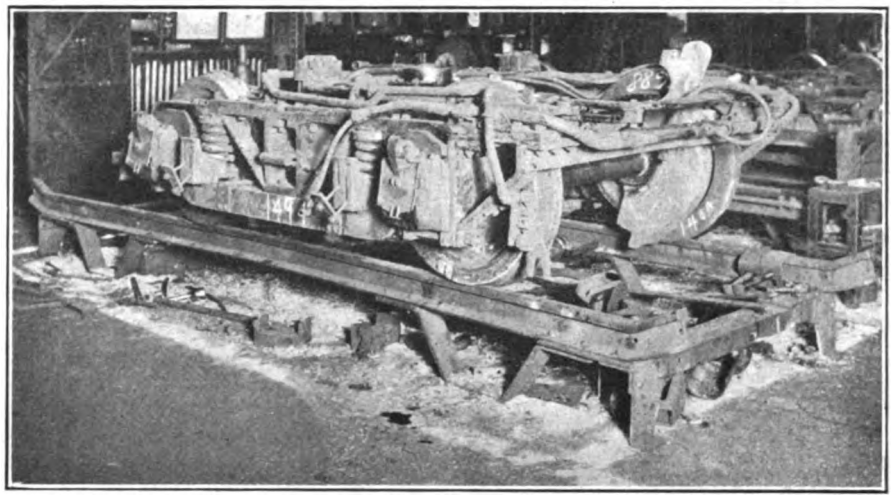
Galvanized Iron Protection for Guy Wires

case by a long, narrow piece of galvanized iron with the ends bent to inclose the guy wire and the whole bent partly around it. The protection is held in place by means of clamps which pass through holes in the iron and fasten below the wire.

The guard illustrated was a protection provided in a high-class residence section and in this case it was painted green so as to blend with the surrounding foliage. In some localities where it is desirable to make the protection more prominent it no doubt would be better to paint with a color which would be more conspicuous. White is particularly desirable as it can be seen more readily after dark.

Truck Stands Reduce Overhauling Time

THE accompanying illustration shows a type of truck stand used by the New York Municipal Railway Corporation in its Thirty-ninth Street shop. Trucks are placed on these for overhauling in order to bring the parts of the truck to a convenient height so that the workmen can accomplish their work with a minimum of physical exertion and a considerable saving in time. The



Truck Stand Enables Workmen to Accomplish Their Tasks with a Minimum of Physical Exertion and Time by Working in an Upright Position

use of these truck stands also provides space underneath for doing work which otherwise would require the placing of the truck over a pit, and thus additional handling is saved.

The two top members on which the truck wheels rest are constructed of standard T-rails. These are fastened together by cross members at the ends. Standard angles 2 in. x 6 in. in dimensions are used for this purpose. The feet or supporting members are constructed of ¾-in. x 6-in. iron plates which are bent to give the necessary floor support and to provide a means for riveting to the T-rails. The corners of the framework are further strengthened by gusset plates. As constructed, the truck stand is 12 in. from the floor to the top of the rails. The ends of the rails are bent upward so as to do away with the danger of the truck sliding or rolling off the framework.

The Roadmaster Has the Right-of-Way

"WHEN are we going to have our picnic this year, Tom?" asked Charlie Riter, the clerk of the general manager of the Jinxville Electric Railway, as he greeted Fairweather, the roadmaster, one fine May morning. "Seems to me we ought to be planning for it soon, before the weather gets too hot."

"You're right, Charlie, it's too bad that our heavy traffic on Memorial Day makes most of us work extra hard that day, or we could go then. I'll take it up with the chief right away. Is Mr. Redfield in this morning?"

"Yes, he's in his office, Tom; go right in."

Fairweather knocked on the G.M.'s door and heard the cheery "Come in," which always made the fellows feel that they were welcome.

"What's on your mind?" Mr. Redfield asked, as Tom entered. "Picnics," the latter replied. "Don't you think we ought to be getting our plans laid? Our people kind of feel out of it on Memorial Day when they have to work hard to give everybody else a good time. If they knew a picnic of their own was coming off soon the case would be different. The blow-out we had last year was a great success. Remember that potato race between Ole Olson, the machine shop lathe hand, and "Whistlin' Dick Singer? Some race, I'll say; I laugh about it yet."

"All right, Tom. I guess the boys deserve an outing, the way they have been pulling together this spring to get the road back in shape. Why don't you head up a committee to get the thing going? I'll ask O'Neill to represent the line department; Bill Gainway can serve for the platform men, Jones for the shop and my clerk, Charlie Riter, for the office force here. If that's all right, it's up to you to get busy."

"I'll get busy, all right. Can I spend a hundred dollars or so on posters, prizes, etc., to help the thing along?"

"Yes, the company will put up a hundred, and your welfare association would probably like to help, too. I'll put up a cup personally for the best all-round athlete in the bunch—provided he isn't too lame to work the next day. Bill Gainway will arrange for specal cars. When will you have the picnic? Or shall we call it a field day?"

"Early in June, I think. There seems to be a picnic spirit in the air around about Decoration Day. I'll get my committee together tonight at the house and we'll lay some plans. Thanks for that cup. I know the boys and their families will appreciate it."

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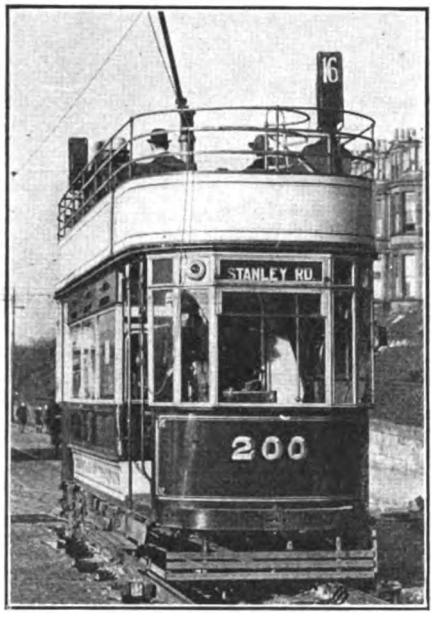
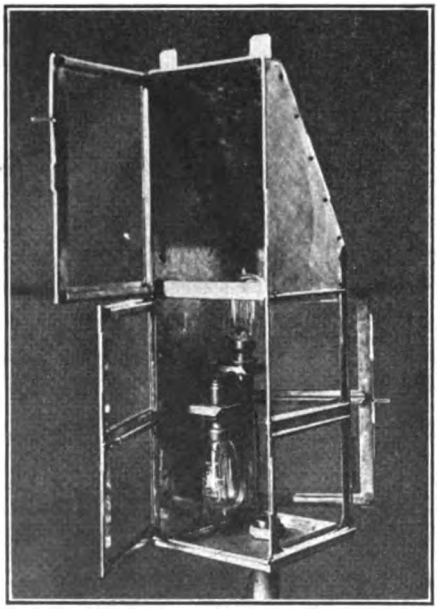
Mirror Saves Current in New Edinburgh Destination Signs

THE practice of the Edinburgh Tramways, Scotland, is to indicate the destination of its cars by colored panels and large numerals prominently displayed in a route number box. Painted tin slides are used by day, and at night transparent glass slides through which shines the light of two electric bulbs



Route Number and Color Mounted Conspicuously at Top of Car



Box Open, Showing Position of Lights and Diagonal Mounting of Mirror

inside the box. Half the face of the box is devoted to the number, and the other half is divided into two small color panels, because the large number of routes makes it necessary sometimes to use two colors to identify a line. Both of the electric lights in the illuminated route number box are placed in the color half, and the numeral in the other half is lighted only by reflection from a mirror. It is claimed that the use of a mirror placed at an angle as shown in the accompanying illustration has saved the use of two additional electric lights.

Stripes Show Location of Fire Apparatus

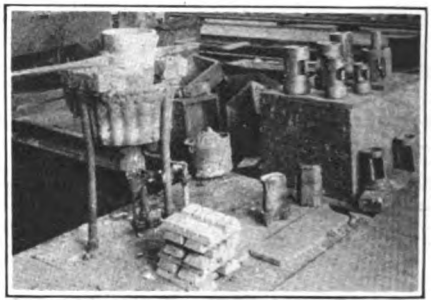
ACCORDING to the insurance rules, every carhouse must be equipped with a specified number of sand pails and extinguishers for fire protection. The value of this equipment depends largely on its instant availability when a fire threatens, as a delay of even a few seconds to locate the fire apparatus is dangerous.

In order that the fire fighting equipment may be quickly located by the men in an emergency, the Beaver Valley Traction Company, New Brighton, Pa., at its Junction Park carhouse has adopted a novel method of indicating the position of extinguishers and pails. The correct location for each of these is indicated by a red space approximately 18 in. square, painted on the white wall. When the house is filled with cars, it may not be possible to see these red spaces, so red stripes are painted vertically upward from the location of the apparatus to a point near the roof. A broad stripe is used to indicate an extinguisher and a narrow one a sand pail. The upper ends of these red stripes may be seen above the car roofs, and the apparatus is located without difficulty. These stripes are so prominent that there is no excuse for delay in finding the equipment.

When the fire equipment has been removed, either for fighting fire or for other purposes, it may or may not be returned to its place. These red spaces and lines are so prominent that they help to overcome carelessness in keeping the equipment away from its proper location, as even a casual inspection will indicate the absence of any equipment.

Making Bearings of Frary Metal

THE Lehigh Valley Transit Company, Allentown, Pa., uses Frary metal for all types of bearings. This is melted in the ladle in the gas furnace shown at the left in the accompanying illustration. In the melting equipment there are two pipes, one for air and one for gas. Both are regulated to give the desired flame. All kinds of bearings are cast in molds similar to the one shown at



Equipment Used for Pouring Bearings at Allentown

the right for armature bearings.

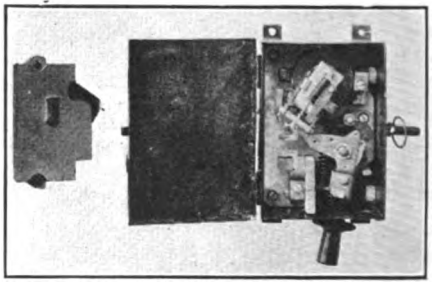
As a result of the use of this metal, together with the method used for making bearings, the company has overcome many bearing troubles.

New Equipment Available

New Circuit Breaker for Electric Railways

THE General Electric Company has recently developed a new line of hand-operated inclosed circuit breakers, known as type M R 22.

Superseding the M R 10, 11 and 12 types of circuit breakers, the new



Circuit Breaker with Easily Removable Arc Chute

units are superior mechanically and are 6 lb. lighter. They are of particularly rugged construction for railway service, with simple parts easily adjustable and readily accessible for repairs or inspection.

An interesting feature is that the arc chute may be removed without tools by raising a latch inside the box cover which releases the chute. The arc chute is also equipped with an arc suppressor plate which reduces the volume of the arc blowing into the car.

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Association News & Discussions

Electrification Largely a Financial Problem*

By W. R. STINEMETZ
Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.

TRANSPORTATION today is one of the most important and essential business enterprises of the country. We have a great network with 253,000 miles of track, 65,000 locomotives and 2,500,000 cars. In the month of January, 1923, the gross earnings of the railroads were $500,810,000, with net earnings of $93,280,000, on a valuation of about nineteen billions of dollars.

American railroad development has been made with the steam locomotive, and it will no doubt for some years to come be the chief motive power. The questions of today, however, are those of efficiency and economy in operation and more intensive use of present facilities, and it is such questions that electrification is expected to solve where conditions warrant its application.

The study of railroad electrification presents two problems: First, we must demonstrate that electrification is adequate from an engineering and operating standpoint, and, secondly, we must justify financially the large investment required.

Electrification has proved to be the most reliable and economical means of transmitting power in railroad work. The electric locomotive has been successfully applied in all phases of railroad service, and has been utilized largely to overcome restrictions in operation caused by increase in traffic, which were unsurmountable with the steam locomotive.

Four Applications of Electrification

Its first application was to permit more freedom of movement in tunnels by eliminating the smoke of the steam locomotive. The trackage capacity of the Hoosac tunnel was increased fourfold by electrification, and the Simplon tunnel could hardly have been operated at all with steam.

The second application of electric motive power was to multiple-unit electric cars as a substitute for the steam suburban train. Elimination of shifting movements of engines and more rapid acceleration of trains has greatly relieved the trackage congestion of large terminals.

Mountain grades were the third application where electric operation surpassed in economy, capacity and reliability the best performance of the modern steam locomotive. Grade sections, when electrified, are no longer the limiting factor to the maximum tonnage which can be put over a railroad system. The Norfolk & Western Railway, whose Elkhorn grade is the heaviest tonnage mountain electrification in the world, now handles heavier tonnage trains at twice the speed of steam operation.

The fourth and final demonstration of the fitness of the electric locomotive was in the complete electric operation of several divisions of a transcontinental line. The Chicago, Milwaukee & St. Paul Railway is now operating all trains electrically over four of our principal mountain ranges. The electric passenger engines on this road make a daily run of 440 miles, with monthly averages of 12,000 miles, and individual engines have made runs of 766 miles in a twenty-four-hour period.

Problem Is Financial Justification

While electric operation has been successfully applied in the United States to fourteen different trunk lines, on 2,500 miles of track, and involving 354 electric locomotives, this represents only 1 per cent of the total steam tonnage and mileage in our country. The question which naturally arises is, why has not electrification been more seriously considered and adopted by our railroads? This brings us to the second problem, namely, that of financial justification.

Electrification is a betterment which requires a large amount of new capital investment, and to be attractive it must pay for itself by economies effected; its application, therefore, presupposes a condition of congested traffic.

Railroad electrification is advancing rapidly in such foreign countries as France, Japan, South America and others, under definite programs of expansion. In these countries the fuel situation is such that economies of operation obtained by utilizing hydro-electric power with electric locomotives, as compared to high-priced coal with steam locomotives, are sufficient to justify such investments of capital. No such condition exists in our country. Fuel costs on American railroads represent only 11 or 12 per cent of the total operating expense, while the fuel costs of the Swedish state railways were reported, during the war, to have been 50 per cent of the total operating expense.

A recent study of electrification on a mountain grade section of one of our heavy-tonnage railroads showed that, with coal costing $3 per ton and electric power at three-fourths of a cent per kilowatt-hour the power cost with steam operation is approximately the same as with electric operation, when maintenance charges for the substation and distribution systems necessary to get this power to the electric locomotive are included. With coal at $15 to $40 per ton in these foreign countries, and the price of hydro-electric power about the same as our own, the reason for their activity is at once apparent.

There are, however, other ways in which electrification can be justified on certain sections of some of our heaviest traffic systems. Our present business expansion is already demanding increased railroad capacity, future increase in which will be secured largely by using more efficiently the trackage which now exists. Electric operation will remove some of the inherent limitations of steam operation and thereby permit economic expansion in railroad work, just as it has in other industries.

One of the limitations of steam operation is labor. The higher wages and labor shortage now existing and which will continue to exist are an increasing handicap. The performance of electric equipment during periods of reduced maintenance and inspection has been well established. The effect of labor troubles on steam operation will only be magnified as this class of operation becomes more congested.

A second limitation is the extensive facilities required for steam locomotives, especially at terminals. The removal of coaling and watering stations, engine house facilities, inspection sheds and turntables and the speeding up of shifting movements and train makeup at terminals will all permit a more intensive use of present track facilities.

A third limitation results from the fact that the steam locomotive will always be an uncertain factor in the rapid movement of freight under adverse weather conditions. Its maximum capacity is fixed by the fact that it is a self-contained unit. This, in turn, is subject to its condition of overhaul and inspection, the quality of coal and the weather. The electric engine will always perform at its rating and, in addition, is good for short overloads, and has improved rating at lower temperatures. Cutting of tonnage rating and slowing up of trains at the very time when the maximum power is needed is a severe handicap to efficient operation.

If we expect the railroads to keep pace with our constantly increasing productivity, means must be provided for improvements and betterments in facilities and equipment. New capital

*Abstract of paper presented before the Rochester, N. Y., Chamber of Commerce, April 27, 1923.

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cannot be obtained unless the railroads are allowed to earn sufficient to pay a reasonable return on the investment. Electrification is one of the major betterments which can be effected with sufficient resulting economies to carry all charges on the capital investment. Every existing electrification has successfully demonstrated this fact.

C.E.R.A. Committees Announced

THE committee appointments of the Central Electric Railway Association for the year 1923 are announced with the publication of the Association's "Brown Book." The committees are as follows:

Auditing: Tudor W. Jones, auditor Union Traction Company of Indiana, Anderson, Ind., chairman; J. S. Clark and F. E. Belleville.

Constitution and By-Laws: Charles L. Henry, president Indianapolis & Cincinnati Traction Company, Indianapolis, chairman; F. R. Coates, C. N. Wilcoxon, F. D. Carpenter and A. C. Blinn.

Finance: Harry Reid, president Interstate Public Service Company, Indianapolis, chairman; S. W. Greenland and Robert I. Todd.

Hotel and Arrangements: S. D. Hutchins, Westinghouse Traction Brake Company, Columbus, Ohio, chairman; Harry L. Brown, John Benham, James H. Drew, J. A. Donahey, C. Dorticos and L. P. Morris.

Safety: Charles B. Scott, manager Bureau of Safety, Chicago, chairman; Neal Funk, J. H. Alexander, L. C. Bewsey, G. S. Wills, J. B. Stewart, E. M. Walker and James Harmon.

Program: Harry Reid, president Interstate Public Service Company, Indianapolis, chairman; M. Ackerman, J. C. Schade, I. W. Hansen and W. S. Rodger.

Publicity: J. S. Bleecker, general manager Indiana, Columbus & Eastern Traction Company, Springfield, Ohio, chairman; Harry L. Brown, H. J. Kenfield, E. B. Atchley, J. A. Greenland, E. F. Wickwire and H. A. Nicholl.

Resolutions: Joseph A. McGowan, secretary Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, chairman; R. A. Crume, J. F. Starkey, Walter Shroyer and Gus Mulhausen.

Rules Governing Interchange of Equipment: C. S. Keever, general superintendent Union Traction Company of Indiana, Anderson, Ind., chairman; E. B. Gunn, P. L. Radcliffe, G. K. Jeffries and C. C. Fast.

Transportation: L. M. Brown, general superintendent Interstate Public Service Company, Indianapolis, chairman; G. K. Jeffries, J. A. Greenland, C. S. Keever, F. W. Brown, R. N. Graham and J. Frank Johnson.

Supply Men: Myles B. Lambert, Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., chairman; C. C. Creighton, J. A. Donahey, E. C. Folsom, W. D. Hamer, C. T. Dehore, H. H. Buckman, S. W. Crawford, E. J. Smith, E. S. Sawtelle, G. L. Kippenberger, James C. Jameson and Robert J. Deneen.

Uniform Charges for Repairs to Interchanged Equipment: E. M. Walker, general manager Terre Haute, Indianapolis & Eastern Traction Company, Terre Haute, Ind., chairman; A. W. Redderson, P. V. C. See, R. C. Taylor, J. F. Elward and G. H. Kelsay.

Membership: A. C. Blinn, vice-president and general manager Northern Ohio Traction & Light Company, Akron, Ohio, chairman; William Harton, E. M. Walker, J. Frank Johnson, Myles B. Lambert.

Annual Transportation: G. K. Jeffries, general superintendent Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, chairman; Harry Reid, J. S. Bleecker, H. A. Nicholl, S. W. Greenland.

Standardization of Traffic Signal Colors

FORTY-TWO men, representing the manufacturers and the users of traffic signals, federal and state governmental departments, associations interested in the prevention of traffic accidents and representatives of the general public, are drafting a national code on the proper colors for traffic signals, which it is expected will not only cut down the annual loss of life through traffic accidents, but will eliminate many of the existing irritations to motorists and the operators of steam and electric railways.

This work is being carried on under the auspices of the American Engineering Standards Committee. The sectional committee drafting this code is made up of representatives of the manufacturers of traffic signals, purchasers of such equipment, the users of traffic signals, governmental bodies, technical specialists and insurance representatives.

Charles J. Bennett, State Highway Commissioner of Connecticut, who represents the American Association of State Highway Officials, is chairman of the sectional committee; M. G. Lloyd of the United States Bureau of Standards, representing both the bureau and the American Society of Safety Engineers, is vice-chairman, and Walter S. Paine, research engineer of the Aetna Life Insurance Company, who is the representative of the National Safety Council, is secretary.

Canvass on Wheel-Tread Width

THE Central Electric Railway Association has just recently been conducting a canvass regarding the opinions of members on the narrowing of interurban wheel treads to 3 in. Of the twenty-two companies that have replied to date, fifteen do not favor the change; two are willing to change a part of the present equipment to continue through traffic arrangements, the city of Detroit having specified the 3-in. tread for cars operating over its tracks; one is willing to change all equipment to take care of traffic arrangements, and four are now using the narrow tread. Considerable difficulty has been experienced in this territory from the use of narrow wheel-tread equipment due to derailments, which occur particularly in the spring.

American Association News

Committee on Rail Head and Wheel Contours Holds Busy Meeting

A MEETING of the Engineering Association special committee on wheel tread and flange and railhead contours was held in New York on May 11. The following members and guests were present: H. H. Adams, chairman, Chicago; J. H. Hanna, vice-chairman, Washington, D. C.; C. A. Alden, Steelton, Pa.; V. Angerer, Easton, Pa.; George L. Fowler, New York, N. Y.; J. F. Miller, Pittsburgh, Pa.; H. F. Heyl, Easton, Pa.; W. F. Graves, Montreal, Canada, and E. M. T. Ryder, New York, N. Y.

Designs of wheel treads and flange contours were decided upon which will be recommended to supersede the contours now standard and included in the Engineering Manual under Section Et-4a. Recommendations for contours of chilled iron and steel wheels were also decided upon. Revision of wheel dimensions and the present wheel mounting gage will be made so as to revise Manual sections Et-7b and Et-18a. The committee considered it inadvisable to recommend a change in the head of the present plain girder rail at this time.

Service Bulletins Now Available

THE following special reports have been prepared for the use of member companies in good standing:

Wage Bulletin 127 Revised: A new edition of the wage bulletin, which combines in one compilation the original bulletin issued on Sept. 1, 1922, and all of the monthly supplements showing changes to May 1, 1923.

Use of Reduced Rate Tickets and Transfers: A tabulated statement showing for a large group of companies the cash fare, ticket rate, transfers issued, the proportion of revenue passengers using reduced rate tickets and proportion using transfers, whether revenue or free, during 1922 and 1921.

Allowances for Going Value in Valuation Cases: A summary of court and commission decisions in valuation cases in which the questions of allowances for going value was brought up. The decisions are grouped by states and thus serve to indicate the attitude of the various states toward this question.

Trend of Material Prices: A new edition of the association's compilation, bringing down to date the trend of prices of materials used by electric railways as furnished by manufacturers.

Motor-Bus Operations: Gives operating figures of the Washington Rapid Transit Company for the first three months of 1923, a six-month statement for the buses operated by the United Electric Railways, Providence, R. I., and the combined operating statement of the California bus lines as compiled by the California Railroad Commission.

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The News of the Industry

Bid Made for Co-operation

New York Transit Commission Urges that Transit Construction Matters Be Taken Up Frankly

George McAneny, chairman of the New York Transit Commission, has made an offer to co-operate with the Board of Estimate of New York City in getting subway construction under way at once, reconciling wherever possible the differences between the Mayor and the commission, so that the imperative need to relieve congestion might be met. His proposal was contained in a letter sent to the Board of Estimate on May 16. He urged that differences of opinion as to the value of certain routes be taken up frankly in conference as early as possible, and offered to meet the board half way in adapting the plans of the Mayor and the commission so that they might be molded into a complete, harmonious system.

Mr. McAneny pointed out that the Board of Estimate in the last two years had refused to approve any measures presented by the commission and that the responsibility of the Transit Commission and the Board of Estimate was a joint responsibility "beyond the possibility of either body to alter at the present time." He referred to the plan of the commission for a five-year building program, to cost $225,000,000, submitted a year ago, and to Mayor Hylan's five-year building program, based on a different arrangement of lines, some of which, Mr. McAneny said, were "wholly feasible." The commission would be glad to take up the Mayor's proposals if they would be submitted to the commission, and would be prepared to accept any change in its own program that would not be antagonistic to certain basic principles of construction and operation.

Mr. McAneny said that the most important work before the commission and the board was the proposed construction of the crosstown subway in Brooklyn and Queens and the Washington Heights extension from Fifty-ninth Street and Broadway. The former plans of the commission for these two lines have been revised to conform substantially with those proposed by Mayor Hylan, he said. The other parts of the commission's program which could be made to agree with the Mayor's plan were the Corona-Flushing extension, the extension of the Fourth Avenue subway in Brooklyn, and the Nassau Street line in Manhattan. These five projects would cost from $100,000,000 to $125,000,000, said Mr. McAneny, which would exhaust the funds the city would have available for subways for a year, and he urged that immediate action be taken with a view to getting this work under way.

Board Revokes Bus Permit

Because they violated the terms of the conditions under which their permits were issued Fred B. Sheldon & Son and Cornelius Jewell were ordered to discontinue the operation of their buses between Dover and Wharton, N. J. The complainant was the Morris County Traction Company, Dover, N. J.

The decision of the Utilities Board in this case is outstanding in that it is said to be the first time under the 1921 act that a previous order approving bus grants has been canceled.

The traction company charged the bus operators with violating a stipulation that they would not take on or discharge passengers while operating in Main Street and Blackwell Street in Wharton and Dover and also that they did not conspicuously display a sign notifying the public that no passengers would be taken on or discharged within the two points mentioned.

At the hearing the electric railway produced several witnesses who testified to the offenses charged by the traction company. The board pointed out that the defendants in effect admitted the violations and attempted to excuse their conduct by saying that it was a matter of violating the conditions of the grant or violating a permit to operate issued by the municipalities.

Permission to operate three buses between Dover and Wharton was granted to the above-mentioned defendants on Feb. 8 last.

Settlement Has Been Reached in Birmingham

Conferences Growing Out of "Jim Crow" Agitation Result in Agreement Practically Eliminating Jitneys and Providing Among Other Things for Reduction in Fare—End of Receivership in Sight

EARLY reorganization of the Birmingham Railway, Light & Power Company is expected as a result of a general agreement between the city of Birmingham, Ala., and the company, according to a joint statement of Lee C. Bradley, receiver, and J. S. Pevear, president and co-receiver of the company.

Settlement of all issues between the city and the company has been effected and was ratified by the City Commission by a unanimous vote at its regular meeting on May 8. An ordinance and a series of contracts, which was made a part of the ordinance setting forth the terms of the settlement, were formally adopted by the commission.

The principal features of the agreement are as follows:

Jitneys are practically eliminated by regulation. They are prohibited from operating on any street on which there is a car line or on any street paralleling and within two blocks of a car line. A surety bond of $10,000 is required from all jitneys allowed to operate, suburban jitneys and buses operating to outside territory excepted. Licenses for operation of jitneys are raised to $100 a year, with increasing licenses above a specified passenger-carrying capacity. Permits are required from the City Commission for the operation of any jitney and a necessity for their operation must be shown before the permits may be issued. Refund of half of the year's license to jitneys is provided.

Cash fares are reduced from 8 to 7 cents. Ticket fares are reduced from 6⅔ cents to 6 cents and are to be on sale at conveniently located places in books of twenty tickets for $1.20. Fares fixed are maximum, the company binding itself not to ask an increase inside of three years, though the city is free to ask a decrease in fares should conditions warrant such action.

Jim Crow ordinance recently adopted by the city will be enforced, but in modified form. Cars with separate entrances for white and negro passengers are to be provided upon all lines except the Highland Avenue and Lakeview line, the Loop lines, the Mount Terrace, Roebuck Springs and Rugby Highland lines, which will retain one-man cars. Movable partitions separating the portions of the cars occupied by white and negro passengers will be used on all lines. These partitions will extend from the aisle edge of the seat back to the top of the window.

Company will install 100 street lights at once and others as ordered. A reduction of from $54 to $48 a year in the price of maintenance of arc lights is made. The contract covers a ten-year period.

Conferences between the city and the company on questions of service are provided under the agreements.

Jitney regulations provided and car-fare reductions made are to go into effect on July 1. It is provided that should the enforcement of jitney provisions be held up by litigation or an election fare reductions and other provisions of the agreement shall be held up pending the result. The agreement is a general one and is made with the provision that if submitted to a vote of the people it shall stand or fall as a whole. However, the company is proceeding with plans to put the Jim Crow provisions into effect at once.

Orders are to be placed for twenty new cars as soon as bids can be obtained. According to present plans the new cars are to be of a large type with side entrances, the doors being toward the rear, leaving about two-thirds of

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the car for white and one-third for negro passengers and providing effective separation of the races. Cars of a similar type are now in operation on the Tidewater lines. The cost of the new cars is estimated at something like $14,000 each or a total of $280,000 for the twenty.

The work of remodeling equipment now in operation is to start at once, Mr. Pevear stated. Ten large cars now equipped for pay-as-you-enter operation on the West End lines will be remodeled. Nineteen one-man double-truck cars will be remodeled for two-man operation with separate entrances. All of this work will be done in the local shops.

Action on the proposed settlement came after a lengthy series of conferences between City Commissioners and the co-receivers of the Birmingham Railway, Light & Power Company. The settlement followed the adoption of the Jim Crow ordinance by the city. This ordinance was to have become effective on April 15. Shortly before that date a conference between the commission and company representatives was held and it was suggested that the conference go into the question of a general settlement. The City Commission at an adjourned meeting on April 12 extended the time limit for the enforcement of the Jim Crow ordinance thirty days, or to May 15, pending the outcome of the conference. After several conferences the terms of the agreement were reached and the matter was turned over to W. J. Wynn, city attorney, and Mr. Bradley, receiver, to be put into proper form.

Jitney Operators Protest

Two meetings of jitney operators have been held, but their attorneys state that no definite course of action has been decided upon. However, funds have been subscribed by the jitney operators to make a fight in the courts.

Under the commission act, by which Birmingham is now governed, it is provided that such matters may be submitted to a vote on the presentation of a petition signed by 1,500 qualified voters. The election having been held, the law provides that the ordinance adopted by the voters at the election cannot be modified or amended by the City Commission and can be repealed or amended only by a majority vote of the people at an election. Members of the commission have expressed confidence that the settlement will be upheld if the issue is submitted to a vote, and it is generally believed that the jitney interests will hesitate to call an election.

The City Commission issued a statement following the adoption of the ordinance setting out the position of the commission and expressing the hope that the matter might be submitted to a vote. The commission declared that it is ready to enter into an election and fight to sustain its settlement.

Between 200 and 300 jitneys have been in operation in Birmingham for some time.

Representatives of the railway have assured the commission that the company will be in a position adequately to care for any added traffic when the ordinance takes effect.

D. C. to Replace Single Phase—Indianapolis Line to Be Extended 50 Miles to Cincinnati

The board of directors of the Indianapolis & Cincinnati Traction Company, of which Charles L. Henry is president, took definite action on May 15 to re-equip the present single-phase system for 600 volt d.c. operation. The plan calls for the purchase of new rolling stock, probably twelve new all-steel multiple-unit cars, and extensive rehabilitation of the present track and overhead. All of this is in preparation for an early extension from Rushville to Cincinnati, thus carrying out the original idea of the promoters to provide service between Indianapolis and Cincinnati.

The authorized expenditure for re-equipping the present lines is $767,271. It is planned to award contracts very shortly for this work. The present system comprises 101 miles of line and fifteen motor passenger cars, six motor freight cars and about thirty other cars. The extension to Cincinnati will require the construction of about 50 miles of new line running through a fertile farming territory not served by any railroad at present. The company plans to purchase its power. A three-phase transmission line will be built to connect with nine automatic substations.

The existing system is being placed in condition to tie up at once with the new construction.

Reports of Floods in Arkansas Exaggerated

Only a temporary suspension of the water, gas, telephone and electric railway service followed as a consequence of the flood, fire and cyclone which on May 14 wrecked the business district of the city of Hot Springs. Delay to the railway service was caused largely by the flooding of Central Avenue, which made the avenue, lying at the bottom of the valley, a rising river for a short time. On May 17 the street cars were again operating on all lines. The utilities sustained only minor damages. These were confined to the blowing down of wires, breaking off of a few fire hydrants and washing out of about 8,000 bricks in the pavement between car tracks. W. J. Boyer, secretary-treasurer of the Citizens Electric Company, operating the gas, electric and street railway service in Hot Springs, reported on May 17 that conditions there are again normal.

No Settlement in Pittsburgh,—The matter of a wage agreement and working conditions for the employees of the Pittsburgh Railways was still under discussion on May 15.

Philadelphia Report Under Attack

Common Council and Rapid Transit Company Do Not Agree with Its Findings

The special report presented by the Mayor's Transit Advisory Board in Philadelphia on the proposed high-speed lines in that city has been the subject of vigorous debates at conferences called by the Mayor to consider the topic. It has also been the topic of advertisements published in the daily papers by the Philadelphia Rapid Transit Company.

Synopsis of Report

The report was submitted under date of April 24 to Mayor Moore by the special commission consisting of Milo R. Maltbie, chairman; Morris L. Cooke and Francis Lee Stuart. This committee was appointed by the Mayor on Feb. 24 to consider the plans of the Broad Street subway, delivery loop, and other authorized high-speed lines, as heretofore prepared by the Department of City Transit. In its report the committee recommends as the first step a subway on Broad Street for pretty nearly its entire length or from Olney Avenue on the north to League Island Park on the south. About half of this would be four tracks and the rest two tracks, but the two-track sections would be so built that they could be changed to four tracks later. In addition the commission recommends a two-track branch subway leaving the Broad Street subway at Arch Street and going under Arch, Eighth and Locust Streets, back to Broad Street and then extending west on Locust and Walnut Streets to the Schuylkill River and then as an elevated line to Darby. In this respect the report recommends something like the Taylor plan, of a loop under these streets. Other recommendations contemplate the inclusion of the Chestnut Hill branches of the Pennsylvania Railroad and the Philadelphia & Reading Railway with the city-owned high speed line, a line over the Delaware River bridge now building and the adoption as standard for all these lines of a gage of 4 ft. 8½ in.

The significance of the last recommendation will be understood from the fact that the present Market Street and Frankford elevateds, operated by the Philadelphia Rapid Transit Company, have a gage of 5 ft. 2 in., the Philadelphia surface lines of 5 ft. 2½ in., and the surface lines in Camden of 5 ft. The committee points out, however, that the steam railroad suburban lines, which it suggests should be taken over as feeders, have the standard gage and this cannot well be changed because they will still have to be used for the haulage of freight. It adds that if the Market Street and Frankford lines should have to be connected with the proposed subway later, they can be changed to standard gage without serious inconvenience.

In the introductory part of the report,

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the committee says that the population of the city in 1920 was 1,823,779, and it is expected that by 1950 the population will be 2,743,000. The report points out that the traffic in Philadelphia has increased rapidly, as shown by the following table:

City	Period	Per Cent Increase Population	Traffic
Philadelphia	1910-1922	22	79
New York	1909-1919	19	44
Cleveland	1910-1919	38	71
St. Louis	1910-1919	11	14

The recommendations of the rapid transit committee are not in accord with the so-called "City-Company Plan" for better transit in the downtown district, recommended by the Philadelphia Rapid Transit Company and described on page 382 of the issue of this paper for March 3. The report of the Mayor's committee has also met a snag in the City Council, which on May 3 adopted a resolution providing for the appointment of a transit commission composed of the president of the City Council, a councilman from each of the eight districts, and a representative each from the Chamber of Commerce, Manufacturers' Club, Real Estate Board, Builders' Exchange, Operative Builders, and United Business Men's Association, with the Mayor as chairman.

The position of the Philadelphia Rapid Transit Company is stated by Chairman Mitten in a recent issue of "Service Talks" for May 8 where he argues that the case of the city and the company is like that of landlord and tenant. The company, the tenant, requires added space in the center of the city to meet increasing traffic needs, while the city, the landlord, finds the capacity of these streets required for the exclusive use of other traffic. The city and the company should solve this problem as any other landlord and tenant and make an arrangement for the transfer of street car tracks from the streets underground, and that the city and the company should co-operate in planning for future rapid transit lines.

To this the Mayor replied that the "tenant" had promised to do certain paving and charge only a 5-cent fare, but without the consent of the city had got rid of its paving and was charging a 7-cent fare, though it was paying 6 per cent dividends and erecting "super" funds for various purposes. Because it had control over all of the surface lines in Philadelphia and of the elevated and subway lines that have been built, the Mayor saw no reason why competition should be denied the sovereign (landlord) if any other operator should appear or if he should decide to provide the service himself.

Portland, Me., Men Seek Wage Advance

Trainmen employed by the Cumberland County Power & Light Company, Portland, Me., are seeking a wage increase amounting to 10 cents an hour. The men have been receiving 50 cents an hour. Operators of the one-man cars, who have been paid 55 cents an hour, are seeking an increase to 80 cents. The men now involved are the same men who a year ago submitted to a voluntary 10-cent wage reduction in order to decrease the deficit in the railway's earnings. A new agreement prepared by the men was submitted to the company several days ago and conferences have been held from time to time. The old agreement expired on May 1.

Town Wants Railway

South Jacksonville Ready to Spend $100,000 to Secure Service, but Wants Road Privately Managed

A municipally owned electric railway operated for the town by a private company appears to be in prospect for South Jacksonville, Fla., a town of approximately 3,500 population lying across the St. John's River from Jacksonville, with which it is connected by a highway bridge owned by Duval County, in which both Jacksonville and South Jacksonville are located.

The people of South Jacksonville have for some time been anxious to have the Jacksonville Traction Company extend its line across the toll bridge and into South Jacksonville. Just at the present time, however, there is not enough business in sight in South Jacksonville to warrant an expenditure on the part of E. J. Triay, receiver of the railway, of $100,000 to build and operate the line. The citizens of South Jacksonville realize, though, that in order for their town to grow and develop as it should it is necessary for them to have some means of transportation between their town and Jacksonville.

Bus Proposal Defeated

An election was held on April 10 to determine what should be done. The issue was put to the people in a general referendum to vote on three propositions:

1. Should South Jacksonville issue bonds in an amount of $100,000 to build and equip a street railway system connecting with the Jacksonville system?
2. Should South Jacksonville issue bonds in an amount of $30,000 to equip a motor bus line, running between South Jacksonville and Jacksonville?
3. A negative vote against either proposition.

Bus advocates were prominent and busy in trying to induce the people of South Jacksonville to install a motor bus line. Those in favor of a railway line were equally busy in trying to impress upon the people the advisability of the street car line, largely on the ground that it was more permanent in nature and that it would give better and more reliable service than a bus line. It was also pointed out that a railway would increase the value of real estate in that city and make it more desirable if a street car line were constructed than if a bus line were installed.

When the ballots were counted it was found that 147 people had voted for the street railway line, 113 for a bus line and 87 against either proposition.

The Council of South Jacksonville then took up with Stone & Webster, Inc., the matter of constructing the line for the city. An engineer representing Stone & Webster, Inc., is now on the ground and is making up estimates covering several routes. The Council of South Jacksonville will probably come to a decision as to the route to be selected at an early date. The present indications are also that Stone & Webster, Inc., will be awarded the contract for the construction of this line.

The town of South Jacksonville also has taken up with the receiver of the Jacksonville Traction Company the question of operation of the line in connection with the railway system in Jacksonville. An agreement will probably be reached, if and when approved by the court, under which Mr. Triay will take over the operation of the line for South Jacksonville and operate it in connection with the Jacksonville system.

Another Franchise Being Drawn for Saginaw

After a two-day session with Otto Schupp, grantee under the last street car-bus franchise that was defeated on April 2, the Council of Saginaw, Mich., has asked that a new franchise be written for Mr. Schupp to submit to the bondholders' protective committee of the bankrupt Saginaw-Bay City Railway at an early date.

The term of the grant is to be fifteen years, and the rate of fare, four tickets 25 cents; 10-cent cash fare; six tickets 25 cents or 5-cent cash fare for school children during school hours, and universal transfers.

The Council proposes that the rate of fare so fixed shall continue during the term of the franchise and that all disputes between the operating company and the City Council shall be settled by a board of arbitration composed of three, all Saginaw citizens. The Council is to name one member of this board, the company one and a federal judge the third.

This provision is designed to eliminate the need for appeal to the Michigan Public Utilities Commission to settle disputes, while with a fixed rate of fare to continue during the period of the franchise the necessity will be done away with of fixing a rate value. This has been considered a stumbling block to the people approving the franchises that were submitted in April and on Nov. 7 of last year.

There are some other changes in the grant proposed last month, but they are of minor importance.

The attorneys for the city and the grantee, when the conference had concluded on May 8, immediately set to work to rewrite the former franchise. It is expected this will be accomplished in a few days, when the new grant will no doubt be approved by the Council. Mr. Schupp will then be asked to submit it to those who will be asked to finance the project.

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Men on Strike

Schenectady Employees Vote for Walk-Out—City Favors Strikers—Company Wants Open Shop

A strike of the operators of cars of the Schenectady Railway was started at midnight on May 16 when failure of the trolley company officials to meet the union representatives in arbitration with Mayor Whitmyer had resulted in an almost unanimous vote of the men to go out. The strike ties up not only the local city traffic but all urban service between Schenectady, Albany, Troy, Saratoga, Watervliet and Ballston Spa as well as service to the villages of Scotia and Woodlawn. About 600 men are out.

No cars are expected to be operated until a settlement is made unless the court should intervene, as just before the strike vote was taken John E. Cole, commissioner of public safety, told the men that in the event of a strike the cars would be kept in the carhouses. He ordered a guard of police stationed at each carhouse to see that the cars were not run out after they had been turned back on May 16. The balloting was a secret referendum but it was said the vote was almost unanimous.

CITY ADMINISTRATION WITH THE STRIKERS

President Frank X. Shay of the Common Council, following the strike vote, told the trolleymen he would aid them in every way by any possible legislation that could be passed by the Common Council. He was followed by Alderman Ray Madden, who said: "Go out and make a strong fight—a winning fight, and I wish you success." Commissioner Cole told the trolleymen to wage a clean fight "and not hit below the belt." He told them he believed they would win.

The strike issue was brought to a head by Harry B. Weatherwax, president of the company, who addressed the trolley men at a meeting of the employees on May 15, when he declared that the Schenectady Railway would operate on an open-shop plan from now on. This stand taken by Mr. Weatherwax after he had been requested by the Mayor to arbitrate brought about the crisis. The Mayor immediately made a last appeal to both sides to arbitrate, in which he was supported by the president of the Chamber of Commerce. Mr. Weatherwax was firm in his stand not to treat with the union officials, the only concession he would make being that he would put the matter up to the meeting of the board of directors who own the stock of the road, which meeting will take place early next week.

James Largay, international officer of the union, who is at present in charge of negotiations for the men, said that in his opinion the company was determined to break the union because of the existence of an old agreement, under which the company would be compelled to pay a 60 cent wage as long as it received a 7-cent fare on city lines. He referred to the agreement entered into several years ago by a former general manager of the company, with the Amalgamated Association, which was a triangular affair resulting from the demands of the men during the war for an increase which was granted through a waiver of the franchise rights by the Common Council. The Council did this so the company would be financially able to increase the wages from 45 to 60 cents. On Dec. 1 last the scale was reduced to 45 cents.

The strike promises to develop a most interesting situation. With the city of Schenectady assuming responsibility for transportation facilities and using its police powers to prevent the company from operating its cars unless it comes to an agreement with the trolleymen's union, and Mr. Weatherwax and Mr. Hamilton determined that they will not recede from the position they have taken, either the company will be forced into serious financial straits or the city of Schnectady will establish the feasibility of municipal regulation of transportation facilities, and with a municipal election to be held in November the administration is certain to bend every effort to do this one thing.

Interurban Increases Wages of Employees Other than Trainmen

Increases of from 3 to 5 cents an hour in the pay of all classes of labor employed by the Indiana, Columbus & Eastern Traction Company with the exception of transportation men were announced on May 11 by F. A. Healy, secretary-treasurer of the company. The increase is retroactive to May 1 and will be added to the pay made May 20. According to Mr. Healy, the increase will add $3,500 monthly to the payroll. Section men are increased from 30 to 35 cents an hour, bridge carpenters from 40 to 45 cents, bridge carpenters' helpers 35 to 40 cents. Other classes of employees get increases ranging from 3 to 5 cents an hour. The increase, Mr. Healy declared, is in line with the increases which have been made by the steam roads of the country.

Pennsylvania Information Committee Functioning

The Pennsylvania Public Service Information Committee started to function on May 15. P. H. Gadsden, vice-president of the United Gas Improvement Company and chairman of the committee, in announcing the purpose of the new organization, said:

> The purpose of the committee is primarily educational. In the last few years the rapid development of public interest in public utilities along practical lines has rendered this necessary. The committee is, in fact, a State bureau created to supply to the public, through the press and otherwise, accurate information concerning the public utilities of Pennsylvania, with a view of crystallizing sound public opinion and a feeling on the part of the public which will promote clear understanding of public utilities.

The executive committee is composed of P. H. Gadsden, chairman; W. C. Dunbar, Philadelphia Rapid Transit Company; W. H. Johnson, W. C. Hawley, C. L. S. Tingley and P. C. Stapler. Headquarters of the committee are 930 City Center Building, Board and Cherry Streets.

James M. Bennett, publicity manager United Gas Improvement Company, has been named secretary of the committee. Major J. S. Stewart Richardson has been appointed director.

Connecticut Men Present Demands

The Connecticut Company, New Haven, on May 14 received the demands of the trolleymen's union to be incorporated in a proposed new agreement when the present one expires on June 1. The request is for a maximum wage scale of 65 cents an hour, an increase of 13 cents. For operators of one-man cars the maximum is 80 cents an hour, an increase of 21 cents. The shopmen and mechanics ask for a 25 per cent increase.

News Notes

Platform Men Receive Increase.—The Buffalo & Lake Erie Traction Company, Buffalo, N. Y., operating between Buffalo and Erie, Pa., has granted a wage increase of 5 cents an hour to its platform employees. About 250 men are affected. The men had threatened to call a strike May 1, 1923, unless their demands for a wage increase had been granted. Operators of one-man cars will now receive 60 cents an hour and trainmen on cars requiring two men will receive a maximum of 55 cents an hour.

Interurban Men Get Increase.—Motormen and conductors employed by the Cleveland, Southwestern & Columbus Railway, Willoughby, Ohio, have voted to accept a wage increase of 5 cents an hour. The new scale provides an increase of 12 per cent over last year's wages. It is the equivalent in amount to that awarded the Cleveland Railway's platform men by a board of arbitration. The new wage scale for the interurban gives first-year men 46 cents an hour, second-year men 50 cents an hour and third-year ment 54 cents an hour.

Men Receive Wage Increase.—Three hundred employees including trainmen, of the York Railways will receive an increase in their wages amounting to 2½ cents an hour. Under the new schedule all who have been with the company six months will receive 42½ cents an hour plus a 10 per cent bonus, which equals 46.75 an hour. Those who have been with the company longer than six months, up to the second year, 43½ plus bonus, 47.85; second year, 44½ plus bonus, 48.95; third year, 45½ plus bonus, 50.05; fourth year, 47½ plus bonus, 52.25; fifth year, 48½ plus bonus, 53.35. The men work from nine and one-half to ten hours a day.

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Financial and Corporate

Lake Shore Plans Announced

Ohio Interurban to Readjust Capital Structure and Arrange for Customer and Employee Ownership

Plans have just been announced for the reorganization of the finances of the Lake Shore Electric Railway, which operates 225 miles of interurban railway connecting Cleveland, Toledo, Detroit, Lorain and Sandusky. Under the refinancing arrangement $2,000,000 of 7 per cent prior preferred stock will be issued. The money derived from the sale of this stock will be used to retire maturing obligations, improve equipment and generally rejuvenate the road.

Involved in the refinancing plan, too, will be the retirement of $500,000 of authorized but unissued first preferred treasury stock. A million dollars of this first preferred stock is now out.

Articles of incorporation are to be amended and changed so that ultimately the authorized capital stock of the company will consist of $9,500,000 of stock of $100 par value. Of this capital, 20,000 shares are to be prior preference stock, 10,000 shares first preferred, 20,000 second preferred and 45,000 shares common stock.

At the present time the company has $1,000,000 of first preferred stock outstanding, $2,000,000 of second preferred, $4,500,000 of common stock and bonds totaling $5,750,000.

An effort is to be made by the company to secure wide distribution of the company's new stock in home markets, following the lead of other public utility companies in the scheme of customer ownership.

In a letter to the stockholders E. W. Moore, president of the company, says:

> Your officers and directors for some time have been convinced of the desirability of a change in the financial structure of the company so as to decrease the amount of its floating indebtedness and fixed charges. In studying the situation they have been impressed with the success of various public utilities in this and other States in arranging permanent financing through the sale of preferred stock to and through employees, to patrons and the public in territory served.

President Moore also refers briefly to the plan already outlined. He continues as follows:

> The experience of other public utilities in arranging this kind of permanent financing indicates, and your officers believe, that your company would receive the following benefits from the issue and sale of this stock:
>
> 1. From the wide distribution of this stock through the territory served the company would have a larger number of stockholders directly interested in its welfare.
> 2. The problem of refunding the company's bonds would be simplified by reason of the smaller amount of bonded indebtedness which, in turn, should enable the company to refund its bonds at a lower rate of interest, thus benefiting all stockholders of the company.
> 3. This plan would provide funds for capital expenditures heretofore provided for through the creation of floating debt and the use of the entire surplus earnings which in the past has prevented, in part at least, the distribution of any part of the earnings to stockholders.

The new plan was ratified by the stockholders at a meeting held at Cleveland on May 14.

Amicable Settlement Averts Receivership

Agreements have been reached to stipulate on certain points in the suit of the Emergency Fleet Corporation, to dispose of the debt standing against the city of Tacoma, Wash., in the case of the municipal car lines to the tideflats. Under the understanding, receivership of the municipal car line will be avoided and the special fleet debt fund will not be sought by the government, pending settlement. Under an agreement between the government representatives and the councilmen for the city the fleet corporation counsel will be allowed to make a physical inspection of the municipal line and equipment and go over the accounts of the city pertaining to the operation of the line. Counsel for the government recently secured a restraining order in the federal court preventing the city from disposing of any of its railway funds by transfer or otherwise, or in any way changing the conditions pending settlement.

Railway and Power Departments Segregated in Portsmouth

The Virginia Railway & Power Company has transferred its Portsmouth holdings to the Portsmouth Transit Company, Portsmouth, Va., which was organized and chartered recently, and which has just made a bid for the traction franchise of that city. Announcement to this effect was made by A. H. Herrmann, assistant to Thomas S. Wheelwright, president of both the new and the old company. The new company will be a subsidiary of the Virginia Railway & Power Company.

W. Jennings Crocker, Jr., counsel for the Virginia property in Portsmouth, is secretary of the new company. Among other incorporators is T. Norman Jones, general manager of the property in Norfolk.

Mr. Herrmann said the movement is one to segregate the railway property of the company from its light and power business. The new company will have nothing to do with the light and power departments of the Virginia Railway & Power Company in Portsmouth, but will buy its current from the concern. The new company is the only bidder on the new franchise offered for operation in Portsmouth by the City Council. Its bid was $5. Mr. Herrmann said the Virginia Railway & Power Company probably would take over the franchise in the course of time.

The new company will sell $750,000 of stock to the citizens of the community.

Seattle Municipal Gross Slightly Less

Operating Expenses Are Reduced by Greater Use of One-Man Cars—Revenue Accounts Shown

The Seattle Municipal Street Railway Department's annual report for 1922 was transmitted to the Mayor and City Council on March 28, by D. W. Henderson, general superintendent of railways. The figures are given in a form somewhat different from the usual corporation annual report. Total gross revenues for the year were $6,228,103, as compared with $6,347,175 in 1921; and total operating expenses, including depreciation and amortization, were $4,631,508. The 1922 report does not give the comparison of these expenses with 1921, but in the 1921 report they are shown as $5,105,487. The accompanying table, "Statistical Report of Operation," shows the detail of revenue and expense accounts. In the operating revenues are included a debit item of discounts and adjustments totaling $55,253, and in the miscellaneous revenues are included operating expenses of shops, service equipment, and utility equipment, totaling $41,984.

The resultant net revenue, $1,596,594, is not shown in the statement. The fixed charges along with operating expenses and separate income are shown in an "income, profit and loss statement." The deductions from gross income, shown in that statement, are:

Interest on general bonds outstanding		$35,750
Interest on revenue bonds outstanding:		
Total accrued	$800,217	
Less interest charged to construction	11,750	788,467
Miscellaneous interest		4,408
Amortization of discount on funded debt		6,908
Total deductions		$835,533

This leaves the net operating income for the year $761,062.

The net income was augmented as shown in the accompanying table of "Profit and Loss."

PROFIT AND LOSS		
Net income		$761,062
Gains accrued (other than income), current annual period		5,843
Delayed gains accrued in prior periods		22,140
Unearned increase of surplus—auto bus donated		3,227
		$792,272
Losses accrued (other than income), current annual period	$283	
Delayed losses accured in prior periods	81,905	82,188
Net income, profit and loss (gain), 1922		$710,084

The condition of the property is shown in the balance sheet. Capital assets, including plant and equipment, special construction, and cash on hand available for capital outlay, totaled $15,072,693. Against this, funded ob-

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ligations and accounts payable are outstanding to the amount of $16,716,384. The total assets fail to equal the total liabilities, there being a deficit up to the end of 1922 amounting to $877,491.

The system spent $1,048,687 for plant additions and betterments during the year, of which $427,832 was for the rebuilding of cars and motive equipment, and $471,861 for undistributed construction of plant and work in progress. Against this the plant retired from service was $518,413, leaving the net additions during the year $530,274.

STATISTICAL REPORT OF OPERATION, SEATTLE MUNICIPAL STREET RAILWAY.

Revenues	Amount	Cents per Car-Mile	Cents per Car-Hour
Passenger car revenue...	$6,130,729	39.64	366.19
Other operating revenue.	85,840	0.56	5.13
Total operating revenue.	$6,216,569	40.20	371.32
Miscellaneous revenues and expenses.....	11,533	.07	.68
Total gross revenues....	$6,228,102	40.27	372.00
Operating Expenses			
Way and structures. ...	$382,805	2.48	22.86
Conducting transportation.....	2,040,453	13.19	121.88
Maintenance of transportation equipment..	382.607	2.47	22.85
Housing and hostling equipment.....	186,956	1.21	11.17
Power.....	613,677	3.97	36.65
Commercial.....	49,725	.32	2.97
General.....	290,171	1.88	17.33
Depreciation and amortization.....	685,114	4.43	40.93
Total operating expenses	$4,631,508	29.95	276.64

CONDENSED BALANCE SHEET OF SEATTLE MUNICIPAL RAILWAY AS OF DEC. 31, 1922

ASSETS		
Capital assets:		
Lands.....	$423,894	
Plant and equipment, $16,067,323, less accrued depreciation, $2,443,094	13,624,229	
Cost of "Greenwood" line acquired in 1922.....	55,410	
		$14,103,533
Special construction..		593,263
Cost available for capital outlay only (bond funds cash).....		375,897
Total capital assets.....		$15,072,693
Total redemption and special fund assets.		1,101,218
Total current assets.....		649,343
Deferred charges.....		85,522
Deficit, Dec. 31, 1922.....		877,491
		$17,786,267
LIABILITIES		
Capital liabilities:		
Bonds outstanding.....	$16,652,000	
Bond fund loan payable to railway operating fund.....	542	
Accounts payable.....	63,842	
Total capital liabilities.....		$16,716,384
Redemption and special fund liabilities:		
Accrued interest on funded debt.....	$274,774	
Matured unpaid bonds, principal.....	250	
Depreciation fund reserves.....	33,294	
Total redemption and special fund liabilities.....		$308,318
Current liabilities:		
Amounts payable to general, light, and railway bond redemption funds.	$445,884	
Accounts payable, tokens and approved claims...	282,604	
Warrants outstanding....	33,075	
Total current liabilities.....		761,565
		$17,786,267

CLASSIFICATION OF PASSENGER CAR-HOURS AND CAR-MILES IN SEATTLE FOR 1922

	Car-Hours	Car-Miles
One-man single truck.....	168,307	1,291,260
One-man double truck.....	296,856	2,704,945
Two-man.....	1,161,343	11,107,158
Buses.....	28,463	258,822
	1,654,969	15,362,185

The authorized bonds of the company totaled $16,730,000, of which there were outstanding $15,877,250. Interest accrued on these bonds during the year amounted to $800,217.

The system carried a total of 96,406,775 passengers, of whom 598,828 rode on the three bus lines operated by the railway. The car-miles and car-hours operated to handle this business are shown in an accompanying table.

"In connection with the data furnished," says the report, "the following comments will be of some value:"

The number of trainmen has been reduced due to the increased number of one man cars in use. Schedule hours have been increased. Schedule speed has been reduced, fully explained by the fact that First Avenue traffic was for the greater part of the year diverted over other streets, making undue congestion.

Our maintenance department has made numerous and extensive repairs. The general condition of roadway and tracks has been much improved.

Aside from general repairs, during the year the shops have converted forty-five two-man cars into one-man cars.

In general, with the nearing of completion of paving on First Avenue from Pine to Atlantic Streets; the better condition of tracks and equipment; the success of the one-man car of the larger type, and the fact that we are prepared to extend their use, we face the coming year in a better condition economically to serve the public than in any year under municipal ownership.

During the year the company has had 3,989 railway accidents, which was an increase of seventeen over the previous year. There were also 1,626 non-railway accidents, a decrease of 107 from the previous year. The principal cause of accidents was collisions with vehicles, which totaled 2,634. The amount of injuries and damages during 1922 was $37,368, corresponding to 0.24 cents per car-mile, or 0.6 per cent of the gross revenues.

The company has a total of 1,880 employees, of whom 1,216 are trainmen. There are thirty-nine other employees in transportation work, forty-two in accounting—including storekeepers and cashiers—and 583 in maintenance of way, construction, and equipment.

An uncommon feature in the labor situation is that all the employees are given vacations with pay. The extent of this is shown in the following table:

PAYROLLS AND VACATIONS—1922

	Payroll	Cost of Vacations
Train roll.....	$2,127,457	$95,134
Shop and carhouses.....	485,366	16,043
Way and structures.....	324,172	24,347
Accounting department....	80,605	3,295
	$3,017,600	$138,819

Additional Common Stock to Be Offered

The United Light & Railways Company, Grand Rapids, Mich., has announced that all first preferred and participating preferred stockholders of the company, of record at the close of business May 25 will be permitted to subscribe at par, to an amount of common stock equal to 5 per cent of their holdings. All common stockholders of record May 25, will be permitted to subscribe, at par, to an amount of common stock equal to 10 per cent of their holdings. This will bring the total of the common stock up to $4,500,000.

Treasury Rules on Profits of Subsidiaries

The Treasury Department in a decision made public on May 11 by Commissioner Blair of the Internal Revenue Bureau has declared certain kinds of corporation dividends exempt from taxation as income. The refunds will come from claims filed under amendment to the tax regulations covering distributions out of earnings or profits by holding corporations accumulated prior to March 1, 1913.

The ruling reverses the previous practice of the bureau, which has held that profits or earnings turned in by a corporation to its holding or parent corporation lost their identity, and therefore when distributed as dividends were taxable as income.

Now, however, the bureau will trace the funds created by the subsidiary company through the holding corporation finally to the stockholder, who, the decision holds, need not pay tax on it. Limitation is made, however, on the distribution of such earnings by the ruling, which adds to the previous regulation the following language:

Whenever one corporation has received from another corporation distributions out of earnings or profits accumulated by such other corporations prior to March 1, 1913, or out of increase in value of its property accrued prior to March 1, 1913, and the receiving corporation, after having first distributed all of its earnings and profits accumulated since Feb. 28, 1913, distributes to its stockholders the amount so received by it from such other corporation, such distributions are not dividends within the meaning of the Revenue Act and are exempt from tax.

Brooklyn Subsidiaries to Be Reorganized

The reorganization committee of the Brooklyn Rapid Transit Company, headed by Albert H. Wiggin, has promulgated a plan for the reorganization of the New York Consolidated Railroad and New York Municipal Railway Corporation, and for adjustment of the respective interests therein of bondholders, creditors and stockholders of these companies. The plan contains an offer to acquire all or part of the preferred and common stocks of the New York Consolidated Railroad outstanding and to issue in exchange preferred and common stock of the reorganized Brooklyn Rapid Transit Company.

The New York Consolidated stockholders participating in the reorganization will receive for each share of preferred stock deposited one-half share of new 6 per cent preferred stock and one-half share of new common, and for each share of common deposited two-fifths share of the new 6 per cent preferred and three-fifths share of new common.

By exercising an alternative option for participating in the reorganization, holders of preferred and common stock of the New York Consolidated will be entitled to exchange holdings for a proportionate amount of stock of the new rapid transit subsidiary proposed to be organized as provided in the Brooklyn Rapid Transit reorganization plan, upon payment of $100 for each share of pre-

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ferred and $105 for each share of common. In return for payments, stockholders will be entitled to receive an equal principal amount of rapid transit refunding mortgage 5 per cent bonds of the new rapid transit subsidiary proposed to be formed.

Stockholders electing the second option will receive for each share of preferred stock $100 rapid transit refunding mortgage 5 per cent bonds and one share of capital stock of the new rapid transit subsidiary; for each share of common stock $105 rapid transit refunding mortgage 5 per cent bonds and one share of capital stock of the new rapid transit subsidiary.

The new rapid transit company contemplated under the Brooklyn Rapid Transit reorganization plan will be vested with the rights and obligations existing under contract No. 4, including leasehold interest in city-owned lines, as well as with title to company-owned elevated lines and other properties now embraced in the rapid transit system. The new rapid transit refunding mortgage 5 per cent bonds will be an obligation of this subsidiary.

The properties of the Consolidated company and of the Municipal Railway have been in the hands of Lindley M. Garrison as receiver since Dec. 31, 1918. He has sold $18,000,000 of receiver's certificates, the proceeds of which have been expended for construction purposes under rapid transit contract No. 4. Suit has been brought to foreclose the first mortgage of the Municipal company and the mortgage securing obligations of the Consolidated company.

The New York Consolidated Railroad owns the elevated lines in Brooklyn, which are operated in conjunction with certain rapid transit elevated and subway lines built with money advanced by the city of New York. It also owns all of the $200,000 of issued and outstanding capital stock of the New York Municipal Railway, which by contract No. 4, dated March 19, 1913, with the city agreed to contribute certain funds toward the construction of certain subway and elevated lines to be built and owned by the city, to equip those lines, to reconstruct and extend the then existing "L" lines owned by the Consolidated company and to operate as a single system all of the "L" lines and the new subway and "L" lines to be constructed. The contracts of the Municipal company with the city were subsequently assumed by the New York Consolidated Railroad.

P.R.T. Valuation Hearing Ends

The taking of testimony in the property valuation proceedings of the Philadelphia Rapid Transit Company, which has been before the Public Service Commission for nearly three years, was concluded before Commissioner Clement on May 15. The commissioner announced that he had arranged to hear the arguments before the entire commission on June 7. In the meantime the city and the P.R.T. Company will file briefs with the commission.

Detroit Mayor Claims Profit in First Year's Operation

With the completion of one year of unified operation by the Department of Street Railways on May 14, Mayor Doremus of Detroit issued a statement to the effect that the Detroit Municipal Railway is paying its way from earnings and improving service as well. The Mayor pointed out the following results for the first year of unified operation: Gross income, $19,000,000; net income, $1,000,000; total number of passengers carried, 475,000,000; average daily number of passengers, 1,500,000; trackage, 373 miles; number of cars, 1,600; cars maintained in daily schedule, 1,425; amount set aside from income to pay interest in sinking fund charges, $4,000,000; taxes paid, approximately $500,000; number of D.S.R. employees, 6,000.

During the past year there has been paid from earnings the sum of $1,200,000 on the contract under which the lines were taken over from the private company. Of this amount, $500,000 represents a payment that is not due until June 1, and $200,000 an advance payment on the installment due December 1.

During the past year a comprehensive program was adopted to rehabilitate the tracks and equipment taken over from the former owner, and this program has been financed from earnings of the system. Owing to the condition of the tracks at the time of purchase, it will require several years to complete this program.

The foregoing results have been accomplished after paying from earnings $456,796.83 for taxes and setting aside 3 per cent of the gross revenue from operations with which to pay damage claims and judgments resulting from personal injuries, according to the Mayor.

The last available statement of earnings under date of March 31 shows that the Department of Street Railways, since May 15, 1922, after meeting the total operating expenses, taxes and all fixed charges, had made a net profit of $948,023, a monthly average of $90,000. So it may be assumed, the Mayor states, that in the year closing May 14 the department's net profits will have exceeded $1,000,000.

These earnings have been transferred to the surplus account. In order to correct an impression that may exist that this surplus represents actual cash, it was pointed out that while the amount is carried as surplus, it represents, to a large extent, expenditures from earnings for additions and betterments of an extraordinary nature. Instead of leaving the money in the treasury it has been expended in rehabilitating the system.

Some of the major items into which the surplus has been converted are: The building of trailers, the construction of a large paint shop, the purchase of additional automobile trucks, the building of additional track layouts, the purchase of machinery, tools and equipment, the payment of a five-year insurance policy and the prepayment of taxes.

Auction Sales in New York.—At the public auction rooms in New York there were no sales of electric railway securities this week.

Sale of Branch Line Approved. — Federal Judge Killits of Toledo, on April 27, approved the sale of the Lima-Defiance branch of the Indiana, Columbus & Eastern Traction Company to Joseph A. Murray for $25,000.

Commission Approves Boston "L" Issue.—The Department of Public Utilities of Massachusetts has approved the issue by the Boston Elevated Railway of not more than $2,300,000 of thirty-year 6 per cent negotiable registered or coupon bonds.

New Director for New York — Harlem Railroad.—Bertram Cutler has been elected a director of the New York & Harlem Railroad, New York, N. Y., to fill the vacancy caused by the death of William Rockefeller. The other directors have been re-elected.

Offer to Purchase Line.—Following a proposal by the Brunswick Traction Company, Brunswick, Ga., to sell its property to the city for $22,283, the city commissioners have submitted their price of $12,000. Authority will be asked of the Legislature shortly for the city to own and operate the railway.

Seeks Issue to Rebuild.—The Lima Street Railway has petitioned the Ohio Utilities Commission for permission to issue $100,000 in common stock to rebuild the lines. If the issue is approved the outstanding stock of the company will be $965,000. D. J. Cable, attorney; Congressman John L. Cable and others bought the property of Thomas Newhall, Philadelphia, for $730,000 and stock totaling $135,000 was issued for the purchase of twenty one-man cars.

Shawinigan Said to Be After Quebec Lines.—Interests identified with the Shawinigan Water & Power Company are said to be considering acquisition of control of the company. If the plans mature, says the *Financial Post*, Toronto, Shawinigan will provide the funds to meet the $2,500,000 of bonds that mature on June 1. This may be done by the purchase of an equivalent amount of the 5 per cent consolidated bonds by the new interests and the creation of an additional loan to the company to cover the difference between market value and par. Or it may be done by short-term financing looking to permanent funding of the bonds later when Shawinigan finally sits in the saddle and can show a record of successful operation. The *Post* says that if the Shawinigan deal falls through it is quite likely the directors will fall back on the former plan of financing the refunding operations by short term notes. The latest move in connection with this matter is the announcement of the election of Julian C. Smith to succeed President Robert with the Quebec Company.

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Traffic and Transportation

Council Firm for Ten Cents

Seattle Body Wants Former Cash Fare Restored—Members Prepared to Pass Measure Over Veto

At a recent joint meeting of the city utilities committee and the entire City Council of Seattle, Wash., enough votes were indicated to insure passage of the proposed ordinance to increase fares on the Seattle Municipal Railway over Mayor E. J. Brown's veto. As amended, the present ordinance provides for restoration of fare to a straight 10-cent cash rate with three tickets for 25 cents. This was the rate in effect before the 5-cent fare was introduced on March 1.

Six votes are required to pass the measure over Mayor Brown's veto, and these votes have been pledged. The rates named in the ordinance were suggested to the City Council by Superintendent of Utilities Russell several weeks ago. Recently Mr. Russell sent the Council a report showing that even if the issue of railway purchase bonds was extended to forty years, at rates of interest varying from 4 to 5 per cent, discussed in connection with pending negotiations, the fare would have to be raised to more than 7 cents in order to take care of all charges.

Mayor E. J. Brown has appointed a committee to negotiate with A. W. Leonard, representing the Stone & Webster interests. The committee includes Mayor Brown, President C. B. Fitzgerald of the City Council and E. L. Blaine, chairman of the finance committee. The city intends to propose to the trustee suggestions for the extension of the maturity of the bonds given by the city in payment for the road. The idea is to extend the contract to forty years from the original date of issue, with equal annual payments. Mayor Brown does not favor Mr. Leonard's suggestion that the committee be sent to Boston, but believes negotiations should be carried on in Seattle. The bonds are now written for twenty years, of which four have elapsed. The forty-year proposal would enable the city to cut down its annual payments on principal and interest to a total of approximately $650,000.

Fight On in Buffalo Over Fare Increase

Dr. Milo R. Maltbie has been engaged by the municipal authorities of Buffalo to assist the city in its fight against the attempt of the International Railway to raise its fares from 7 cents or four tokens for 25 cents to 8 cents or four tokens for 30 cents.

Frederick C. Rupp, deputy corporation counsel, has been detailed by the city to handle the legal phase of the fight. He says there is no justification for the attempt of the railway to increase the fare at this time. He regards the move of the company as an attempt to recoup itself for losses in the strike.

Herbert G. Tulley, president of the International, explains that the application is made because the receipts are insufficient to pay the actual cost of operating the local lines. For the three months ended March 31, 1923, the deficit for the system, he says, was $193,219. Over and above operating expenses the company must pay bond interest, which amounts to $387,222. The total deficit, therefore, of the company for the first three months of the current year is $580,441. The amount of this deficit attributable to operations within the city of Buffalo, Mr. Tulley says, is $319,855.

City Agrees to Fare Extension

The Kansas City Railways filed an application with the Public Service Commission of Missouri on May 5 for authority to continue charging the public the same schedule of fares it now is exacting and extending the time for one year from May 18, 1923.

John B. Pew, Kansas City city counselor, wrote to the receivers, as follows:

> I do not feel that I could sincerely resist an application on the part of the receivers for a continuation of these fares at this time. I do desire to suggest, however, that if your body, after examining the evidence, feels that these fares should remain as at present, an order be made continuing them indefinitely, or if for a fixed time, that it be not longer than six months.

Mr. Pew says he believes the road is being operated as economically as possible.

A section of the application shows that for all of last year a deficit above the earnings occurred to the extent of $418,504, and that for January, February and March this year, the deficit was $86,165.

The fare in Kansas City is 8 cents.

Houston Jitneys to Be Rerouted

City Council Decides Autos Must Be Removed from Streets that Have Car Lines—Jitney Men to Submit Plans to Meet New Requirements—Hope Ahead for Railway

After considering both sides of the question the City Council of Houston, Tex., on May 4, voted to reroute the jitneys to streets not occupied by the railway lines. Both the Houston Electric Company and the jitney men were requested to submit a rerouting plan, and from these plans the Public Service Commissioner will definitely establish the new routes. This will eliminate direct competition between street cars and jitneys and is expected to help solve the transportation problem in Houston.

The jitney matter came up again for consideration as a result of the appeal of the Houston Electric Company for relief. It will be recalled that the company recently negotiated an extension of its franchise calling upon it to spend $1,200,000 for rehabilitation and improvements. The jitneys had long been more or less of a menace to the company, but with the beginning of this program their operation became a source of greater annoyance than ever to the company. After construction work was well under way, the Houston Electric Company asked the City Council to reduce the number of jitneys. At that time 191 jitneys were running. By way of a compromise the city agreed to reduce the number to 150. This was done on Jan. 1, 1923. The results of the operation of the company for 1923 are not as promising as were expected and it was necessary to ask further relief of the City Council. Accordingly on April 27 the company submitted a letter to the City Council in which it pointed out, among other things, that since the company commenced the work under the franchise extension, its financial condition had gradually grown worse instead of better and that it had suffered enormous losses during this period, as shown in the following financial statement:

REPORT OF HOUSTON ELECTRIC COMPANY

Result of operation under franchise extension ordinance and four tokens for 25 cents for year ended March 31, 1923

Gross earnings		$2,021,929
Operating expenses	$1,530,074	
Depreciation	296,957	
Taxes	148,450	
Total		1,975,481
Balance		$46,448

As the company pointed out it was barely earning operating expenses, depreciation and taxes; in fact, the balance of $46,488 earned during this twelve months' period would pay a fair return on less than $590,000 of value.

Stated another way, the return earned during these twelve months was insufficient to pay a fair return on even one-half of the amount of actual cash which the company had expended since the franchise extension ordinance was passed. This statement, said the company, challenged the fairness of every right-thinking man. The responsibility for this condition of affairs was charged to jitney competition and insufficient fares. It said that jitney competition had, in fact, reached a point where either the jitneys must go or the company must fail utterly to function as a transportation system. Against the jitneys these counts were brought:

> Jitneys are permitted to operate on the same streets with street cars, thereby furnishing a duplication of service.
>
> Jitneys are permitted to operate within the short-haul radius only. They play no useful part in the upbuilding of a city, nor do they serve outlying territory.
>
> Throughout the city the company has

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paid for and maintains approximately 200,000 sq.yd. of paving at a total cost to the company, including bridges and tunnels, of more than $1,100,000, an amount that would have been assessed against property owners and had been saved to them through payment by the company.

Jitneys use this investment to take away from the company the short haul, which is the most profitable part of our business.

Jitneys do not contribute to the upkeep of the streets, but instead are permitted to wear out an investment made by the property owners and by the company.

Jitneys make the operation of street cars more hazardous and add enormously to the already and fast-increasing traffic congestion of our streets.

Jitneys operate as best suits their convenience.

As a first step toward a settlement of the problem the company suggested:

1. That jitney competition be abolished, or;

2. That transportation in the city be divided between jitneys and street cars; the jitneys to furnish transportation to any one entire section of the city, withdrawing street car service therefrom, and the street cars to furnish transportation to the entire other section of the city, withdrawing jitneys therefrom.

JITNEY HISTORY REVIEWED

The City Council asked for time to consider this letter and at the same time give the jitney men an opportunity to present their side of the story. This the jitney men did in a communication addressed on April 30 to the Mayor by R. R. Tripp, recording secretary of Auto Bus Drivers' Union No. 243. The jitney men said that after carefully considering the company's statement and after making an investigation of the existing franchises and city ordinances, they could find no grounds for granting the company's appeal for the elimination of the jitneys. They said that the auto bus drivers were not complaining about the existing conditions and had conceded various reductions without protest, but felt they could not concede any further curtailment.

To this the Council replied, as indicated previously, by voting to reroute the jitneys to streets other than those occupied by the railway.

On its historical side the jitney as a menace to the company dates back to 1914. The first jitney began operation in Houston on Nov. 28 that year. By Dec. 25 there were 625 in operation and in the early part of 1915 there were approximately 900. To combat the jitney service the railway greatly increased service on all lines. However, the people rode in the jitneys in preference to street cars. As a result it became necessary to curtail railway service.

Early in 1916 the City Council passed an ordinance regulating jitneys and fixing the license fee at $36 a year and requiring a bond of $2,500. The cost of the bond was from $125 to $150 a year. The jitney men initiated an ordinance granting jitneys a blanket franchise on all of the streets without license. This was voted down by the people because it completely turned the streets over to the jitneys.

The war-time demand for men practically stopped jitney operation. At one time in 1918 only six jitneys were running, all to Camp Logan, where 30,000 soldiers were stationed. During the general depression of 1920, with many unemployed, the number of jitneys increased so that at the end of the year there were 170 in service.

During the fall of 1922 the company endeavored to obtain the passage of an ordinance extending the present franchise fifteen years and obligating the company to spend $3,000,000 for improvements, $1,000,000 of which was to be spent within sixteen months after the passage of the ordinance and specified that the company be permitted to earn 8 per cent on its property value.

This ordinance was submitted to the people and defeated by a vote of three to one.

Undaunted by this failure the company submitted a proposition asking for a sixteen-year extension to the franchise which expires in 1935, agreeing to spend $1,200,000 for extensions and improvements, within two years from the passage of the ordinance. It further specified that no money could be spent as a part of the $1,200,000 without approval of the City Council. This franchise extension did not state the rate of return allowed on property value.

The City Council passed this franchise in the form of an ordinance on Jan. 20, 1922, and at the same time passed an ordinance requiring the Houston Electric Company to sell tokens at the rate of four for 25 cents, the cash fare remaining 7 cents with universal transfer.

No serious difficulty was experienced in selling these notes, due to the general understanding that the financial condition of the company would be gradually restored to a sound basis through wise and fair regulation by the City Council.

Another Railway Uses Buses in Supplementary Service

The Youngstown & Suburban Railway, Youngstown, Ohio, has begun operation of a bus line between Youngstown and Salem along a route which in general parallels the company's own tracks. The bus line, however, serves several localities more or less remote from the railway. It is felt that the transportation needs of these places justify the establishment of the new service. In fact, wildcat jitneys were already attempting to give service before the railway commenced operation.

Four de luxe buses are used in the new service. They operate between Salem and Youngstown on a two-hour headway during a greater part of the day. The railway gives hourly service to Salem and the bus schedule is arranged to split every second trolley headway. In the evening, the buses do not operate through to Youngstown, but meet cars at Columbiana and carry passengers from that place to East Palestine. The jitneys formerly provided the service between these two points, unloading their passengers at Columbiana for transfer to the railway. When the jitneys commenced to run through to Youngstown the railway took up the matter of bus operation.

Improvement Program at Los Angeles Approved

Following the defeat at a public election in Los Angeles, Calif., on May 1 of two proposals for operation of buses in competition with the electric railways, the plans for extensive improvement of Los Angeles transportation facilities were officially approved on May 7 by the Los Angeles Board of Public Utilities, by granting permits for the operation of buses in connection with the electric cars.

The service improvement program includes construction of new track extensions by the Los Angeles Railway, the operation of buses by the Los Angeles Railway and the operation of joint buses by the Pacific Electric and the Los Angeles Railway under the name of the Los Angeles Motorbus Company.

Operation of One-Man Cars Will Continue in Lansing

As the result of a recent Federal court hearing in Detroit Receiver John F. Collins of the Michigan United Railway will continue the operation of one-man cars on all lines in Lansing. At the hearing Judge Tuttle was presented with a protest against the one-man cars which was adopted by the City Council.

Two months ago the receiver went into court at Detroit with a petition to substitute one-man cars in Lansing which was allowed by the judge, who set a sixty-day test period for the operation of one-man cars. The union was represented at the hearing.

When the trial period was up the court ruled that the dangers of the plan had been exaggerated and gave his consent to the one-man operation for an indefinite time.

Restricts One-Man Cars in District of Columbia

Capt. R. G. Klotz, traffic engineer, as the result of his study of one-man car operation in a dozen American cities, made a recommendation to the Public Utilities Commission that the use and development of this type of car in the District of Columbia for the time being be restricted to the lines on which they are now in operation and that these present lines be fully equipped for one-man operation as an experiment. Captain Klotz submitted with his report a description of the types of one-man cars and how they are operated in New York, Rochester, Detroit, Chicago and Cincinnati. In his report he said:

The opinion of those operating the greater number of such cars is that they should not be placed in use until there are sufficient available to operate an entire line and that their installation should be accompanied by some reduction in the headway. I am inclined to believe that lack of acquaintance with these two pointers or failure to observe them, has had considerable to do with the hostility toward such cars that has been apparent here, as our local cars are undoubtedly equal in type and quality to the best to be found elsewhere and very much superior to the general run of such equipment.

Some weeks ago the commission held

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a public hearing on the one-man car argument. The report of Captain Klotz was awaited before a decision was handed down, which is expected in the near future.

Traffic Report at New Orleans Believed to Satisfy Railway

Paul H. Maloney, city commissioner of public utilities at New Orleans, said on May 4 that while the officials of the New Orleans Public Service, Inc., had made no formal announcement in regard to the Beeler report on traffic, they virtually had agreed upon complying with all the recommendations of the report except for a few minor details, which it is expected will be adjusted.

Officials of the New Orleans Public Service, Inc., have already agreed to start work at once toward the widening of St. Claude Street for the construction of the necessary tracks and neutral ground. The proposed Tulane-St. Claude line is the key of the entire Beeler reorganization of the traction system.

Mr. Maloney says that since the publication of the Beeler report, which foretold the widening of St. Claude Street, property owners have jumped the price of their properties to an unreasonable height. Commissioner Murphy is known to object to the city and company facing the heavy expense involved, because of the sudden jump in realty prices along the proposed route. He favors the adoption of another route or resort by the city to court action for the expropriation of the necessary ground under the city's right of eminent domain.

Completion of the new St. Claude-Tulane line as proposed in the Beeler survey will give New Orleans its first complete cross-town line, running from Carrollton Avenue to the sugar refinery at Arabi, in St. Bernard parish. It will do away with the present Tulane belt system.

Completion of the St. Claude-Tulane line, according to Mr. Maloney, will pave the way for other changes and will give the street car company the right-of-way to go ahead with its first cross-city lines from the river to Lake Pontchartrain.

Pass in Effect.—The Seattle & Rainier Valley Railway, Seattle, put into effect on May 7 the wholesale weekly pass. The rate is $1.15. Passes are on sale by all conductors of the line and at company offices.

Bus Experiment at Emporia.—The City Commission of Emporia, Kan., has granted the Kansas Electric Power Company, which operates the local electric railway system, permission to discontinue railway service for six months and to substitute eight buses as an experiment.

I. C. C. Postpones Date of Coupon Book Sale.—The Interstate Commerce Commission has postponed until Jan. 1, 1924, the effective date of its order requiring railroads to issue 2,500-mile interchangeable coupon books at a reduction of 20 per cent from the standard rate of fare. In the meantime it is expected a permanent injunction, granted by the Federal District Court at Boston against enforcement of the order, will be appealed to the Supreme Court.

Bus Rights Granted in Rochester.—The Council of Rochester, N. Y., at a meeting on May 8 granted the New York State Railways, through a subsidiary corporation, the Rochester Coordinated Bus Lines, Inc., a franchise to operate buses on Dewey Avenue, as an adjunct to the railway service of the company. It is expected that the line will start operations about June 1, when the crosstown trackless trolley line will also be instituted.

Buses for Auxiliary Service in Trenton.—The Central Transportation Company, with offices at 137 East State Street, Trenton, N. J., has been incorporated by Rankin Johnson, president of the Trenton & Mercer County Traction Corporation; Edward J. Peartree, general superintendent of the company, and Richard Stockton, a director of the corporation. The railway plans to augment its trolley service in Trenton and suburbs with buses. It is proposed to issue transfers from the buses to the trolley and vice versa for 1 cent.

Ten Cents Charged on Milwaukee Buses.—The buses used in the de luxe service started in Milwaukee, Wis., on May 2 by the Wisconsin Motor Bus Lines, a subsidiary of the Milwaukee Electric Railway & Light Company, are being operated entirely independent of the railway, and there is no exchange of transfers or tickets between the two. The bus fare is 10 cents and as far as possible loading is limited to the seating capacity. The starting of this service was referred to briefly in the ELECTRIC RAILWAY JOURNAL for May 12, page 824.

Approve Railless Cars.—Members of the City Council of Philadelphia and officials of the Philadelphia Rapid Transit Company recently visited the works of the J. G. Brill Company to inspect the new trackless trolley which the traction company is planning to operate on Oregon Avenue. W. C. Dunbar, president of the Philadelphia Rapid Transit Company, said that Oregon Avenue was the only route on which the company had definitely decided to operate the new cars. The rate of fare on the trackless trolleys will be the same as on the regular lines.

Annual "Dress-Up Day" in Green Bay.—Sunday, April 15, was "Dress-Up Day" for conductors and motormen of the Wisconsin Public Service Corporation, Green Bay, Wis. Conductors and motormen of all city and interurban cars were groomed in their best. "Dress-Up Day" is an annual custom adhered to by the company as a part of the campaign of trainmen to reduce accidents. Photographs were taken of the crews in two relays, and bonuses earned during the first quarter of the year for freedom from accidents were distributed to employees meriting such awards.

New Fare Tariff Filed.—The Puget Sound Power & Light Company has reported to the City Council of Bellingham, Wash., that it has filed with the Public Works at Olympia a new experimental tariff of four tickets for 25 cents, or a cash fare of 7 cents. The report declared that the present tariff of twenty tokens for $1, or a cash fare of 7 cents, had caused a loss during nineteen weeks of $10,018, compared with the revenue during the 6¼-cent fare in effect during the corresponding period last year. The revenues decreased from $77,638 to $67,620, although the passengers carried increased 6.9 per cent.

More Bus Lines for San Diego.—Claus Spreckels, general manager of the San Diego Electric Railway, San Diego, Calif., has applied to the State Railroad Commission to abandon certain of the company's railway lines and replace them with motor coach service. It is proposed soon to start motor coach service over 17½ miles of streets. The new service involves the abandonment of approximately 8.64 miles of railway including the line to Old Town and portions of the Point Loma line. In order to carry out the plan, additional motor coaches will have to be purchased, but the number required has not yet been determined. The new coaches will be similar in design to those now owned.

Barring One-Man Cars Opposed in Wisconsin.—A unified front was presented by the electric railways in Wisconsin operating one-man cars at the hearing before the corporation committee of the Senate. They attended in opposition to the proposal asking that one-man cars be barred in Milwaukee. The resident engineer of the Railroad Commission at Milwaukee and representatives of the commission in Madison appeared in opposition to the bill along with representatives of the railways. They declared that there are two things to take into consideration in the operation of one-man cars—safety and service, which have been fully exemplified by the one-man cars now in use in different parts of Wisconsin.

Favorable Results Expected.—After watching the results of the operation of the arterial highway ordinance for a week in Green Bay, Wis., Charles E. Warwick, superintendent of the railway department of the Wisconsin Public Service Corporation, stated that the setting aside of arterial highway zones in cities where cars operate will reduce accidents involving street cars and automobiles by 50 per cent on the street where such a safety measure is placed in force. With the streets crowded with new cars and new drivers, the trainmen of the company have staged a special defense against accidents in an effort to keep the number down during this period. Their efforts, coupled with the working of the ordinance, promise favorable results, it is said. In April the number of accidents was less than for any month for more than a year.

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Personal Items

A. D. McWhorter Advanced

Engineer Long Connected with Memphis Street Railway Is Made General Superintendent

A. D. McWhorter, recently appointed general superintendent of the Memphis Street Railway, Memphis, Tenn., in charge of transportation, mechanical and overhead line departments, entered electric railway work in Atlanta in 1894 as a conductor with the Atlanta Traction Company. He served in that capacity for about six months. The industry was then just beginning to find itself electrically and mechanically, and an opening being offered in the shops Mr. McWhorter jumped at the chance to have an opportunity to become a factor in the work of "making the wheels go round." His first job in the mechanical department was in maintenance and inspection work as a member of the night force. He served there for two years and was then made night foreman. This position he held for two and a half years.

A. D. McWhorter

Just about this time the Atlanta Traction Company and the Atlanta Consolidated Street Railway were consolidated and Mr. McWhorter was appointed general foreman of the Glenn Street shops, in which capacity he served for a year. He was next transferred to the Fulton County shop, the main shop, and placed in charge of the motor and truck departments. Two years later he was made assistant master mechanic with direct supervision over all carhouses. He served in this capacity for three years, but in March, 1905, resigned to accept the position of master mechanic of the Memphis Street Railway. On Jan. 1, 1916, Mr. McWhorter was appointed superintendent of equipment and overhead lines of the Memphis company, which position he held until April 21, this year, when he was made general superintendent.

Mr. McWhorter is a member of the Memphis Engineers' Club, the American Society of Municipal Improvement, the Memphis Chamber of Commerce and the American Electric Railway Engineering Association. He has always been interested in the work of the last-named body and in 1911 served as co-chairman of the joint committee on engineering accounting, interdepartment charges. At the convention of the A.E.R.A. in Chicago last October he was appointed a member of the committee on wheel tread and rail contours.

Mr. McWhorter was born in Madison, S. C., on June 3, 1877, but was reared in Atlanta.

Chicago Surface Lines Changes Announced

John E. Wilkie, assistant general manager Chicago Surface Lines, has been appointed assistant to the vice-president. He has been connected with the company since 1913 as assistant to the president and assistant general manager. He is also vice-president of the Chicago City Railway, one of the subsidiaries of the Chicago Surface Lines.

Michael Harrington has been appointed assistant superintendent of transportation. Mr. Harrington entered the service of the West Chicago Street Railway in December, 1884, as a horse car driver. In 1903 he was promoted to foreman at the Kedzie Avenue Depot, and at the time of the consolidation of the various companies in 1914 he was made division superintendent.

Joshua Burgee has also been appointed assistant superintendent of transportation. He has been connected with the Chicago companies in various capacities for thirty-eight years, beginning with the Chicago City Railway as a conductor in 1885.

R. M. Jenkins has been appointed division superintendent of the second division. He entered the service of the Chicago City Railway as a conductor in 1889. In 1905 he was promoted to the position of supervisor, which he held until June, 1918, when he was appointed assistant division superintendent at the Burnside Depot.

Andrew R. McDonald, South Kaukauna, a railroad engineer for twenty-three years, has been appointed by Governor Blaine as a member of the Wisconsin Railroad Commission to succeed Henry R. Trumbower, resigned. Mr. McDonald has been a road engineer for the Chicago & Northwestern Railroad since 1900. He was for four years legislative representative of the Brotherhood of Locomotive Engineers, vice-chairman of his railroad organization on the Northwestern system for six years and local chairman of his organization for sixteen years.

Mr. Reynolds Made Manager of the Washington-Virginia Railway

A. L. Reynolds, manager of the Youngstown & Suburban Railway, Youngstown, Ohio, under the management of Day & Zimmermann, has been transferred and promoted to general manager of the Washington-Virginia Railway at Washington, D. C., which property is also under Day & Zimmermann management. In his new post with the Washington-Virginia Railway Mr. Reynolds succeeds M. G. Stratton, who resigned on May 1.

Mr. Reynolds was appointed general superintendent of the Youngstown & Suburban Railway, Youngstown, Ohio, in March, 1921. Shortly thereafter he was made manager of the company. Before that Mr. Reynolds had been foreman of the Snelling car station of the St. Paul City Railway, included in the system of the Twin City Rapid Transit Company. He was in the operating department of the company for about twelve years.

A. L. Reynolds

Mr. Reynolds began his railway training in the operating department of the Northern Ohio Traction, Light & Power Company in 1907. The following year he took a position as salesman with the B. F. Goodrich Company, and after remaining with that concern for a year he again took up railway work with the operating department of the St. Paul City Railway as supervisor of transportation. Before the entrance of the United States into the war in 1917 Mr. Reynolds went to the Second Officers' Training Camp at Fort Snelling, Minn. He received there a commission as first lieutenant in the infantry.

Upon his return to civil life in 1918 he became identified with the Minneapolis Street Railway. During the latter part of 1918 he conducted for the company many public meetings in connection with its campaign to explain to the people the cost-of-service franchise which the company was seeking to obtain from the city.

In 1919 Mr. Reynolds was again transferred to the St. Paul City Railway by the Twin City Rapid Transit

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Company, and while with that company he acted as supervisor and also in various other capacities. Mr. Reynolds was born in 1886 in Ashland, Ohio. He received his education in the grade schools of Akron, Ohio, and later attended Kenyon Military Academy at Gambier, Ohio. He is a graduate of Kenyon College, also in Gambier.

Philadelphia Newspaper Man Appointed to Pennsylvania Bureau

J. S. Stewart Richardson, formerly city editor of the Philadelphia *Public Ledger*, has been appointed director of its bureau by the recently formed Committe on Public Utility Information for the State of Pennsylvania. The temporary committee was headed by P. H. Gadsden, vice-president of the United Gas Improvement Company and former president of the American Electric Railway Association. For the present, at least, Mr. Richardson will make his headquarters at the office of the U. G. I. in Philadelphia.

Mr. Richardson is fairly well known to newspaper men throughout the entire State and is intimately known to the Philadelphia editors and the other newspaper men all along the line. He was born in England, and during the World War served as a Major in the forces of the U. S. A.

Officers Elected for Companies at Pottsville

The Eastern Pennsylvania Railways on March 26, 1923, was merged with its subsidiaries into the Eastern Pennsylvania Power & Railway Company. This company is located at Pottsville, Pa. Its officers are as follows: President, J. H. Pardee; vice-president, J. K. Choate; vice-president, R. W. Leigh; vice-president, J. I. Mange; secretary and treasurer, T. W. Moffat. The East Penn Electric Company, which holds approximately 99 per cent of the outstanding stock of the Eastern Pennsylvania Power & Railway Company, and into which the Eastern Pennsylvania Power & Railway Company will shortly be merged, has the following officers: President, J. H. Pardee; vice-president, J. I. Mange; vice-president, J. K. Choate; secretary and treasurer, T. W. Moffat.

Julian C. Smith Succeeds E. A. Robert at Quebec

Julian C. Smith has been elected president of the Quebec Railway, Light, Heat & Power Company, Quebec, Que., succeeding E. A. Robert. Several of the old directors resigned and their places filled by officials representing the Shawinigan Water & Power Company.

Samuel Cochrane has been promoted to the position of superintendent of maintenance of the railway department of the East Penn Electric Company, Pottsville, Pa.

Interstate Commissioner Goes to Yale

Winthrop M. Daniels Has Been Selected to Occupy Chair on Transportation at New Haven

Announcement was made in Washington on May 17 that Winthrop M. Daniels, Interstate Commerce Commissioner, will become professor in the Strathcona School of Transportation, Yale University. Since its receipt a few years ago of the endowment for this school under the will of the late Lord Strathcona, Yale has been planning the organization of a faculty to teach transportation. Its present staff includes Professor Dudley, formerly with the Westinghouse Air Brake Company, on the mechanical engineering side of transportation, and Charles J. Tilden on highway transport. Mr. Daniels' work will be confined largely to public policy toward transportation utilities, including in these utilities steam railroads, bus and truck transportation, electric railways, inland water transportation and transportation by air. In his second term, Mr. Daniels expects to take up a special course in the valuation of utilities and a course for graduate students on regulation of utilities.

Mr. Daniels is a native of Ohio and a graduate of Princeton University, where he was professor of political economy from 1892 to 1911. In the latter year he resigned to become a member of the Board of Public Utility Commissioners of New Jersey, on which he served until he was appointed in 1914 a member of the Interstate Commerce Commission. In 1918-1919 he was chairman of the Interstate Commerce Commission. He is the author of a number of books on financial and other topics. His resignation as a member of the Interstate Commerce Commission becomes effective July 1. The President has designated Frank McManamy as his successor.

Jason C. Leighton has been made vice-president of the El Paso (Tex.) Electric Company, to succeed Donald C. Jewett. Mr. Leighton is located in Boston at the main office. The other vice-presidents are Norman W. Mumford and Joseph Remick.

Samuel H. Sarena, formerly superintendent of transportation of the New York & Queens County Railway, New York, N. Y., has accepted the position of superintendent of the railway department of the East Penn Electric Company, Pottsville, Pa.

George B. Reamer, auditor of the Youngstown & Suburban Railway, Youngstown, Ohio, will act as manager of that company, succeeding A. L. Reynolds, whose appointment to the Washington-Virginia Railway at Washington, D. C., is noted elsewhere in this department.

Hugh Pattison has been appointed engineer of electric traction of the Virginian Railway, with headquarters at Norfolk. He comes to this position from the Illinois Central Railroad, with which for the past two years he has been engaged on preparation work for the coming electrification of the Chicago terminal.

Alvin Coffman has been appointed claim agent for the Chicago & West Towns Railway, with offices at Oak Park, Ill. His appointment became effective on May 1. Mr. Coffman is a native of Philadelphia. He first engaged in electric railway work in Roanoke, Va., where for a number of years he served as superintendent of transportation and claim agent. Later he assisted in establishing and conducting a joint claim adjusting bureau in Dayton for the City Railway, the People's Railway and the Oakwood Street Railway. He resigned from the service of the companies in Dayton to engage in war work.

Obituary

John M. Egan

John M. Egan, seventy-five years old, former president of the Metropolitan Street Railway and the Kansas City Light & Power Company, Kansas City, Mo., dropped dead on the stage of the new Amboy, Ill., Township High School Auditorium on the night of May 9.

Mr. Egan, who was reared in Amboy, had just concluded his number on the program, having recounted his school-days in Amboy and recited five verses of Longfellow's "Psalm of Life." It is believed the excitement brought on a heart stroke.

He started his railroad career as a boy in the shops of the Illinois Central at Amboy about sixty years ago. Several years later he went to St. Louis, Mo., as assistant engineer of the Southern Missouri Railroad, and later to Lacrosse, Wis., as chief engineer of the Southern Minnesota. He also served as president of that road. A few more years found him general superintendent of the Western Division of the Canadian Pacific, then under construction from Winnipeg west. He also helped to construct the Great Northern from Minot, N. D., to Helena, Mont., a distance of 1,200 miles. Later he was general superintendent of that road and subsequently president of the Great Western.

Going to Savannah, Ga., he became president of the Georgia Central, but after a brief stay went to Kansas City, Mo., to become president of the company that built the new Union Depot there. From Kansas City he went to South America to take the vice-presidency of the Brazil Railway. Two years later, or in 1910, he returned to Kansas City as president of the Metropolitan Street Railway and Kansas City Light & Power Company. After six years of strenuous work in that position he retired in 1916 and returned to Amboy.

Mr. Egan was born in Springfield, Mass. His wife, three sons and two daughters survive him.

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Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

$1,800,000 Car Contract Contemplated

Pacific Electric Railway Proposes to Order Fifty All-Steel Interurban Cars

The Pacific Electric Railway, Los Angeles, Cal., has announced that fifty new all-steel interurban passenger cars will be purchased immediately at a total cost of $1,800,000, each car to cost $37,000. Bids have been asked for the proposed new equipment and the earliest possible date of delivery specified.

The new cars each will seat sixty passengers and will be similar in type to the present all-steel interurban cars known as the 1,200 class now in service on the company's Long Beach and San Bernardino lines. End vestibules will be unusually wide and of the inclosed type, with double entrance.

During the past year the Pacific Electric lines have placed orders and had delivered more equipment, both passenger and freight, than for any similar period in the history of the company. With the order for the new interurban cars now being placed and 100 new cars for the Hollywood service, fifty of which are in service and fifty on order, the company, in the past year, will have contracted for 150 passenger cars, costing $3,687,000. Also for passenger service the company has contracted for a total of eighty-one motor buses, some of which have been delivered.

Regarding freight equipment on order delivery to the company has been partially completed on orders for 400 dump cars, 300 box cars, 150 flat cars and 10 electric locomotives, the total cost of which is $2,225,000, making passenger and freight equipment purchases total $6,562,000. The company states that the steady increase in population of all cities of southern California and the enormous growth of the Los Angeles harbor traffic have made these purchases necessary to keep pace with the industrial expansion.

Steel Contact Wire Discontinued

The Erie Railroad was one of the pioneers in electrification, having installed the Westinghouse single-phase system on the branch line between Rochester and Mount Morris in 1906. This work was done for the railroad by Westinghouse, Church, Kerr & Company (later absorbed by Dwight P. Robinson & Company).

The contact system is of the double catenary type, that is, there is a catenary "messenger" of steel in this case, a secondary supporting wire of hard-drawn copper, and a contact wire of steel. The last-named was added about ten years ago, but the railroad has now purchased Phono-electric wire for the 19-mile stretch between Rochester and Avon. The wire is on the ground and will be installed as soon as weather conditions permit.

$12,263,485 Net for Westinghouse

The statement of the Westinghouse Electric & Manufacturing Company submitted to the New York Stock Exchange for year ended March 31, 1923, shows net income of $12,263,485, after inventory adjustment, charges and federal taxes, equivalent to $8.19 a share ($50 par) earned on outstanding $74,812,650 combined preferred and common stocks (the two issues sharing alike in dividends after 7 per cent on the common). In previous year net was $5,837,389, or $3.80 a share. Property and plant are carried in the balance sheet at $50,055,473 compared with $39,347,074 in 1920.

World Stocks of Staple Commodities Are Lower

A recently published memorandum dealing with the world's stocks of fourteen staple commodities shows that in general the stocks were lower on Jan. 1, 1923, than at any other time in the last three years. This is particularly true of the commodities in demand by electric railways. The stocks of such metals as copper, lead and spelter are all very low. Tin, on the other hand, is fairly plentiful, and the stocks of rubber and crude oil have increased.

The results of the survey, which is the work of J. M. Keynes of Cambridge University, may be briefly summarized as shown in the table below.

A few figures for March 1, 1923, which are available show a continuation of the downward trend.

WORLD STOCKS OF STAPLE COMMODITIES

	Copper (Thousand Tons)	Tin (Thousand Tons)	Lead (Thousand Tons)	Spelter (Thousand Tons)	Rubber (Thousand Tons)	Crude Oil (Million Barrels)
Jan. 1, 1920	900	35	101	61	142	128
Jan. 1, 1921	822	27	72	81	207	134
Jan. 1, 1922	451	53	21	72	216	170
Jan. 1, 1923	319	38	1	17	248	248

Analyses of Samples and Delivered Coal Vary

Purchaser May Be Misled by Placing Dependence on the Former—Bureau of Mines Publishes Analyses

In using coal analyses it should be recognized that there is a decided difference between mine samples and samples from deliveries. Mine samples are important for determining the character of the coal in any given mine or district, and to the experienced purchaser they may serve as a sufficient guide in the purchase of coal. An average purchaser, however, may be misled by dependence on mine samples because the quality of coal indicated by the mine samples can rarely if ever be attained in the coal delivered.

Return to High Standard Difficult

Impurities eliminated from the formally prepared mine sample may not be eliminated in the production of large tonnage. If the roof and floor are friable or soft, pieces of them may be included in the coal shipped. When prices are high and competition is not keen it is easy for both the miner and the management to lower the standard of preparation of the coal, and the return to a higher standard is always difficult.

The Bureau of Mines has developed specifications for the purchase of coal that require a guaranteed analysis and contain premium and penalty clauses. A sample weighing not less than 1,000 lb. is systematically collected while coal is being loaded or unloaded.

Analyses Being Published

In using analyses of samples of delivered coal the reader must recognize that impurities are not uniform and some variation in the results obtained are consequently to be expected. When a considerable number of such analyses are available the average value and range of variation of a particular coal become known with assurance, and with allowance for variations, delivered coal can be sampled with sufficent accuracy. The Bureau of Mines is now publishing analyses of mine samples and delivered coal in a series of pamphlets by separate states.

Metal, Coal and Material Prices

Metals—New York	May 15, 1923
Copper, electrolytic, cents per lb.	15.437
Copper wire base, cents per lb.	19.00
Lead, cents per lb.	7.175
Zinc, cents per lb.	6.82
Tin, Straits, cents per lb.	41.75
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$6.875
Somerset mine run, Boston, net tons	3.125
Pittsburgh mine run, Pittsburgh, net tons	2.00
Franklin, Ill., screenings, Chicago, net tons	1.75
Central, Ill., screenings, Chicago, net tons	1.87
Kansas screenings, Kansas City, net tons	2.625
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft., cents per lb.	7.75
Weatherproof wire base, N. Y., cents per lb.	19.25
Cement, Chicago net prices, without bags	$2.20
Linseed oil (5-bbl. lots), N. Y., per gal.	$1.16
White lead, in oil (100-lb. keg), N. Y., cents per lb.	13.375
Turpentine, (bbl. lots), N.Y., per gal.	$1.20

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Rolling Stock

Moncton Tramways Light & Power Company has purchased and placed in service twelve new Birney safety cars.

Gary Street Railway, Gary, Ind., has ordered from the General Electric Company four car equipments with 265 motors and K-63 control and CP-27 air compressors.

Milwaukee Electric Railway & Light Company has ordered from the General Electric Company one hundred G-E 247 motors, which will be used on remodeled cars.

Toledo, Fostoria & Findlay Railway, Fostoria, Ohio, suffered the loss by fire on May 10 of two passenger cars. Three other cars were damaged. The estimated loss is $40,000.

Indiana Service Corporation, Fort Wayne, Ind., has ordered from the General Electric Company ten four-motor 264 car equipment and CP-27 compressors for use on light-weight interurban cars.

Birmingham Railway, Light & Power Company, expects to purchase twenty new cars as a result of the agreement reached with the city, of which mention is made at length elsewhere in this issue. The company also expects to remodel present rolling stock to meet requirements of the revised "Jim Crow" ordinance. This remodeling work will be done in its own shops.

Menominee & Marinette Light & Traction Company, Marinette, Wis., has announced that the four used cars which have been received from the Wisconsin Public Service Corporation at Green Bay for local use in Marinette will be overhauled, re-equipped and put into condition to be used as spare cars, replacing the old style trailers which were used during the summer.

Lake Superior District Power Company, Ironwood, Mich., has received its new rolling stock, orders for which were placed several months ago. The equipment includes four of the smaller type of cars and five of the larger. The smaller cars, for use on the local system, have a seating capacity of thirty-two and the larger cars, for use on the interurban system, have a seating capacity of sixty-four.

Los Angeles Railway has placed an additional order for twenty-five steel cars with the St. Louis Car Company. The cars will be of type "H," similar to the seventy-five already in operation in Los Angeles. Fifty cars were ordered at the first of the year for delivery this summer. The additional twenty-five cars are scheduled to be delivered next fall. While the seventy-five new cars are being built in the East, the Los Angeles Railway has started a program for construction of fifty-five type "H" cars in its own shops. The work on the first car has been begun, but the greater part of the program will be carried out in a new mill building which will house forty-five cars. The type "H" cars are 48 ft. long and seat fifty-four passengers. They are equipped with cross seats throughout and have an inclosed center section and open sections at both ends. They are equipped for operation as single units or in two-car trains.

Track and Roadway

Windsor, Ont.—Mayor Wilson has signed the by-laws authorizing the expenditure of approximately $1,000,000 to rehabilitate and build extensions to the electric railway.

Montreal Tramways will soon proceed with the double-track extension on Rosemount Boulevard between Papineau Avenue and First Avenue, Rosemount.

Erie Railroad, Rochester, N. Y., is planning to extend its electric line from Mount Morris to Dansville and from there into Hornell. It is reported that most of the rights-of way for the new line between Dansville and Hornell have already been secured.

Milwaukee Northern Railway, Cedarburg, Wis., is being urged by the Green Bay Advancement Association to extend its trackage to North Milwaukee. This organization has also asked for the double-tracking of the company's line on Atkinson Avenue between the Green Bay Road and Eighteenth Street.

Wisconsin Railway, Light & Power Company, Winona, Minn., following the completion of track improvement work on the north side of La Crosse will be at liberty to begin work on track improvement work on Main Street. It is the plan of the company to double-track this downtown street from Seventeenth to Twenty-third Street.

San Antonio, Medina Lake & Western Railroad, San Antonio, Tex., will soon start construction of the line which will open up a modern and up-to-date summer and winter resort at Medina Lake, 40 miles west of San Antonio. It is the company's intention to operate gas-electric interurban service between these two points. At a later date the company will also consider the construction of an electric line between San Antonio and the Lake. The gas-electric interurban service planned by the company is in conjunction with its proposal to build a standard gage steam railroad from San Antonio northwest to Sonora and San Angelo, a distance of 274 miles, passing through the towns of Rio Medina, Utopia and Rock Springs.

Shops and Buildings

Columbus, Delaware & Marion Electric Company, Columbus, Ohio, have let contracts for the construction of a boiler of 1,000 hp. at its power plant in Scioto.

Denver Tramway is installing two 10,000-kw. turbines in its Fourteenth and Platte Streets plant. When installed the plant will have a capacity of 30,000-kw.

Cleveland Railway will build six new automatic substations, according to Joseph H. Alexander, vice-president. The total cost of these new stations will be $1,500,000 and will increase the number of automatic substations in Cleveland to nine. A contract has been made with the Westinghouse Company for the equipment for two of the stations that are to be built immediately. As soon as the new stations are completed, the Cleveland Railway will purchase all of its power from the Cleveland Electric Illuminating Company, from which it is now receiving approximately 80 per cent of its current.

Trade Notes

Arthur C. Sullivan, formerly connected with the Rail Welding & Bonding Company, Cleveland, has been made special representative for the Holland Trolley Supply Company, Cleveland.

George Macnoe, manager of the Boston office of W. B. Connor, Inc., has been recalled to New York to take charge of the contractors sales department, handling heating and pumping equipment.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., recently announced personal changes: C. W. Jones has been appointed general foreman of the controller department. C. A. Fike has been appointed general foreman of the coils and insulation department. J. H. Hartman has been appointed general foreman of the storekeeping department. W. S. Oswald has been appointed general foreman of the railway motor department. All these departments are located at the East Pittsburgh works.

Conveyors Corporation of America, Chicago, announces the appointment of the Pittsburgh Machine Products Company, Oliver Building, Pittsburgh, as district representative. The Pittsburgh organization will handle the sale of American steam jet ash conveyors, air-tight doors and cast-iron storage tanks in western Pennsylvania and the northwestern part of West Virginia. The Pittsburgh Machine Products Company is an organization of experienced ash disposal engineers, having handled the sale of Green steam jet ash conveyors, full rights to which were recently purchased by the Conveyors Corporation.

Johns-Pratt Company, Hartford, Conn., announces that arrangements have recently been made with the Curtin Mill Supply Company, Houston; Globe Supply & Machinery Company, New Orleans; Hide, Leather & Belting Company, Indianapolis; Hardy & Dischinger, Toledo; Rathbun Company, El Paso; the Miller Supply Company, Huntington; Walworth-Ohio Company, Cleveland, and the Wayne Belting & Supply Company, Fort Wayne, as distributors of its power plant specialties, vulcabeston products, including compressed asbestos red fiber sheet packing, asbestos valve stem and rod packing, asbestos air pump packing, asbestos pump valves and asbestos valve disks.

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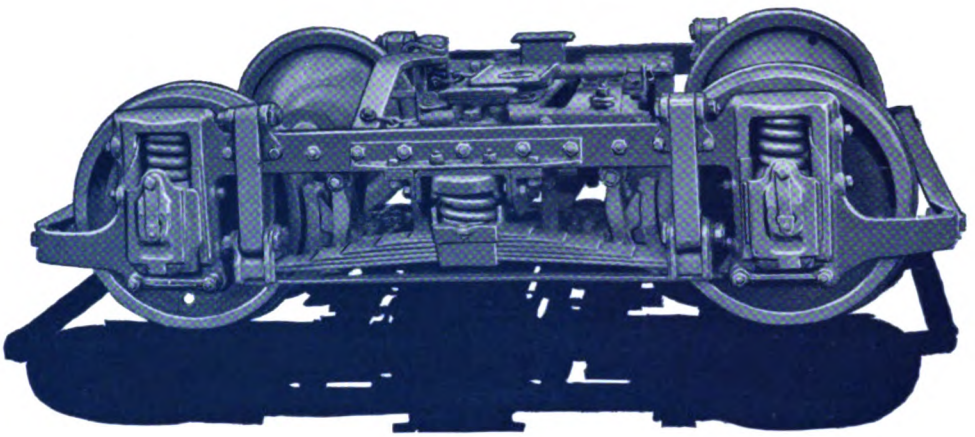

Light-Weight Interurban Truck

High Speed, Light Weight and Comfortable Riding Characteristic of Brill 77-E Low-level Type

With new Swing Link Construction

High-speed Interurban Electric Railways can take advantage of the economies resulting from the use of light-weight cars, and still maintain their schedules and provide the riding comfort essential to this class of service.

The Brill 77-E Low-level Truck equipped with a new type swing link recently developed can capably meet the higher speed schedule requirements, is light in weight, and provides the same comfortable riding characteristic of this type in slower-speed service.

Solid-forged side frames, Bolster Guide, Graduated Spring System, Oil-retaining Center Bearing and "Half-ball" Brake Hangers are distinctive Brill features, which exert an important influence on the operation of this truck, and the satisfactory service which is assured.

THE J. G. BRILL COMPANY
PHILADELPHIA, PA.

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G-E Electric Switching Locomotives

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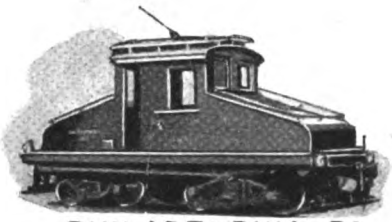
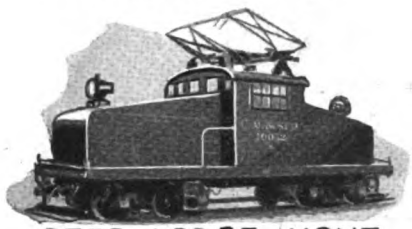


PHILADELPHIA, PA.

CHICAGO, ILL.



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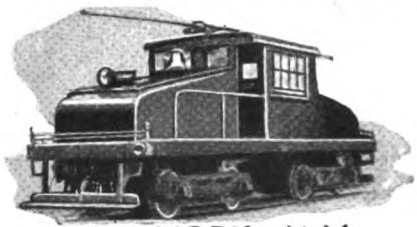

NEW YORK, N.Y.

NEW YORK, N.Y.

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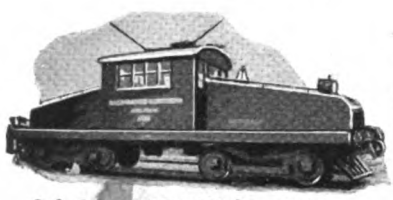


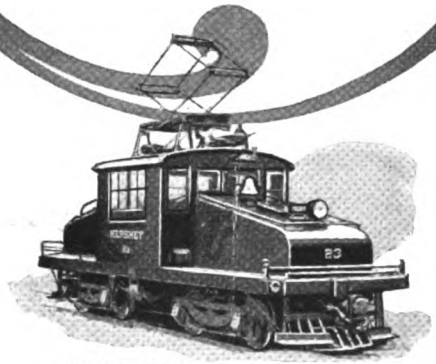
SACRAMENTO, CAL.

STOCKTON, CAL.

HAVANA, CUBA.

FU SHUN, CHINA.

AKRON, OHIO.



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Your guarantee of satisfactory operation from a G-E Switching Locomotive is embodied in the fact that since 1895—the birth year of railway electrification—we have been producing electric locomotives adequate for any service and of well balanced mechanical and electrical design. Operating records are available.

With this experience as a foundation, our ability to furnish switching units which will meet your requirements is unequalled.

MEMBER AERA

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Schenectady, N.Y.

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McGraw-Hill Company, Inc. May 26, 1923 Twenty Cents Per Copy

ELECTRIC RAILWAY JOURNAL

PANTASOTE
TRADE MARK
AGASOTE
TRADE MARK

Standard for Electric Railways

THE PANTASOTE COMPANY
NEW YORK CHICAGO SAN FRANCISCO

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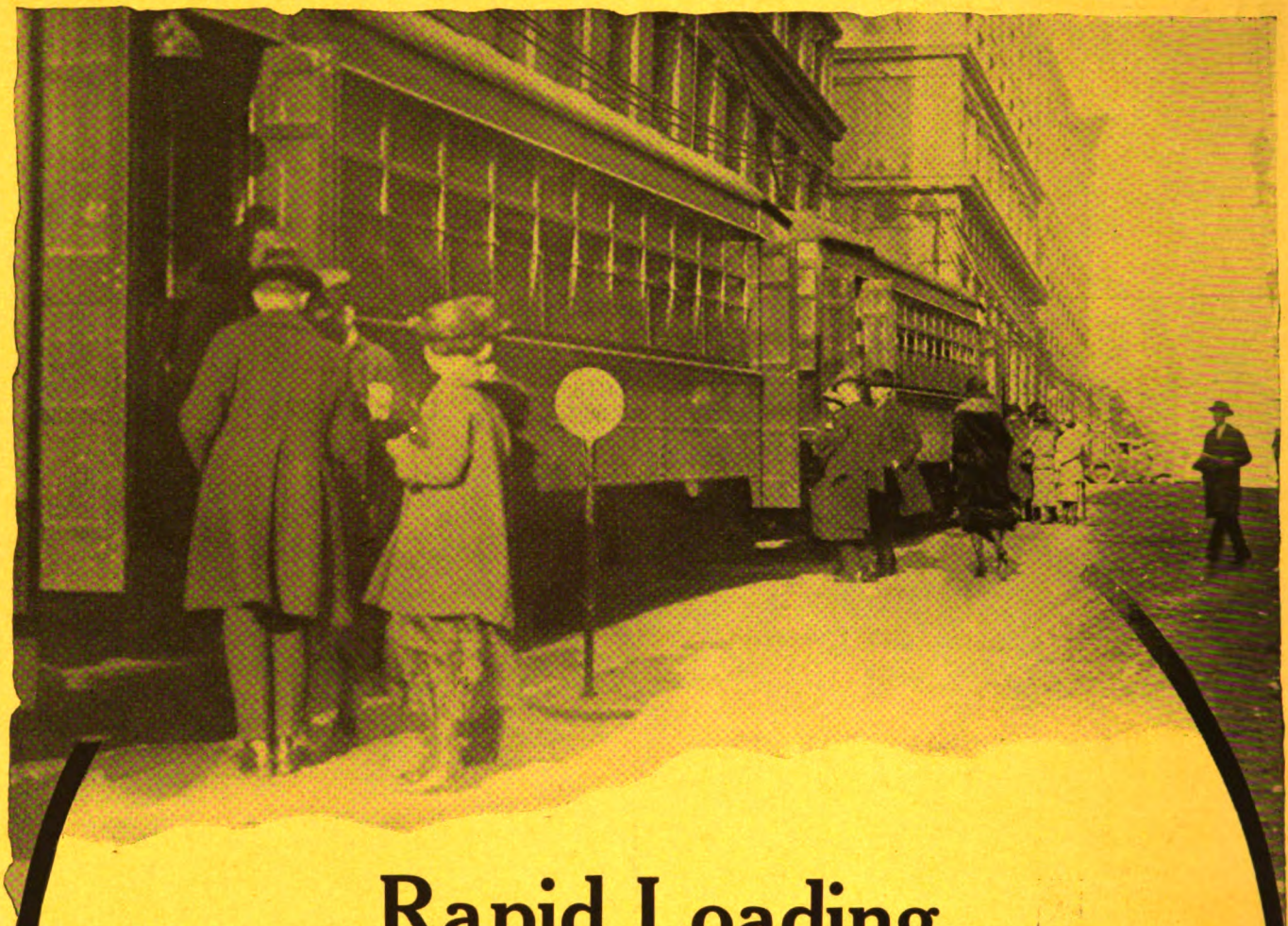

Rapid Loading

The Kansas City Railways Company upon the installation of train operation found that rapid loading at downtown terminals was a vital factor in maintaining schedules.

The problem was solved by loading the cars at both ends at the same time, and, to facilitate the rapid handling of passengers during rush hours, extra conductors are placed on the street.

It has been found that this method of handling rush-hour traffic materially decreases the time required for loading.

The cars of the Kansas City Railways Company, being equipped with Westinghouse HL Control, are particularly adapted for operation in trains of two or more cars.

HL Control

Westinghouse Electric & Manufacturing Company
East Pittsburgh, Pa.

WESTINGHOUSE ELECTRIC

Westinghouse

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New York, Saturday, May 26, 1923

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Company, Inc.

HENRY W. BLAKE and HARRY L. BROWN, *Editors*

Volume 61
Number 21

The Lessons of Experience in Developing Good Public Relations

THE ignorance of the true situation with respect to the utilities as manifested in Congress and the state legislatures on the part of those dependable men not numbered among the radical and socialistic elements only emphasizes the fact that the task of getting the people informed has by no means been accomplished. The work must go on, its importance during the present year being particularly great, as there is a persistent outcropping of socialistic and anti-state regulation agitation here and there.

In pursuing this work further, the industry may well be guided by the experience thus far, from which it is possible to draw these general conclusions.

The plan to greatly enlarge the number of local stockholders is good, but it cannot be relied upon to afford any security at an election. The stockholders need to be educated just as much as the general public. The California campaign for socialization of the water powers proved this.

Too much reliance should not be placed in having lawyers appear before legislative committees to explain what proposed legislation would mean to the utility. The personal appearance of the practical operating executive, the responsible head of the utility, to answer questions and present facts is much more convincing and effective than the efforts of the attorney paid to represent the utility.

Man to man talks should be had with local legislators and congressmen, preferably while they are back home and off duty, about the problems of the public service companies. Or if the railway executive is not personally acquainted with the man who should be truly informed, then he should get a friend who has confidence in him, and who holds the friendship and confidence of the public official whose ear is sought, to put the railway story before the official—the story of facts.

Some definite interest should be taken and time devoted toward raising the caliber of personnel of the legislatures. The need for this is evident in almost all political bodies.

The vote of the men in overalls counts very heavily. Therefore enlist the support and influence of the utility employees and the employees of manufacturers whose prosperity and welfare are tied up with those of the railway.

Reliance on the national railway association for compilations of data is good, but success in any situation depends on how thoroughly the work of education is carried on locally by the local men. The absent treatment won't do. The work of publicity committees and the use of newspaper space have their place, but the railway men must themselves take the stump in dealing with unsound agitations important to their business.

If state regulation is in jeopardy and the backward step to municipal control seems inevitable in any local situation, a compromise providing for state regulation of valuation, rate of return and rate of fare, with municipal control of service, extensions, cars, etc., may partially save the day. Such a law is now working out well in Minnesota.

Political Aspects in Chicago Quite Different

"I AM for the lowest possible fare consistent with good service and good wages. People who are talking about a 3-cent fare or a 4-cent fare are not speaking advisedly. The future will determine what a just fare is, just to the public and just to the companies. The people demand service and they should have it, and I will not favor any reduction in service for the purpose of getting a lower fare."

That, surprisingly enough, from Chicago's Mayor. What a pleasant relief it is to hear from the chief executive of a large city such an expression of view, based on business sense rather than political adventure. It is also reassuring to reflect on the fact that the people of Chicago finally saw through Mayor Thompson's endless and groundless attacks on the street railway, ostensibly in behalf of the people, but really to create political sentiment, and voted overwhelmingly to rid the City Hall of such tactics. This gives hope for the situation in New York and other cities suffering from mayors afflicted with the anti-traction mania. The turn of the mayoralty in Chicago puts a very much more promising outlook on the prospects for working out a satisfactory agreement when the franchises expire in 1927, or, more likely, an agreement in advance of that. This is a matter of such tremendous importance to Chicagoans that it calls for the most complete and intelligent co-operation. Hence the riddance of sham hostility at just this time is of particular significance.

A Semi-Automatic Substation That Controls Its Own Output

PASSENGERS on the New York Central and New Haven Railroads, entering or leaving Grand Central Terminal, New York City, cannot see an unobtrusive new substation which is tucked in under the Park Avenue viaduct near 110th Street. They benefit by its presence, however, for it enables them to get into or away from the city more quickly due to the hundred volts more or less which it adds to the third-rail voltage. Being ignorant of the presence of the substation, they cannot be expected to realize that it is not just another substation, but embodies features of unusual interest.

Its outstanding characteristic is what may be termed "non-overloadability." The station of the usual type, whether manual or automatic, goes out of commission when overloaded. There is nothing else for it to do except to injure itself, and then it will go out anyway. A constant-potential rotary-converter substation cannot

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safely be left on the line when the line voltage falls materially. With the aid of resistors in the feeders it can be operated with a greater range of line voltage than otherwise, but this expedient, while necessary, results in power loss and is limited in ability to keep power on the line in case of heavy demands. In general, however, the constant-potential quality of rotary converter output is a controlling advantage in its favor; the circumstances on the New York Central are exceptional. This station must not go out when the heavy load comes on; in fact, it is distinctly a peak-load station and does not run at other times. Non-overloadability was secured by using a plain shunt-wound generator, the natural drooping characteristics of which are accentuated by means of an automatic voltage regulator.

The new substation is also attendantless, and it contains practically all of the relays which form the nervous system of the modern automatic substation. As it was designed to come into and go out of service at specified times the usual undervoltage and overload control was omitted. A time device could easily have been arranged to replace the usual control, but as a manual substation is near by it is preferable to have the service of the new substation initiated and stopped by its operator. The schedule can then be easily modified, and as he supervises operation anyway by means of ammeters, the throwing of the "start" and "stop" switches occasionally is a mere incident to him.

The use of the motor-generator set in this case permitted unusually simple a.c. power supply, because, as the substation is fed at 11,000 volts, a voltage not too high for direct supply to the synchronous motor, the usual transformers and auxiliaries could be dispensed with.

The Personal Work of the Executive in Bettering Public Relations

A REAL service is being done the people of St. Louis by Col. A. T. Perkins, manager for the receiver of the United Railways. Several times recently he has appeared at public meetings and discussed frankly the problems of the company. His latest appearance was before a civic association. At the conclusion of the program for the evening he announced his readiness to answer questions. He did answer many, and no attempt was made to hector him.

The audience was frank and the colonel was even more so. He explained the concern of the creditors. He told about the vast amount of work done in upbuilding the property. He frankly said that much still remains to be done, and that in his opinion the sum of $4,000,000 might well be spent on improvement looking toward the future. He told his hearers he favors a new long-term franchise for the company and said that the valuation issue will probably be decided by July 1. He brought out forcefully the effect of taxation upon the fare paid by the car riders. His statement along these lines probably came as a revelation to many of his hearers.

Limitations of space do not permit a recapitulation here of all the questions that were put to Colonel Perkins, but the account of the meeting addressed by him as reported elsewhere in this issue does indicate that his discussion made a very favorable impression. In short, the Colonel's talk was an effort at intimate understanding with his public that has been deferred too long by many other operating managers.

Municipal Railways Show Profit

THOSE who believe in the policy of private ownership for public utilities should not be surprised when a statement is issued showing that one of the municipal railways in this country or Canada is making money. The editors of this paper consider that under American political conditions the policy of private operation of these utilities is better, both politically and economically, than public operation, but it would be foolish for any one to claim that simply because a management is appointed by a mayor or common council rather than by a board of directors it is incompetent. According to the sixteen months report of the Toronto Railway, published in the issue of May 12, that system shows a very comfortable profit; the informal statement recently made public by Mayor Doremus of Detroit indicates a gratifying return for the road owned by that city; and Seattle had an operating ratio of less than 75 per cent in 1922.

As these railways have been in operation municipally for only a short time, it may be that some of the figures may have to be changed slightly. Thus, the Toronto report contains the statement that some of the figures should be considered approximate only, because the exact sums to be paid by the city for the property, for electrical energy and other matters have not yet been fully settled, and in the case of Detroit it is well known that no decision by the arbitration board on the charges to be paid to the city by the Detroit United Railway for the entrance of the interurban cars has yet been rendered. Finally, in the case of Seattle, as explained last week, the apparent net return is somewhat larger than if the property were subject to all the charges of a privately operated concern. The figures involved in all of these indeterminate matters are probably small enough, however, not to change the income from operation from a surplus to a deficit.

The critical time in municipal operation does not come during the first few years after the city has taken over the property. During this time, the conditions for successful operation are at their best. Much of the equipment is new. The question of taking the property over has been so prominently before the public that there is an eager spirit on the part of every citizen to co-operate in making the new city enterprise a success, and even a political city administration would hesitate about making a political appointment to the railway administration. Hence, able men are chosen.

The critical time comes some time later, after the edge of civic zeal in the enterprise has become dulled and the politicians feel that they can begin safely to tamper with the operating efficiency of the property. Then will come requests or demands for this particular appointee, or that special extension of the line or service, or other action which would not be undertaken by a private property because financially unwise. Of course, a management, commission or political administration strong enough to resist this pressure will be able to conduct the property on business principles. But the experience with various kinds of public operation in this country has not been very happy, and it is obvious that those enterprises, like railways, in which such a large percentage of the receipts goes in direct payment of labor, and where so much loss can be occasioned through the construction of unprofitable extensions, are particularly unsuited for political control.

Whether these reasons will prevent further extension of municipal operation is a question of the future.

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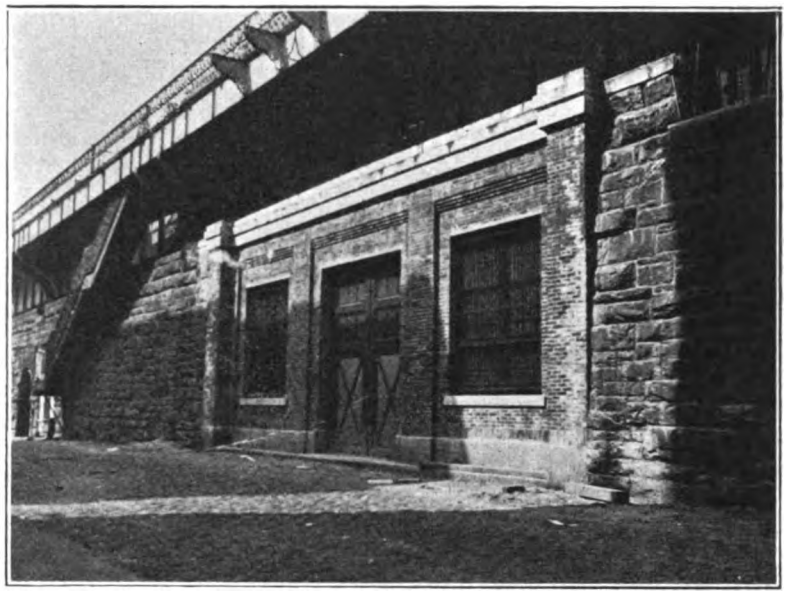
New York Central Railroad Has Installed in Electrified Zone at New York a 2,000-Kw. Motor-Generator Set to Raise the Potential 100 Volts During Rush Hours — Construction of Building Under Elevated Structure on Park Avenue Near 110th Street Involved Special Structural Problems

Distant-Controlled, Non-Overloadable, Semi-Automatic Substation

ONE of the most interesting recent applications of automatic control and safeguarding of power-transforming apparatus is the new substation of the New York Central Railroad on Park Avenue near 110th Street, New York City.

The substation is located underneath the Park Avenue viaduct, over which operate all the New York Central and New Haven trains entering the Grand Central Terminal. The steel viaduct at this location is supported at the sides on stone walls and in the middle on steel columns on spread concrete foundations, which, in turn, rest on the rock and dirt fill between the stone walls.

The substation is designed to fit between the stone walls and has a width less than the distance between the central columns. In the removal of the fill, as the column foundations would be undermined, it was necessary to provide temporary supports for the steel structure and extend the column foundation to a level below the floor of the substation.



This Substation Is Tucked Away Under the Park Avenue Elevated Structure

The station is designed for two 2,000-kw. synchronous motor-generator sets, of which one is now installed and in operation. The substation generator set functions as in any other station until fully loaded, when it begins automatically to reduce its bus potential in proportion to the exterior load so as to maintain a constant current output. Under maximum swings it raises the local potential at least 100 volts. It will be operated normally without attendants, although an inspector will visit it once a day, and it will be thoroughly cleaned once a week.

The station is started and stopped from the nearest manual substation, that at Mott Haven, 2 miles away. The operator there simply closes a switch to initiate starting of the new unit. This sets in motion the pilot motor on the drum controller of the type standard in General Electric control equipments. Shutting down is a similar operation. Aside from the fact that the operator at Mott Haven has supervisory control the operation is entirely automatic.

In the Mott Haven substation are an indicating ammeter and a curve-drawing ammeter, which show the conditions at 110th Street. There is also a pilot lamp which lights up when the machine in the new substation cuts in on the direct-current circuit. This is done by a contact on the last direct-current circuit breaker which goes in.

The present schedule calls for the starting of the station at 6:30 a.m. and it runs until 10:30 a.m. It is started again at 4:30 p.m. and operates until 6:30 p.m.

A motor-generator set was used at this point rather than a synchronous converter because the fluctuations in voltage are so great that they could not be followed by a synchronous converter, which is fundamentally a constant-voltage machine. The shunt generator, as used here, lends itself admirably to the production of constant current, especially under automatic control. A unique feature in this case is that the control is so arranged that when first started the unit will operate at 150 per cent of full load and hold this until it warms up to a predetermined amount, which usually takes two hours. The control then automatically lowers the current to full-load value, which it can carry continuously.

An incidental advantage of the use of the motor-generator set is that the motor can be connected directly to the 11,000-volt transmission line, thus eliminating transformers and the auxiliaries that go with them. The cushioning action of the transformers was not necessary, desirable as it might be in constant-voltage substations, because the load is controlled automatically from the direct-current side.

In general the layout of the substation is symmetrical about a center line at right angles to the railroad tracks. (See Figs. 1 and 2.) At the west end is the alternating-current switch and busbar section. The station is cut in on two 11,000-volt, three-phase cable loops, either of which may be used in either direction alone in case of cable trouble. That is, either loop may be opened and either side used, as may be seen in the simplified wiring diagram, Fig. 3.

The high-tension equipment is on two levels, the upper level being for the switching and control equipment,

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the lower for the main bus and the cable distribution. The high-tension line passes from the cable potheads through disconnects and current transformers to the motor-operated oil switches, all on the upper gallery. Thence the path is to the main bus on the lower level, thence to the gallery, again branching into two circuits, starting and running. In the starting circuit are disconnects, motor-operated oil switches, current transformers, a three-phase starting compensator to lower the voltage to 4,400, and the starting bus. The starting bus is so arranged that the same compensator can be used for starting either unit in the completed station.

In the running circuit there are disconnects, oil switches and current transformers, with potential transformers (two for the three-phase circuit). A house transformer, tapped in on the main bus, provides for the necessary control power and lighting in the station.

The motor-generator set used in this substation is the largest which the General Electric Company has built for a speed as high as 500 r.p.m., the speed of this set. The motor is of standard design for a.c. starting, being provided on the revolving field with brass bars, copper ring segments and a steel reinforcing ring. The field circuit is closed through a discharge resistor during starting. The alternating current generated in the field winding by transformer action, which dies away as synchronous speed is approached, is used to operate a relay which prevents the field circuit from being completed until after the alternating current has disappeared.

The exciter is direct-connected, being mounted on the commutator bearing of the generator.

As suggested earlier, the set is started at reduced voltage through the compensator, which is cut out when the motor reaches synchronous speed. The oil switches are set to trip at 300 amp., so that not more than about 5,700 kva. can be drawn from the line.

As mentioned earlier, the generator is of the shunt type, there being no series-field winding. There is, however, a series-commutating winding on the generator. The plain shunt machine was used here because its drooping characteristic, conduce to automatic control of the output.

A feature of this installation is the high-speed direct-current circuit breaker, shown in one of the illustrations in the foreground in front of the motor-generator set, and shown in another illustration by itself. This is of the JR-4A type, with a capacity of 5,000 amp. at 666 volts.

Some Details of the Control Circuits

In the control circuits the only manual operation is to close the control-power switch (at 110th Street) and the master starting switch (at Mott Haven). Then through the functioning of relays, if the a.c. control voltage is not below 180, an important device known as the control-current contactor closes and completes several circuits, among them the starting circuit of the motor driving the master switch or drum controller (34).* The drum of the master switch then begins to revolve, completing in succession a number of circuits as in all G.E. automatic control equipments.

The control-current contactor also closes a circuit breaker (42) in the magnetizing circuit of the compensator through which reduced voltage is supplied

*Reference numbers after the names of devices correspond to the numbering in Fig. 4, page 877.

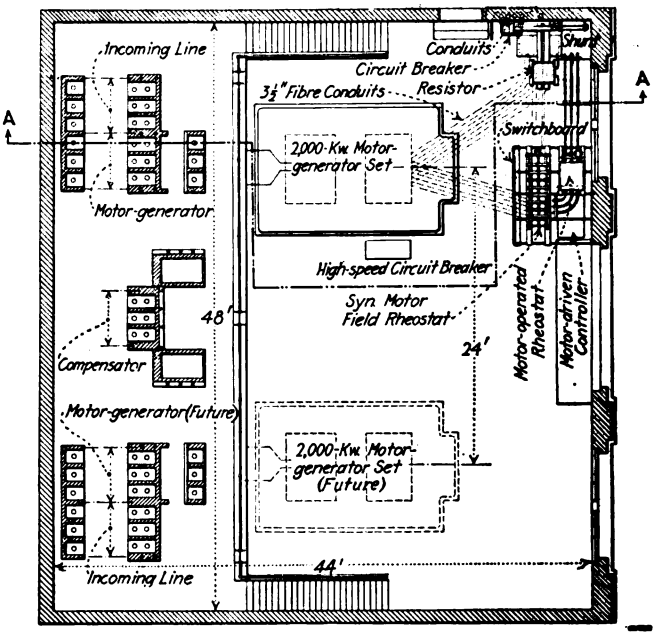

Fig. 1—Plan of Non-Overloadable Substation of New York Central Railroad in New York City

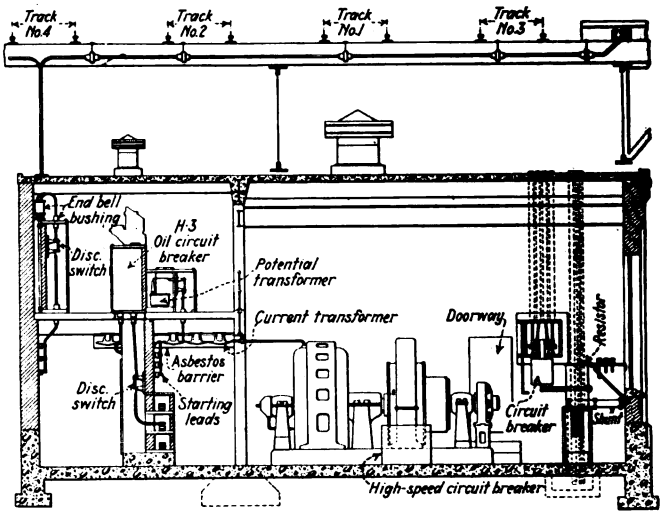

Fig. 2—Vertical Section of the Substation

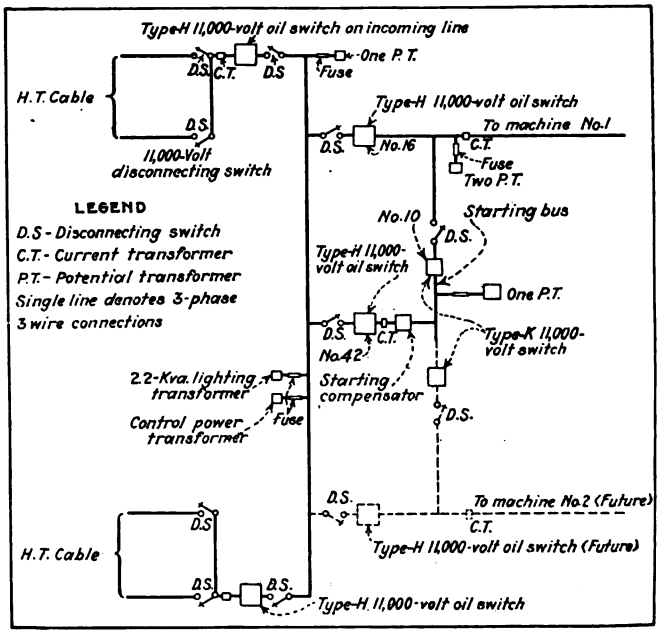

Fig. 3—Single-Line Diagram of 11,000-Volt Circuits in Substation

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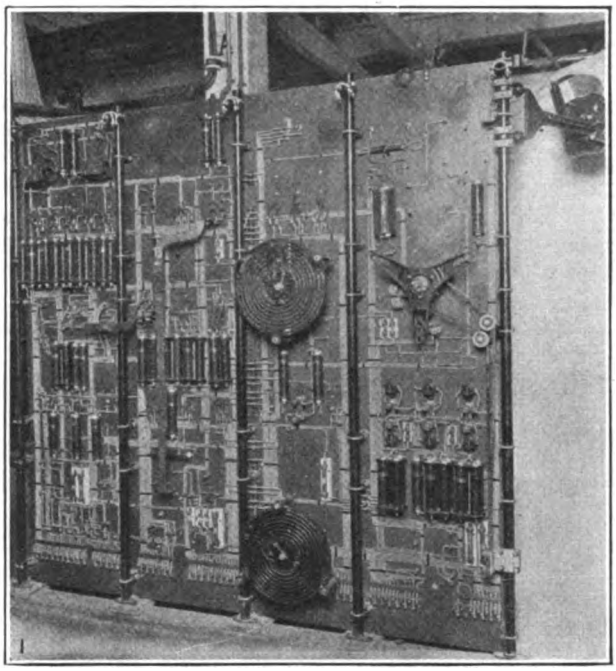
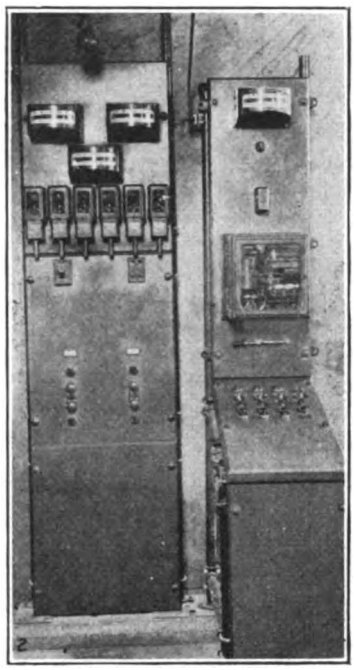
for starting. This operation energizes the starting bus. An auxiliary switch on the circuit breaker (42) completes the closing-coil circuit of the main motor-starting oil circuit breaker (10), starting the motor.

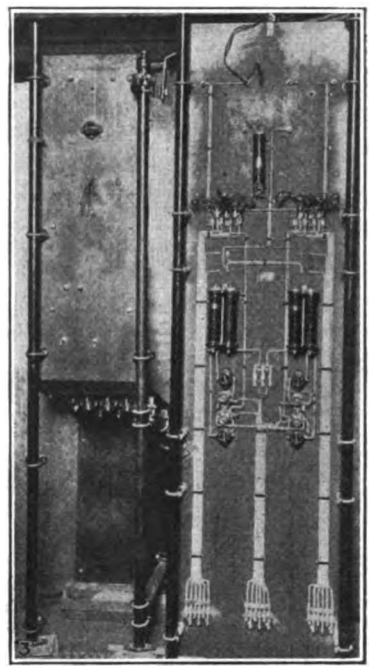
As the set comes up to speed the exciter voltage builds up and, with the rotation of the master switch and the corresponding operation of relays, a contactor known as the motor-field contactor (41) closes and applies direct current to the field. However, this cannot occur unless synchronous speed has been reached, because there is linked in the field circuit, by means of an auxiliary circuit containing a resistor and the primary of a current transformer, a relay termed the synchronous-speed relay (13), through whose coil flows alternating current induced in the field by the armature which is gradually reduced to zero as synchronous speed is approached. This relay holds out the motor-field contactor until the alternating current dies away, as it does completely at synchronous speed.

At a given point in the rotation of the master switch the trip-coil circuit of the starting circuit breaker is completed and this circuit breaker opens. Immediately thereafter a circuit is completed through the mechanism of the running circuit breaker (16), which closes and applies full voltage to the motor. Next the compensator circuit breaker is tripped open by the de-energizing of an undervoltage device which forms a part of it. When the running circuit breaker closes it completes a circuit for the contactor (40) for the synchronous-motor-field resistor, which closes and reduces the resistance in the motor field.

As the set is coming up to speed, the d.c. voltage of the generator is building up, and a motor-driven automatic voltage regulator, which is a central feature of the installation, is short-circuited for the time being. If the polarity is right, a polarized relay closes after the machine voltage has sufficiently built up, and when the generator voltage is slightly above that of the bus, a relay, known as the d.c. voltage equalizing relay, closes its contacts and operates the d.c. line contactor (18). This connects the generator and the 666-volt bus through a cushioning resistor.

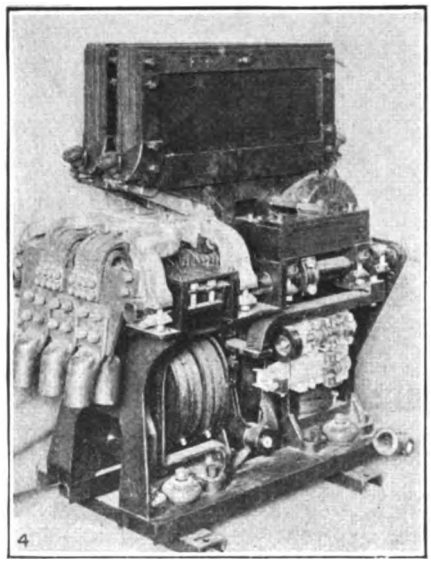


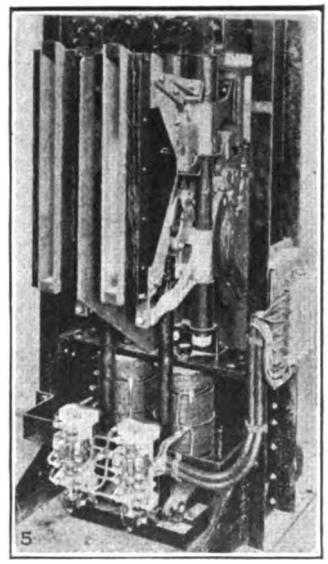




Views of Details of Substation Equipment as Assembled in the Factory

No. 1—Rear view of control and instrument, and motor-operated rheostat panels for motor-generator set.
No. 2—Control panels for two incoming lines, front view.
No. 3—Same, rear view.
No. 4—High-speed direct-current circuit breaker; height about 3 ft.
No. 5—Direct-current control contactors; height about 3 ft. 6 in.





The master switch now has rotated to such a position as to stop its motor and it so remains, the station being in full operation. At the same time the short circuit on the voltage regulator is removed and voltage control is taken over by what is known as the d.c. load regulating relay (57). In case the current tends to rise above the setting of this relay its contacts open, bringing the regulator into action and causing the current to be held at a predetermined value.

The manual shutting down of the station by the Mott Haven operator is initiated by his closing a "stop" switch. This energizes a stopping contactor at 110th Street, de-energizing the a.c. undervoltage relay and

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dropping out the control-current contactor. This starts the master switch, which, by its rotation, opens the running circuit breaker, the d.c. line contactor and the machine resistor short-circuiting contactor. The master switch then stops and all devices assume the "off" position.

APPARATUS IS WELL SAFEGUARDED IN THE NEW SUBSTATION

The protective features in the substation cover the safeguarding of the apparatus in case of the following abnormal conditions:

Single-phase starting.	Overspeed.
Alternating-current under-voltage.	Direct-current overload.
Field failure.	Overheated resistors.
Wrong polarity.	Overheated starting compensator.
Reverse power.	Overheated generator winding.
Overheated motor winding.	Under-voltage connection to the direct-current bus.
Hot bearings.	
Alternating-current overload.	

Told in very brief fashion, the operation of these several protective features in the order given above is as follows:

Single-phase starting is prevented by a single-phase starting relay (32), which is connected across one phase of the circuit, and the under-voltage relay across another, so that three-phase voltage must be present for starting.

Alternating-current under-voltage starting is provided through the under-voltage relay mentioned above, which is connected across the 220-volt a.c. control bus. When the bus voltage is less than 180, this relay makes contact and opens the circuit of the control-current contactor.

In case of field failure during normal operation, the field relay, which is in series with the motor field, is de-energized and closes its lower contacts. This energizes an auxiliary relay which picks up and opens the coil circuit of the control-current contactor, shutting down the set.

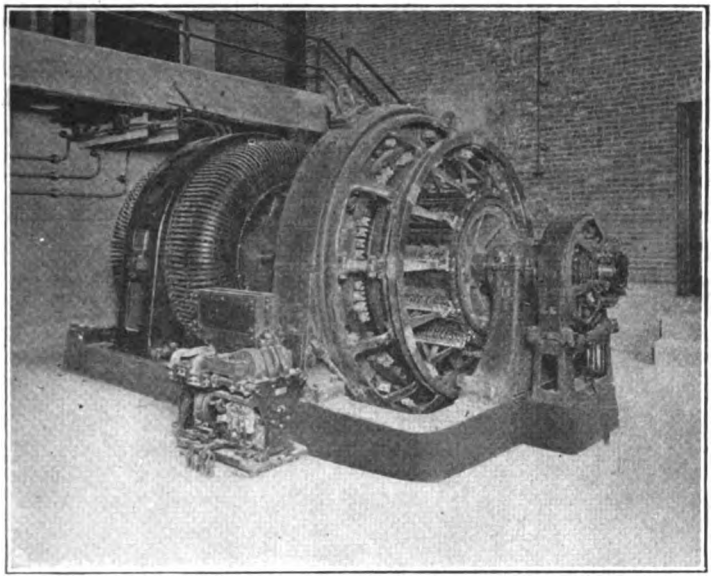
The polarized relay mentioned earlier is provided to prevent operation with wrong polarity. Its coil is connected from the positive terminal of the generator to ground. It must be energized in the proper direction before the d.c. line contactor can close.

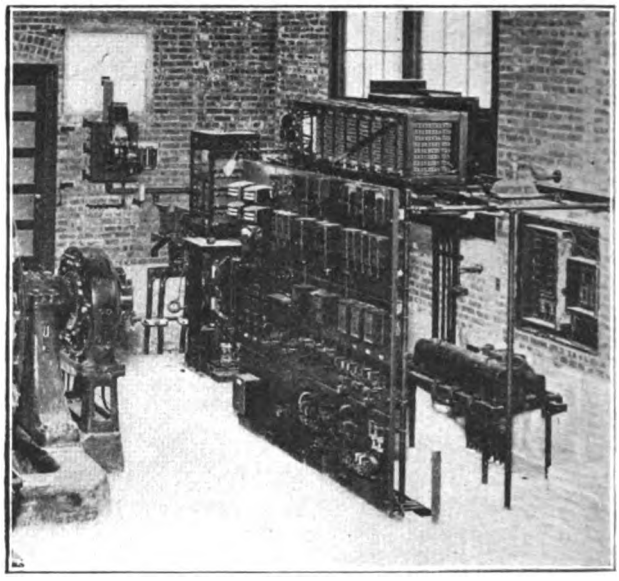
As to reverse power, this is taken care of through a special d.c. reverse-power relay (56). Its contacts close at less than the running-light or no-load current in the reverse direction, exciting the closing coil of an auxiliary relay, which in turn opens the coil circuit of the d.c. line contactor (18), disconnecting the machine from the d.c. bus. The machine is automatically reconnected to the line after a time delay, when the bus voltage drops below that of the machine. For protection against heavy values of reverse current, a d.c. reverse power relay (29) is provided. With current in a normal direction (that is, from the positive terminal of the generator to the bus) the contacts of this relay remain open. On a value of reversed direct current above the setting of the relay, the contacts close, energizing the trip coil of the d.c. line circuit breaker and shutting down the set.

Particular interest attaches in this substation to the way in which overloads are provided for, especially as the substation can be set automatically to take a 50 per cent overload and hold it until the windings are warm enough to require a reduction of load to 100 per cent. For protection against overheated a.c. machine windings, a relay (49) is provided which has temperature-time characteristics similar to those of the motor. A heating element in the relay expands and opens the relay contacts, in turn opening the control-current contactor and bringing the set to rest. When the element has cooled down, the set may be started again. These relays also prevent running too long under heavy loads or badly unbalanced phases.

To prevent overheated bearings a thermal relay of another type functions. This contains a flexible spun-copper bellows connected by a copper tube to a metal cylinder located in a hole at the bottom of the bearing near the babbitt lining. The bulb and bellows are filled with a non-freezing liquid, with a boiling point of 90 deg. C. Overheating of the bearing trips the relay contacts, opening the control-current contactor and shutting down the set. The relay must be reset by hand.

Provision is made for a.c. overload by means of what is termed the a.c.-overload time-delay relay (28), which opens after a predetermined period and shuts down the





At Left—The Quick-Acting Circuit Breaker Is Placed on the Floor Beside the 2,000-Kw. M-G Set. At Right—The Control Centers in This Corner

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station. It must be reset by hand. For an overload produced in starting, another time-delay relay (128) is provided. The opening of the contacts breaks the circuit of the control-current contactor and opens the compensator magnetizing circuit breaker.

If overspeed of the set occurs, a centrifugally-operated switch (12) mounted on the motor end of the shaft closes, tripping out the d.c. line circuit breaker. A switch on this breaker opens the circuit of the control-current contactor, which, of course, shuts down the motor-generator. The circuit-opening contacts also interrupt the coil circuit of the latter contactor on overspeed. The set cannot be restarted until the d.c. line breaker and both sets of contacts of the overspeed limit switch are reset by hand.

An overload on the generator is taken care of by a quick-acting circuit breaker (54), not mentioned earlier, which instantly clears the generator on the negative side. The breaker opens the d.c. line contactor (18) and then recloses immediately. The d.c. line contactor then recloses, as described above.

Overheating of resistors and the starting compensator is prevented by means of thermal relays similar to the bearing-temperature relay.

Particular interest centers in the way in which overheating of the d.c. windings is prevented. Two

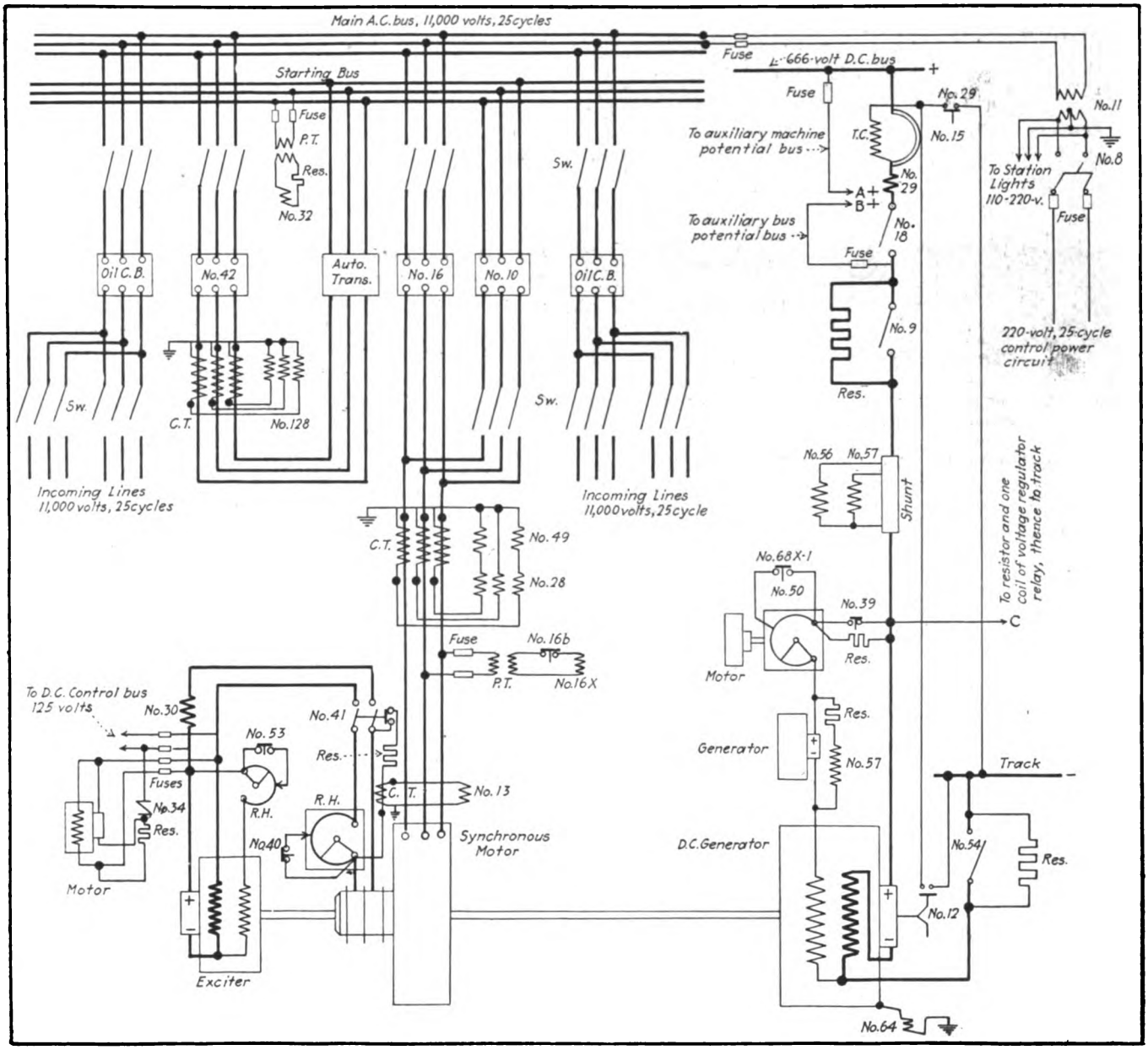

Fig. 4—Diagram of the Power Circuits (Control Circuits Omitted)

8—Control-power switch.
9—Machine-resistor short-circuiting contactor.
10—Starting oil circuit breaker.
11—Control-power transformer.
12—Overspeed limit switch.
13—Synchronous-speed relay.
15—Direct-current-line circuit breaker.
16—Running oil circuit breaker.
16b—Auxiliary switch on No. 16.
16x—Interlocking relay for No. 16.
18—Direct-current-line contactor.
28—Alternating-current-overload time-delay relay, hand reset.
29—Direct-current reverse-power relay.
30—Field relay.
32—Single-phase starting relay.
34—Master switch.
39—Generator field-killing contactor.
40—Synchronous-motor field-resistor contactor.
41—Synchronous-motor field contactor.
42—Compensator-magnetizing oil circuit breaker.
49—Alternating-current-machine temperature relay.
50—Motor-operated field rheostat.
53—Exciter relay.
54—Quick-acting circuit breaker.
56—Direct-current reverse-power and underload relay.
57—Direct-current load-regulating relay, two coils.
64—Direct-current grounding protective relay.
68x-1—One contact of auxiliary relay for direct-current-machine temperature relay.
128—Compensator line time-delay overload relay.

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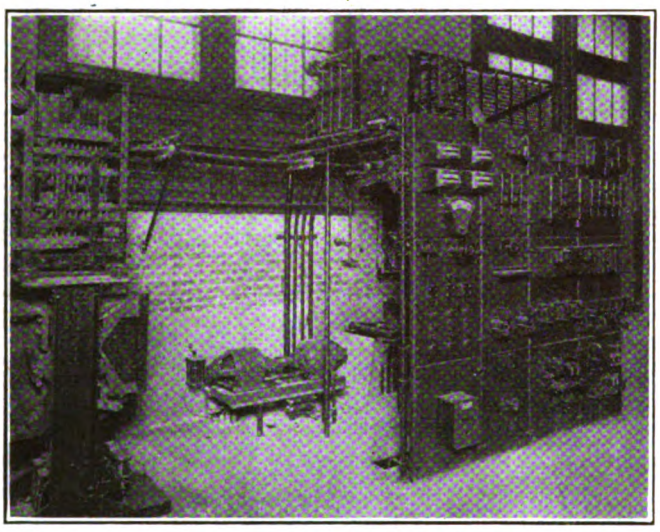
special thermal relays function for this purpose. On moderate overloads the "hot" contacts of one of these close, energizing an auxiliary relay (68x), which cuts in a potential coil of the d.c. load-regulating relay mentioned earlier and causes the load to drop to such an amount that the machine will cool to a safe temperature.

If the overload should still continue the other relay makes its "hot" contact and opens the d.c. line contactor. These relays of course operate in connection with a thermostatic element.



Another View of the Switchboard Corner, with the Field-Boosting Motor-Generator Set in the Foreground

Connection to the d.c. bus at less than the proper voltage is prevented by the d.c. voltage equalizing relay, mentioned earlier. The d.c. line contactor will not close until two contacts of this relay are closed by the voltage of the generator rising slightly above the bus voltage.

The relay functions not only during starting sequences but at any time when the generator is to be reconnected to the bus.

ENGINEERS OF RAILROAD CO-OPERATED IN SUBSTATION WORK

The new equipment was installed under the general direction of the chief engineer of the railroad company, George W. Kittredge. J. W. Pfau, engineer of construction, had charge of the building and foundations; while the heavy shoring and foundations for the overhead viaduct structure were under the direction of Francis Boardman, division engineer. The electrical design and installation were in charge of E. B. Katté, chief engineer of electric traction, and his associates C. B. Martin, transmission engineer; C. P. Ferguson, assistant engineer, and H. W. Walsh, inspector at the site of erection.

Oil Consumption in St. Louis

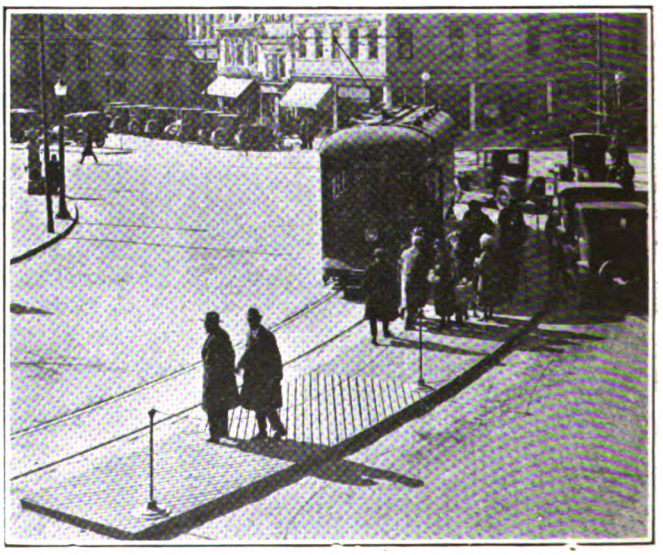
IN an article entitled "Waste Saturation Plant Halves Oil Consumption, in the April 21, 1923, issue of this paper, page 676, the statement is made that the oil consumption in St. Louis has been reduced from 4,000 to 2,000 gal. per year. The actual reduction was from 4,000 to 2,000 gal. per month. This gives for 1922, the year to which the lower consumption applies and during which the car-mileage was about 43,000,000, a mileage of about 1,800 per gallon.

Passenger Platforms Relieve Confusion in Easton, Pa.

THE center square of Easton, Pa., is popularly known as the "Circle." Eight electric lines of the Easton division of the Lehigh Valley Transit Company enter this circle and leave by the same street, passing entirely around the loop. Formerly passengers boarded these cars at the various corners and thus from four to six stops were made on the loop. To relieve the congestion and confusion of this arrangement a platform has been installed in each of the quadrants of the circle. The cars of two lines stop at each platform, so that but one stop is required in the circle for each car. A conspicuous illuminated sign at the center of each platform gives the names of the lines assigned to it, and each station has a designating number, so that policemen and traffic officers can direct people by telling them the numbers of the stations at which their cars will stop.

The platforms are made in sections 21 ft. long by 8 ft. wide, and they are 5 in. above the street pavement. The flooring of the platform is laid diagonally, as experience has shown that most travel is either longitudinal or crosswise of the platform. With diagonal flooring there is less danger of slipping than when people travel in the direction of the boards. Space is left between the individual boards for drainage and for dirt to fall through. The underframing is of 2-in. x 4-in. and 3-in. x 4-in. timber brush-treated with creosote. The top boards are 1 in. x 4 in. A guard chain with stanchions extends along the outside edge. The stanchions consist of pipe posts with large base castings.

Where lines have both local and limited service, this is designated on the sign. The sign is of white glass with black letters, and lamps are installed inside for illuminating them. The sign is also fitted with a globe and light on top for giving illumination to the platform.



Loading Platform in the Circle, Easton, Pa.

A pipe stanchion supports the sign, and the wiring passes through this to the ground connection. The upright is of 2½-in. pipe and a 3-in. pipe is set in the concrete, so that the upper pipe fits inside of this and is held in place by set screws. The sign and stanchions can thus be readily removed for repairs.

The illustration shows No. 3 platform, at which lines for College Hill, Bethlehem, and Allentown stop.

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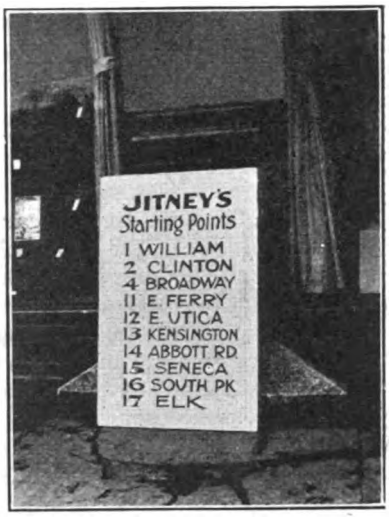
Bootlegging Jitney Rides in Buffalo

An Amazing Story of How Jitneys Are Being Operated Contrary to the State Transportation Law—They Are Gradually Being Put Out of Business, but It Is Thought that 500 Remain of the 5,000 Which Once Were Operating



These illustrations were taken some time ago when the jitneys were advertising their service. The one at the left shows a jitney displaying its city permit for Route No. 5, which is the Niagara Street route. The illustration to the right shows the former principal down-town terminal for jitneys, with an index of the route numbers displayed by the jitneys and the streets over which they were operating at that time.

ALTHOUGH normal street car service has been restored on the local and interurban lines of the International Railway Company, Buffalo, there are still a number of persons in that city who are in sympathy with the platform employees who have been on strike since July 1, 1922. These sympathizers make the boast that they will never ride on the cars until the men return to work. While every effort is being made by private detectives in the employ of the International to check jitney competition, it is estimated that more than 500 privately-owned automobiles are engaged in the jitney business in Buffalo. These jitneys charge a 10-cent fare and probably collect in fares daily at least $10 each or $5,000 a day in toto.

When the strike of platform employees went into effect on the local and interurban lines of the International almost a year ago, Mayor Frank X. Schwab announced that emergency jitney permits would be issued at the office of the city's chief executive in the City Hall. Thousands of would-be jitney operators stormed the City Hall during the next forty-eight hours seeking permits, and more than 5,000 were granted.

Each person to whom a permit was issued was required to promise that he would operate over a specified route and the fare charged would be not more than 10 cents. A numbered permit was issued to each applicant, and the name and address of each jitney owner was filed with the police department, together with the make of the machine and its carrying capacity. The permit was displayed on the windshield of each jitney, together with a sign giving the route over which the jitney operated.

Within twenty-four hours after there was complete suspension of service on the lines of the International privately-owned jitneys were carrying upward of 750,000 passengers daily and many drivers were boasting that they had a daily income of $40 and $50. Terminals were established at downtown corners by the order of the police department, and Mayor Schwab swore in fifty striking employees as special policemen to act as traffic officers at jitney loading points. Hundreds of other strikers bought automobiles on the partial-payment plan and started to engage in the hauling of passengers for a 10-cent fare. It is said that many strikers took in enough money in the first month of the strike to pay for their cars and operating expenses, and by the end of the summer hundreds of strikers had substantial bank accounts because they found the jitney business profitable

JITNEYS OPERATE IN SPITE OF STATE LAW

When the International Railway began to expand its service with the new employees which it had recruited and to operate cars on various local lines throughout the city, the legal department of the company was confronted with the problem of attempting to rid the streets of the thousands of jitneys. The traction company encountered opposition on every hand, because the chief executive officer of the city largely had control of the situation and he was determined to keep the jitneys in operation.

Application was made to a justice of the Supreme Court for a writ of mandamus directing the Mayor as head of the Department of Public Safety to enforce the law against jitney operation. Counsel for the traction company argued that service was being given on all lines of the company on a normal basis, yet the municipal authorities allowed jitneys to operate without the authority of the Public Service Commission in violation of the transportation law. The writ of mandamus was granted and the Mayor withdrew the emergency permits, but the jitneys continued to operate even on a more extensive scale than before.

The service was not given by buses but by passenger automobiles of various makes and ages. These cars appeared in the streets without jitney license numbers and without route designations, but attempted to get around the law by carrying such signs as, "Going Out Main," "Ride Out Genesee," "We Stop Along Elmwood," "My Home Is on Niagara Street," etc. These signs appeared pasted on the windshields of cars in all parts of the city. The police made no effort to stop this illegal jitney competition.

The legal department of the International found it was facing a very difficult problem, and the entire claims department of the International and many of the officials of the claims department of the Philadelphia Rapid Transit Company were assigned to jitney duty

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in Buffalo. Scores of men worked day and night in an effort to put an end to this unfair competition and so successful were their efforts that today fewer than 500 jitneys are in operation and they are making every effort to conceal their identity and avoid arrest.

Finding that the mandamus proceedings directed against the Mayor were of little effect, the International Railway placed checkers at dozens of street corners to get the license numbers of cars suspected of being jitneys. After careful checking it was easy to determine what cars were being operated back and forth along certain streets. Then application was made to the courts for injunctions restraining the car owners from operating their machines as jitneys in violation of the state transportation act. The service of these thousands of injunctions was a big task, but it had a tendency to scare many jitney drivers into ceasing operations.

The work of the secret service department of the International Railway with the aid of operatives from the Philadelphia Rapid Transit Company continued and the checking was renewed. Men were detailed to ride the jitneys and obtain evidence against individual drivers. The men worked in pairs so that the testimony of one would corroborate that of the other. The jitney drivers then grew suspicious when two men attempted to board their car at a given point, so a man and woman detective were paired off and much evidence was obtained in this manner.

Nearly Two Thousand Warrants Were Issued

When the legal department of the International was satisfied that automobile owners were violating the injunction and there was sufficient evidence that they were operating in competition with the local lines of the International on a 10-cent fare, application was made to judges of the Supreme Court for warrants of arrest for contempt of court. Almost 2,000 such warrants were issued. The company found it an exceedingly difficult task to serve these Supreme Court warrants, but when they were served and the jitney owners were taken into custody by International detectives fines of $250 and ten days imprisonment were imposed.

After several heavy fines and penitentiary sentences had been imposed, there was a noticeable drop in the number of jitneys being operated in Buffalo. The campaign is being continued, and now the jitney owners are being arraigned in City Court on charges of operating a bus line without obtaining certificates of convenience and necessity from the Public Service Commission. More than 700 jitney drivers have been arrested and most of them have demanded jury trials, so that at least 500 such cases are now pending in the City Court.

The International has been having some difficulty in prosecuting these cases because the evidence against them was obtained probably months ago and the detectives who were then working on the case have left the city or are no longer in the employ of the railway company. Many jitney owners have been arrested four and five times, apparently willing to pay a fine and consider it part of the cost of operation. In a large number of instances convicted jitney owners have paid their fines with dimes and nickels. In one instance when a jitney driver was found guilty and fined $250, he laughed and offered to pay the fine in small change. The judge was impressed with the large amount of silver being counted so he ordered the jitney driver locked up until the money could be counted. The judge told the clerk to be in no hurry to count the money so the jitney driver was in the lockup thirty-six hours before he was informed that he had given the correct amount of change to pay his $250 fine.

Evidence Is Getting More and More Difficult to Obtain

With the arrest and conviction of so many jitney owners and drivers, it is getting more and more difficult to secure the necessary evidence against suspects. Detectives, however, continue to make attempts to obtain rides and ask the rate of fare. In some instances the jitney drivers say there is no charge for the ride, but "leave your donation on the rear seat." Other jitneys display a small box attached to the driver's seat saying, "Poor Box," "For the Benefit of Strikers," etc.

The jitney owners have been subjected to so much prosecution that they have organized an association. Membership in it provides the driver with an attorney in case he is arrested, and the application of the association for certificates of convenience and necessity from the Public Service Commission was recently rejected.

Many tricks have been tried by the jitney drivers in their attempt to evade the law. One recent attempt was nipped in the bud by the traction company. It provided for the organization of a social society with weekly dues of $1 entitling the members to a weekly pass on any jitney in the city. The court ruled this was merely an attempt on the part of the jitney owners and drivers to evade the law.

It is estimated that fully 70 per cent of all jitney owners and drivers brought into court are convicted. Few of them plead guilty, but figures available in the records of the City Court show that about 5 per cent enter pleas of guilty. The others demand jury trials. In almost every instance where jitney drivers have been taken into custody on warrants charging contempt of court they have been found guilty. Judges of the City Court and Supreme Court justices have been co-operating in an effort to stamp out this illegal competition with the International.

The city law department took an appeal from the writ of mandamus issued during the early days of jitney competition and the contentions of the city were upheld by the higher courts. It was ruled that the Mayor could issue such permits during a strike emergency. The contentions of the International Railway, however, have been upheld in other decisions of the Appellate Division and the New York State Court of Appeals in its efforts to stop unfair jitney competition.

Changes in Cost of Living

ACCORDING to the Bureau of Labor Statistics of the U. S. Department of Labor changes in the total cost of living in various cities throughout the United States from December, 1922, to March, 1923, show variations from a decrease of 2.9 per cent to an increase of 0.8 per cent, the average for the United States being a decrease of 4.4 per cent.

In thirty-two of the leading cities the decrease in cost of living from June, 1920, to March, 1923, averaged 22 per cent. The decrease was greatest in Savannah, Ga., where it was 25.1 per cent, and it was least in Los Angeles, being but 14.3 per cent. For the year from March, 1922, to March, 1923, the changes were all the

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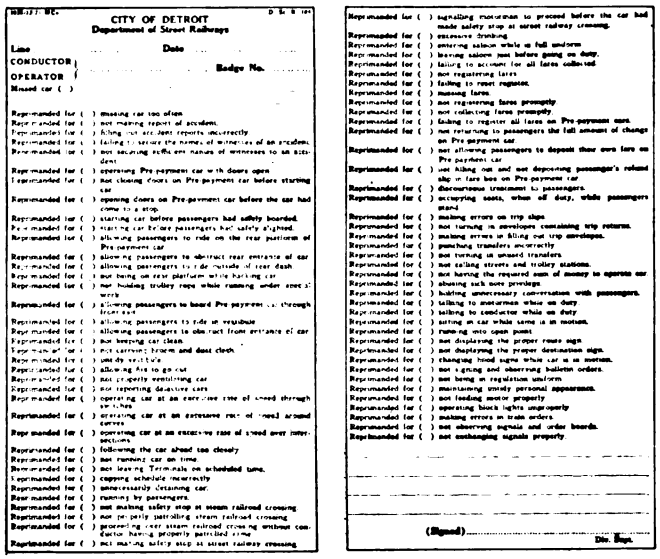
way from an increase of 3.8 per cent in Indianapolis to a decrease of 3.3 per cent in Seattle. For the period from December, 1922, to March, 1923, the range was considerably smaller, the maximum increase being 0.8 per cent in Memphis and the maximum decrease 2.9 per cent in Seattle.

Detroit Trial Board Works Well

All Cases of Dismissal from the Ranks of the Platform Men Come Before Board for Final Decision—Method of Handling Cases Outlined

ON THE Detroit municipal railway no platform employees are discharged until their cases have been considered by a board of three, known as the trial board. The general manager of the company, or, in his absence, the assistant general manager, is chairman of the board. The superintendent of transportation is one of the other members. The third member is some department head, and the effort is made to enlist in this service the heads of the different departments of the company in rotation.

Cases come before the board upon the application of a division superintendent who has authority to suspend the man from service but not to discharge him.



CITY OF DETROIT
Department of Street Railways

Line ..... Date .....

CONDUCTOR }
OPERATOR } ..... Badge No. .....
Missed car ( )

Reprimanded for ( ) missing car too often
Reprimanded for ( ) not making report of accident.
Reprimanded for ( ) filling out accident reports incorrectly
Reprimanded for ( ) failing to secure the names of witnesses of an accident.
Reprimanded for ( ) not securing sufficient names of witnesses to an accident
Reprimanded for ( ) operating Pre-payment car with doors open
Reprimanded for ( ) not closing doors on Pre-payment car before starting car
Reprimanded for ( ) opening doors on Pre-payment car before the car had come to a stop
Reprimanded for ( ) starting car before passengers had safely boarded.
Reprimanded for ( ) starting car before passengers had safely alighted.
Reprimanded for ( ) allowing passengers to ride on the rear platform of Pre-payment car
Reprimanded for ( ) allowing passengers to obstruct rear entrance of car
Reprimanded for ( ) allowing passengers to ride outside of rear dash
Reprimanded for ( ) not being on rear platform while backing car
Reprimanded for ( ) not holding trolley rope while running under overhead work
Reprimanded for ( ) allowing passengers to board Pre-payment car through front exit
Reprimanded for ( ) allowing passengers to ride at vestibule
Reprimanded for ( ) allowing passengers to obstruct front entrance of car
Reprimanded for ( ) not keeping car clean
Reprimanded for ( ) not carrying broom and dust cloth
Reprimanded for ( ) not dressed neatly
Reprimanded for ( ) allowing fire to go out
Reprimanded for ( ) not properly ventilating car
Reprimanded for ( ) not reporting defective cars
Reprimanded for ( ) operating car at an excessive rate of speed through curves
Reprimanded for ( ) operating car at an excessive rate of speed around corners
Reprimanded for ( ) operating car at an excessive rate of speed over intersections
Reprimanded for ( ) following the car ahead too closely
Reprimanded for ( ) not running car on time
Reprimanded for ( ) not leaving Terminals on scheduled time.
Reprimanded for ( ) skipping schedule incorrectly
Reprimanded for ( ) unnecessarily detaining car.
Reprimanded for ( ) running by passengers
Reprimanded for ( ) not making safety stop at steam railroad crossing
Reprimanded for ( ) not properly patrolling steam railroad crossing
Reprimanded for ( ) proceeding over steam railroad crossing without conductor having properly patrolled same
Reprimanded for ( ) not making safety stop at street railway crossing

Reprimanded for ( ) signalling motorman to proceed before the car had made safety stop at street railway crossing.
Reprimanded for ( ) excessive drinking
Reprimanded for ( ) entering saloon while in full uniform
Reprimanded for ( ) leaving saloon near before going on duty.
Reprimanded for ( ) failing to account for all fares collected
Reprimanded for ( ) not registering fares
Reprimanded for ( ) failing to reset register.
Reprimanded for ( ) running farm.
Reprimanded for ( ) not registering fares promptly
Reprimanded for ( ) not collecting fares promptly
Reprimanded for ( ) failing to register all fares on Pre-payment cars
Reprimanded for ( ) not returning to passengers the full amount of change on Pre-payment car
Reprimanded for ( ) not allowing passengers to deposit their own fare on Pre-payment car
Reprimanded for ( ) use filing nut and not depositing passenger's refund slip in fare box on Pre-payment car
Reprimanded for ( ) discourteous treatment to passengers.
Reprimanded for ( ) occupying seats, when off duty, while passengers stand.
Reprimanded for ( ) making errors on trip slips
Reprimanded for ( ) not turning in envelopes containing trip returns.
Reprimanded for ( ) making errors in filling out trip envelopes.
Reprimanded for ( ) punching transfers incorrectly
Reprimanded for ( ) not turning in unused transfers.
Reprimanded for ( ) not calling streets and trolley stations.
Reprimanded for ( ) not having the required sum of money to operate car
Reprimanded for ( ) abusing cash fare privilege
Reprimanded for ( ) holding unnecessary conversation with passengers.
Reprimanded for ( ) talking to motorman when on duty
Reprimanded for ( ) talking to conductor while on duty
Reprimanded for ( ) acting as car while same is in motion.
Reprimanded for ( ) running onto open point.
Reprimanded for ( ) not displaying the proper route sign
Reprimanded for ( ) not displaying the proper destination sign.
Reprimanded for ( ) changing front vestibule car as in motion.
Reprimanded for ( ) not signing and observing bulletin orders.
Reprimanded for ( ) not being on regulation uniform
Reprimanded for ( ) not maintaining orderly personal appearance.
Reprimanded for ( ) not feeding motor properly
Reprimanded for ( ) operating block lights improperly
Reprimanded for ( ) making errors in trip orders.
Reprimanded for ( ) not observing signals and order boards.
Reprimanded for ( ) not exchanging signals properly.

(Signed) .....
Div. Supt.

Front and Back of Sheet Used to List Reprimands of Employees

Promptly after he is suspended the superintendent forwards to the superintendent of transportation a report on a regular form provided. This gives the name of the employee, his residence address, badge number, line, etc., date of the suspension, and detailed information as to the offense for which dismissal is requested.

Notice that the trial board will take up any particular case is sent to the suspended employee so that he can be present in person, and also to the division superintendent so that he can be present or represented. If the suspended employee fails to appear before the trial board without due cause, he is automatically discharged, or if he declares to the division superintendent when being suspended that he does not wish to appear before the trial board, he is required to sign a resignation and this resignation is forwarded to the trial board. When an employee is under suspension, his outfit is not taken up unless he resigns.

The evidence considered by the board consists not only of such verbal or written statements as the division

TABLE SHOWING COMPARATIVE MONTHLY REPORT OF ACTIVITIES FOR JANUARY, 1923, AND FEBRUARY, 1923, OF TRANSPORTATION DIVISION, DEPARTMENT OF STREET RAILWAYS, DETROIT

Revenue car-miles in January 4,285,160.78
Revenue car-miles in February 3,953,915.27
Decrease in February 331,245.51

	Total in January	Total in February	Increase Over January	Decrease Under January
New Service Schedules				
Put into effect	36	28	.....	8
Prepared	38	32	.....	6
Platform Men				
Qualified	392	345	.....	47
Not finishing practice	146	143	.....	3
Dismissed on account of unsatisfactory reference letters	8	8	0	0
Under instruction end of month	210	165	.....	45
Failing to pass doctor	111	63	.....	48
Not reporting to doctor	.....	.....	.....	.....
Transferred	45	21	.....	24
Operators resigned	71	72	1	.....
Conductors resigned	63	68	5	.....
Total resigned	134	140	6	.....
Operators dismissed by trial board	4	7	3	.....
Conductors dismissed by trial board	4	7	3	.....
Total dismissed by trial board	8	14	6	.....
Grand total left service	142	154	12	.....
Force at End of Month				
Operators on board	1,906	1,998	92	.....
Conductors on board	1,808	1,919	111	.....
Platform employees on board	3,714	3,917	203	.....
Carhouse and terminal employees	275	281	6	.....
Division superintendents' supervisory force	43	43	0	0
Main office and miscellaneous employees	50	51	1	.....
Total force	4,082	4,292	210	.....
Complaints				
Received at City Hall office either by mail or telephone, re:				
Passing up passengers	21	11	.....	10
Transfers issued improperly	6	9	3	.....
Service	5	6	1	.....
Discourtesy of employee	10	4	.....	6
Negligence of employee	10	6	.....	4
Transfer controversies	8	7	.....	1
Dispute over fares	4	4	0	0
Heat and ventilation	0	3	3	.....
Miscellaneous	10	6	.....	4
Total	74	56	.....	18
Received at Main Office, re:				
Passing up passengers	46	51	5	.....
Transfers improperly issued	13	12	.....	1
Service	41	25	.....	16
Discourtesy of employee	40	32	.....	8
Negligence of employee	58	55	.....	3
Transfer controversies	22	26	4	.....
Dispute over fares	11	9	.....	2
Heat and ventilation	4	2	.....	2
Miscellaneous	8	10	2	.....
Total	243	222	.....	21
Grand total all complaints	317	278	.....	39
Commendations of employees				
Received at City Hall Office	2	0	.....	2
Received at main office	13	9	.....	4
Total	15	9	.....	6
Suggestions				
Received a. City Hall office	7	1	.....	6
Received at main office	38	29	.....	9
Total	45	30	.....	15
Lost articles				
Received	1,453	1,264	.....	89
Claimed at carhouses	128	114	.....	14
Claimed at lost article department	328	245	.....	83
Total claimed	456	359	.....	97
Returned to finder	1,052	943	.....	109
Money at Lost Article Department				
Received	$832.44	$494.90	.....	$337.54
Claimed at carhouses	136.15	267.91	131.76	.....
Claimed at lost article department	608.67	146.91	.....	461.76
Total claimed	744.82	414.82	.....	330.00
Returned to finder	180.18	95.44	.....	84.74
Notification postal cards sent out	163	134	.....	29
Calls (in person or by phone)				
At City Hall Office				
In person	1,772	1,040	.....	732
By phone	573	454	.....	119
Total	2,345	1,494	.....	851
At Lost Article Department				
In person	351	338	.....	13
By phone	613	515	.....	98
Total	964	853	.....	111
Total at both downtown offices				
In person	2,123	1,378	.....	745
By phone	1,186	969	.....	217
Grand total, all calls at downtown offices	3,309	2,347	.....	962
Maps sold by City Hall office	1,005	700	.....	305
Passenger stops established	16	4	.....	14
Passenger stops discontinued	7	7	0	0

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superintendent and employee wish to make, but also all documents relating to the complaint, accident, or whatever the reason for the hearing by the board, and all papers relating to the past performance of the employee. This file is collected and submitted to the board by the chief of the intelligence bureau.

After the board has taken action on the case a bulletin is issued and posted in all carhouses stating the charges which were made and the action taken by the board in each case. A copy of this bulletin is also filed with the record of each employee whose case was brought before the trial board.

If an employee is reinstated after being suspended, his seniority and rating continue, the board deciding whether he shall be paid for full time or part time during the period of suspension. Employees who have resigned under the conditions of suspension already mentioned, or who have been discharged by the board, are not re-employed unless the case comes again before the board and authority for re-employment is given. The ex-employee must also make written request to have the board authorize his re-employment if he wishes again to work on the system.

A blank found convenient for keeping records of reprimand and forming part of the employee's record, already mentioned, is reproduced.

All complaints sent in relating to employees are investigated personally before they go definitely against a man's record. Each month a table is made up giving a list of the number of the different kinds of complaints, as well as of commendations and suggestions received from the public, and this table forms a part of the records of the transportation division, with other data called its "comparative monthly report of activities." The monthly report of this kind for January and February, 1923, is published in the accompanying table.

Cleveland and Interurbans Agree

The Latest Form of Contract for Interurban Cars Entering the City Over the City Tracks Is Published in Full

THERE is so much interest in the subject of contracts between interurban and city roads by which interurban cars enter the city over the city tracks that the form of contract recently adopted by the Cleveland Railway for passenger cars is presented in full. This particular contract was made with the Northern Ohio Traction & Light Company, which operates the line from Cleveland to Akron and was signed last December, but there are similar contracts between the Cleveland Railway and the other interurbans entering Cleveland.

These contracts replace those made about twenty-five years ago. Most of these were for twenty-five years and have expired or are expiring. Under this former contract the Cleveland Railway took all of the fares for the city rides, paid all of the expenses and recompensed the interurban railway at the rate of 2 cents per car-mile for the use of its cars. The only expense assumed by the interurban railway was that of ordinary car maintenance. The new contract follows:

This Agreement, made and entered into this first day of December, 1922, by and between the Cleveland Railway, party of the first part, and the Northern Ohio Traction & Light Company, party of the second part, both being electric railway corporations organized and existing under and by virtue of the laws of the state of Ohio, witnesses that:

Whereas it is the mutual desire of the parties hereto that the party of the first part operate all cars owned by the party of the second part between the point of physical connection of the tracks of the two parties and any point on the lines of the party of the first part which may be the destination of such cars and whereas the operation of freight, express, work and other cars on the lines of the party of the first part are subject to and governed by other agreements, franchises and rules, this agreement is limited to and affects only the operation of passenger cars;

Now, therefore, the parties hereto have agreed, and do hereby agree, as follows:

ARTICLE I

The party of the first part agrees:

1. To accept all scheduled, extra or special passenger cars in good condition tendered it by the party of the second part at or near a point about 4,210 ft. southerly from the intersection of Miles Avenue and Broadway on the private right of way of both companies in front of the Calvary Cemetery (the point of physical connection of the tracks of the parties hereto), and to operate them over such routes and to such points as may be agreed upon by the parties hereto or fixed by the Council of the city of Cleveland, and to return cars to the party of the second part in like good operating condition, necessary wear and tear excepted.
2. To charge, collect and retain all fares from and to the points herein named as provided in ordinance of the city of Cleveland, File No. 53779, adopted Dec. 13, 1920.
3. To assume and pay all expenses of operation of cars from and to the points of physical connection.
4. To credit party of the second part with all fares received by it and to account for same monthly.
5. To render, monthly, invoices for all mileage operated under this agreement at the rate of 35 cents per car-mile, less credits made as provided in Sec. 4 hereof.
6. To pay to the party of the second part the sum by which the receipts for each year of this agreement exceed 35 cents for each car-mile operated during that year, if there be such excess; provided, however, that this sum shall not be greater than 5 cents per car-mile operated under this agreement, and to retain all, if any, excess above 40 cents for each car-mile so operated.

ARTICLE II

The party of the second part agrees:

1. To deliver all scheduled, extra or special passenger cars to the party of the first part in good operating condition.
2. To report promptly to the party of the first part all accidents occurring out of the operation of cars under this agreement known to the party of the second part, and to assume and pay any and all expense caused by failure to make such reports.
3. To furnish, monthly, to the party of the first part schedule of regular runs and to report any changes therein promptly to the party of the first part.
4. To report, daily, all trips of extra and special cars and to forward trip-sheets and registed readings to the party of the first part each day.
5. To pay 50 cents per car for each day or part thereof any of its cars are stored on the property of the party of the first part.

ARTICLE III

The parties mutually agree:

1. That this agreement shall be for a period of five years, ending Nov. 30, 1927, and shall cease and terminate with that day.
2. That this agreement shall inure to the benefit of and be binding upon the parties hereto, their respective successors and assigns.
3. That the party of the first part shall receive not less than 35 cents for each car-mile operated under this contract and not more than 35 cents unless the earnings on such operation in any one year of this agreement shall exceed 40 cents per car-mile.
4. That the cars covered by this agreement are to be equipped with couplers and manned by crews acceptable to the operating officers of the party of the first part.
5. That all motormen and conductors operating cars under this agreement shall be under the immediate jurisdiction of the party of the first part, and discipline imposed by the party of the first part shall be final.
6. That all invoices shall be paid on or before the 20th of the month following the operation for which invoice is made.
7. That each party may have access to the records of the other so far as they relate to the carrying out of this agreement.
8. That this contract shall not be binding upon the Cleveland Railway unless and until approved by the Council of the city of Cleveland.

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Carrying Safety to the Public—III*

How the Schools May Be Used as a Means to Reach the Entire Community—Proper Methods of Instruction of First Importance in Effective Safety Teaching

By C. W. Price
Vice-President in Charge of Public Safety,
Elliott Service Company, New York City

Safety Is Used Effectively as a Subject in the Drawing Class

IN ANY effort to reach an entire community with the safety idea, the secret of success is to utilize the existing civic agencies. The public and parochial schools offer by far the most effective agencies through which to impress large numbers of people. Half of all that can be done to reach not only the children but the adults will be done through systematic, daily instruction in safety in the schools. Electric railway executives long have appreciated the value to them of safety instruction.

For ten years safety had been taught in a systematic way in many schools, but with no appreciable results in reducing accidents. The method consisted usually of a ten-minute talk once a week, and a few posters.

Dr. E. George Payne of the department of Sociological Pedagogy of New York University first developed a successful plan of safety instruction in 1918 in the schools of St. Louis. More recently he has prepared complete material covering safety instruction, for the use of superintendents and principals, and monthly leaflets for teachers. This material is based on the experience in many schools in which successful work has been done.

The Payne plan does not add another subject for study to the already crowded curriculum; it provides for the use of a safety material in each of the studies already included. To illustrate: at least once each week in the drawing class each child designs a poster on safety. I have seen posters illustrating every kind of hazard, from putting up a stove pipe while standing on a step ladder, to the right and wrong ways of alighting from a street car.

In the writing lessons the children copy such sentences as this: "When I start across the street, I look to the left, and when I get to the middle of the street, I look to the right."

Safety material, so the educators testify, lends itself to the teaching of reading and composition better than many of the standard kinds of material. It is found that in this use of safety material, the children get just as much drill in drawing, writing, reading and composition, and at the same time get valuable suggestions in safety.

In each school room a safety patrol, consisting of three to five children, is appointed to help keep its room on the banner list for freedom from accidents. One of the duties of this patrol is to guard the streets when school is dismissed, and to warn the children against crossing the streets when cars or automobiles are approaching.

In the schools of Cincinnati there are 13,000 "Safety Guards." Each child has been pledged individually to do three things: play safely, warn others, and, if opportunity offers, save human life. Some months ago a mother stepped out of her door and saw her two-year old baby boy toddling out on the railroad track. Then she saw that he had caught his foot in the frog. She looked up the track and saw a freight train backing down toward the child. She lost control of herself and

*The third of a series of ten articles.

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began screaming. A boy 200 ft. down the track heard the screaming, rushed up, grabbed the child, tore the sole off of his shoe and rescued the little fellow just before the train reached him. Some one asked the boy, "Johnny, how did you come to do it?" He replied, "Well, I was playing down the track. When I heard the mother scream, I turned round and noticed the child, and I saw he was going to be killed. Then I remembered that I was a safety guard and had promised to save human life."

Now that boy had not only got the safety idea into his mind, but he had put into his very soul the sort of courage and unselfishness which we need in our future citizens.

Through the use of safety material in at least one study each day, and through the activity of the safety

This "Safety Patrol" Shows How Even the Smallest Kiddies Can Get the Idea

patrol, safety is made an active and vital part of the child's daily life. This is the secret of the success of the plan.

Three facts stand out in the experience of hundreds of schools in which safety instruction has been given successfully during the past four years:

First: Accidental deaths to children of school age have been reduced materially. In St. Louis, for instance, forty-nine school children were killed in 1919, and only twenty-five in 1922, in the face of a 45 per cent increase in automobiles. In Detroit deaths to school children were reduced from ninety-six to thirty in two years. In both of these cities systematic safety instruction was made a part of the school curriculum.

Second: Safety material has proved to be more vital, more interesting to the child, and more valuable from the standpoint of the education of the child, than the old material. The introduction of safety instruction is quite in line with the modern development of pedagogy. More and more the demand is coming among progressive educators for material which is vital and familiar to the child's daily life.

Parents are demanding that their children be equipped not only to cope with the environment in which they will live as adults, but with the present environment in which they are living as children. The prime consideration is to train the child, first, to preserve his life and limb, and second, to conserve his health.

Educators are also seeking to train the children in good citizenship. This can be done only by allowing the children to participate actively in work for the improvement of the community. Safety lends itself admirably to this training, better than do most other activities in which the children can engage.

Third: The most direct and effective means thus far discovered of reaching and convincing the adults of a community is through the message carried home by the school children to their parents. It is found when safety has been made a vital part of the daily school life, the children become enthusiastic advocates of safety in the home. Parents who might be indifferent to an outside appeal seldom will turn a deaf ear to the appeal of their own children for safety.

Employers of labor were among the first to see the far-reaching value of safety instruction in the schools. They not only saw its vital bearing on public safety, but also its direct effect on industrial safety, appreciating that if the workmen were reached through their children and impressed with the safety idea, they would come back to their place of employment not only interested in safety as employees but as fathers and citizens convinced of its necessity.

Because of the widespread interest in most communities in safety, especially traffic safety, it is comparatively easy to persuade school authorities to adopt some form of safety instruction. It is much more difficult to persuade them to install the right plan of instruction, using safety material in the studies and organizing safety patrols. Unless they are fully informed regarding the details of the method, and are convinced that it is practical to make safety a vital part of the curriculum, they may adopt some poorly-planned method which will not get results. It is, therefore, advisable to place in the hands of the school authorities full information regarding the methods used and the results achieved in other cities.

It is found that many teachers are willing to teach safety, but are unable to do the most effective work unless suitable material is furnished. The Washington Safety Council has adopted a plan of furnishing a monthly bulletin to each teacher in the public and parochial schools. This bulletin contains a complete analysis, by causes, of the accidents of the previous month, along with a half dozen stories of accidents to children. Suggestions regarding points to be emphasized, and items regarding what various schools are doing, are also included.

What Is a Living Wage?

The Chairman of the Labor Board Tells Why It Did Not Attempt to Answer that Question

MUCH has been said about the need of a "living wage" in arbitration hearings during the past five years, but those who have attempted to decide impartially in dollars and cents just what this wage is, under American conditions, have found the task a difficult one. To begin with, the expression may mean to some people bare subsistence, to others it implies a greater modicum of comfort, while to a third group it may be considered to be an income sufficient to insure such savings as will provide support during ill health and old age. It is interesting, therefore, that Ben W. Hooper, chairman U. S. Railroad Labor Board, contributes an article to the June issue of the *Nation's Business* in which he discusses the entire subject, as it has been presented to that board.

It seems, to quote from Mr. Hooper's article, that during the railroad wage arbitrations the board was asked to fix for the unskilled and lowest-paid worker on the railroads a wage sufficient to maintain a family of five in health, decency, and reasonable comfort, and above this basic living wage to establish differentials for the higher grades of railroad workers, according to skill, hazard, responsibility, experience, training and productive efficiency. Thereupon, representatives of labor organizations presented budgets for such living, varying from $1,750 to $2,637 a year, with a figure prepared by the Bureau of Labor Statistics, $2,133, part of the way between. These budgets were intended to cover only the basic wage which common labor required under the conditions specified. It was discovered, however, that when

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the lowest of these scales was used for calculation, with the existing percentage differentials maintained for skilled labor, that their payment would have meant an annual deficit on the railroads of more than two and a quarter billion dollars, on the basis of the revenues of 1921. Still further calculation showed that if this annual income of $1,750 had been received by each of the 25,000,000 families in the country, and it was thought that the employees of other industries were as justly entitled to it as were the railway employees, the total would be somewhat in excess of the latest estimate of the total annual income of the people of the United States. Finally, it was found by calculation that if the 25,000,000 families in the country should receive the highest scale mentioned for common labor, or $2,637, the total would be nearly $26,000,000,000 in excess of the country's total income. Mr. Hooper naturally says in his article in this connection: "Wonder where the excess would come from!"

These figures naturally led to a recast of the entire situation.

In the first place it was found that according to the census of 1920 there was in each family in the country an average of only 4.4 persons and not 5, an average of only 1.4 dependent children under sixteen years of age and not 3, and an average of 1.36 male workers instead of 1, as assumed in a number of the budgets submitted to the board. The facts were also realized that the common laborer does not always have to remain in that capacity, that some of the comforts and conveniences which he might like to have necessarily must be deferred until thrift has resulted in accumulation, and a fair degree of contentment and even happiness may be enjoyed with a low wage under conditions of self-denial.

Finally, it was also pointed out that the transportation law, under which the board was appointed, does not require the board to determine what constitutes a "living wage," but wages that are just and reasonable, and Mr. Hooper points out that these words imply a wage which is just both to the railroad and the employees and consequently to the public at large. In conclusion, he says, in part:

> It is by no means my purpose to indicate that laboring men on the railroads or elsewhere should be discouraged from rational efforts to improve their wages and working conditions. Standards of living have gradually advanced in this country and must continue to do so. It must not be forgotten, however, that the worst legacy left us by the war was that of wasteful and extravagant habits of living in all classes of our people. These cannot be expected as the normal standards of sensible and wholesome living.

Belt Lines Abandoned and Through Routes Established

Second Section of Beeler Report Recommends Revision of Practically Every Route in New Orleans—Four Through Routes, Seven Crosstown Routes and Express Service Are Features—Traffic Conditions Will Be Simplified

AS MENTIONED in the digest of the Beeler report on the New Orleans street railway situation published in this paper April 28, the survey included a plan for extensive rerouting of lines. Four main features will be accomplished by the rerouting. A set of through cross-city lines will be established, connecting important residence districts with industrial centers. These are the Tchoupitoulas-Gentilly, Tulane-St. Claude, Claiborne Avenue and Napoleon-Broad lines. At least three of these lines undoubtedly will prove to be most important factors in the future growth of the city. Independent crosstown lines will be established, giving a type of service better fitted to the needs of the population and acting as feeders and distributors for the inbound and outbound lines. Express and semi-express service will be provided on certain routes, which have the advantage of operating over "neutral ground" for the greater part of their length, thus assuring more rapid transportation on certain important routes. In addition to the changes, the proposed routing will extend service into a dozen or more localities now entirely without or with only very limited facilities.

The proposed routing plan shows great simplification over the present. The turning movements are less and interlocking and duplication of routes are reduced. By operating crosstown lines exclusively as such, instead of endeavoring to furnish this kind of service with the ends of through lines, the proper type and amount of equipment can be placed where it will do the most good.

The length of route has been reduced, the average round trip distance of each of the present routes being 9.03 miles, and of the proposed route 8.34. The length of run between layover points is reduced from the present figure of 7.37 to 5.73 miles.

According to the report, the present routing plan shows a duplication of routes in some localities and a lack of facilities in others. A futile attempt is made to give crosstown service by extending tail ends of trunk lines, accommodating a few at the expense of many. The belt lines, too, have a tendency to limit expansion, and their unbalanced loading is an objectionable feature. Many of the routes are indirect; their devious windings slow the car service and conflict with the movements of general traffic. The city of New Orleans has outgrown a system of routing that requires all car lines to concentrate in one heterogeneous tangle in the congested area.

The unequal distribution of service under present conditions is shown in the accompanying routing diagram. Some twenty-six lines are operated, all but one of which reach or run on Canal Street.

DETAILS OF THE PLAN

The most striking feature in this routing is the breaking up of two old-established belt line systems, the St. Charles and Tulane Avenue on one side of the city and the Canal Street and Esplanade Avenue on the other side. It was found that the traffic on these belts was badly unbalanced and that much service was being wasted on the light sections in order to handle the

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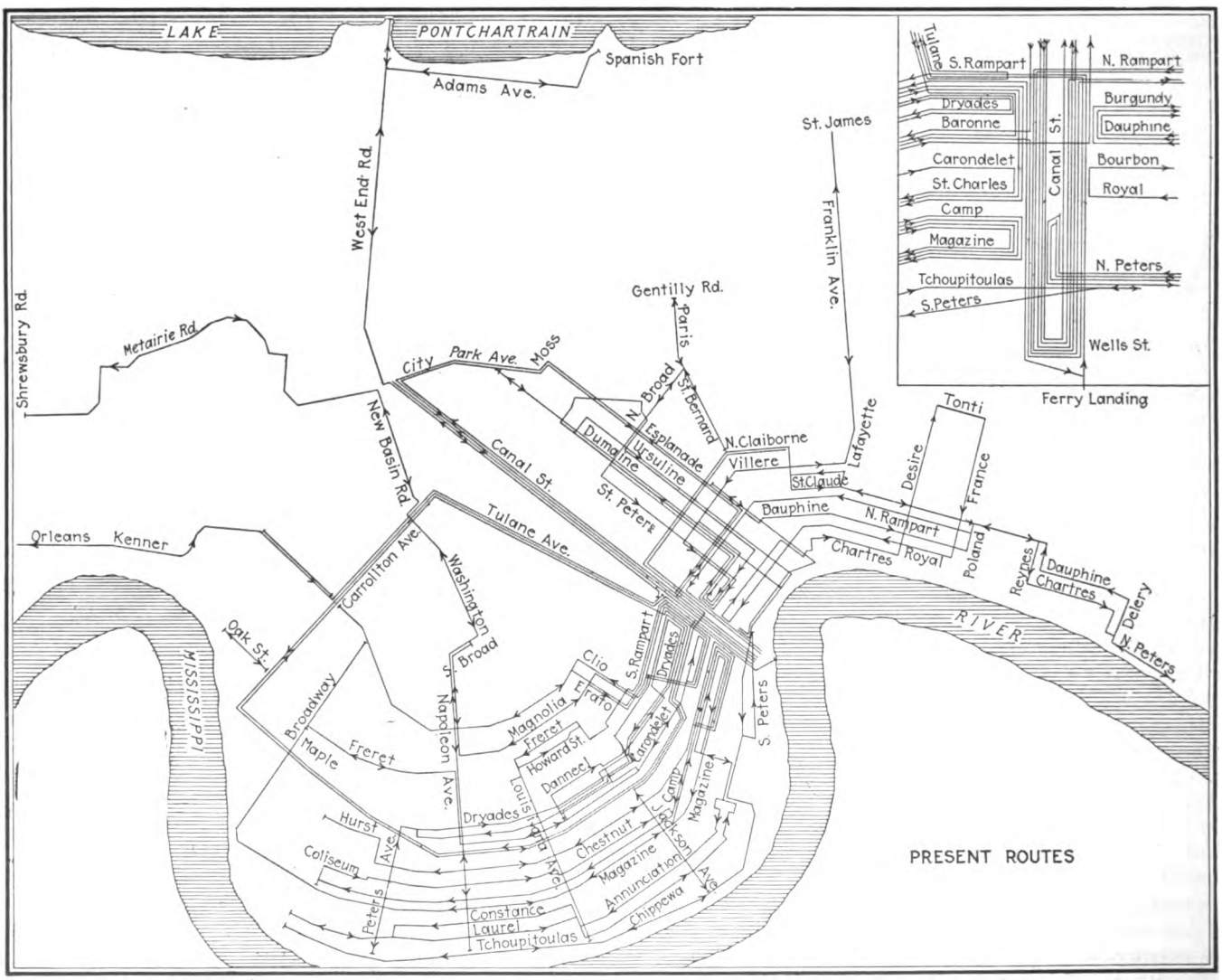
business on the heavy sections. The proposed Tulane-St. Claude Avenue through line, which will take over the Tulane side of the St. Charles-Tulane belt, connects a very heavy residential district on the uptown side of the city with a large industrial district in the downtown section. In the past there has been a great deal of transferring in the vicinity of Canal Street, and it is anticipated that the establishment of this through line will reduce that to a minimum.

The Canal Street line, formerly one side of the Canal-Esplanade belt, will be given an independent service that may be more readily adjusted to care for the heavy volume of traffic here. It will be free from the difficulties at present encountered from the unbalanced traffic on Esplanade Avenue and the still lighter travel on City Park Avenue. Semi-express service is recommended for this line, the stopping places being two to three blocks apart.

The other side of the present belt line, operating principally on Esplanade Avenue, will be given a separate route coming in on Dauphine street. It will make a one-block loop on Canal Street and go out on Burgundy Street. This will be a much lighter line than the Canal Street line and better fitted to the needs of its territory.

St. Charles Avenue, formerly covered by the St. Charles-Tulane belt line, will be given independent service by a new route operating on St. Charles Avenue from Carrollton Avenue to Canal Street. This route, operating midway between the river and Claiborne Avenue, is undoubtedly destined to be, considering its length, the heaviest car line in the city. It traverses for its full length the city's best residential section, affording direct connection to the retail business district. The population served is large and growing. Except for the comparatively short distance between Canal Street and Lee Circle the tracks are in the center of the "neutral ground," or center parkway, and free from all interference of street traffic except at the cross streets. Advantage should be taken of this condition to establish express service on this line. This will have many of the advantages of real rapid transit service, without some of the numerous disadvantages of an elevated or subway line. The location of the stopping places will have to be revised on St. Charles Avenue. From Carrollton to Lee Circle, a distance of 4.5 miles, there are at present seventy-six stopping places, or practically seventeen to the mile. It is proposel to reduce these to twenty, averaging a little more than a quarter of a mile apart. This will permit an increase in the schelude speed of 50 per cent in this section.

The general layout of the majority of the other lines will not be radically different from what it is at present, although a number of rearrangements of tracks have been made in order to eliminate unnecessary lines and to straighten out the remainder to give better distribution. The proposed changes in the track layout were



Present Routing of New Orleans Street Car Lines

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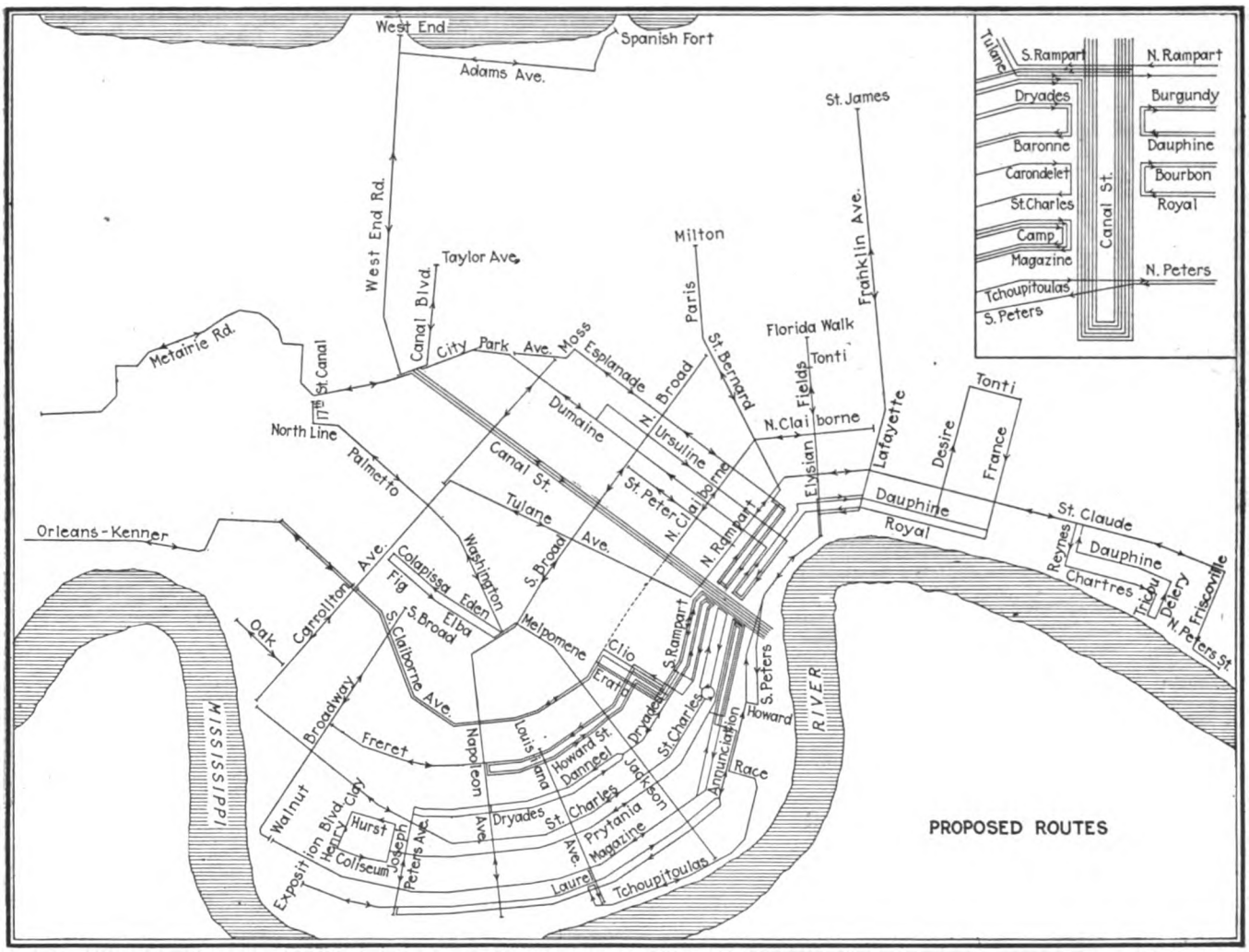
described in the April 28 issue and are shown in the map on page 717.

Apart from the through lines, the service reaching the business district will, in the main, be given by a series of lines terminating at or on Canal Street, as at present, but including a rearrangement which permits a material simplification of the Canal Street tracks. This is treated in a later section of the report.

A number of crosstown lines are recommended in addition to the through lines, which in themselves give a good deal of crosstown service. There are seven of these lines proposed, some of which are on existing tracks and some on tracks recommended for construction. They are the Carrollton Avenue, Broadway, Napoleon-Broad, Louisiana, Jackson, St. Peter and Elysian Fields lines.

Two lines operating beyond the main portion of the city have been given special treatment. The Spanish Fort line and the Orleans-Kenner interurban, which now terminate on South Rampart Street, just off Canal, are serious factors in the congestion at that point. It is recommended that the Spanish Fort line be continued down Canal Street to the river, where ample facilities for layover storage of trains required for the heavy excursion business are provided by the Wells Street loop and extra tracks at the foot of Canal Street. It is recommended that the Kenner interurban be terminated in the spacious neutral ground on Howard Avenue. This would give the interurban line an extension to the central portion of the city without interfering too much with the local street cars and the general street traffic. This routing would also be more convenient to the majority of the riders. It would, of course, require the Orleans-Kenner line to change its track gage to 62½ in. from the present standard gage of 56½ in.

One feature of considerable importance is a rearrangement of traffic direction on the streets adjacent to Canal Street. Numerous plans have been tried in the past few years, but no comprehensive arrangement has been provided that will take care of the growing traffic. The report proposes that the streets from Rampart to the river alternate in traffic direction, and that the street cars follow the general direction of traffic. This has been extended so that the same traffic direction will apply on both sides of Canal Street. In the past in some cases the traffic has been reversed on the opposite sides of Canal Street, thus reducing the value of these streets. Baronne Street, which has been a two-way street, will be made to conform to the general plan. This necessitates the removal of the St. Charles Avenue line from this street, to which it has been confined because of the use of standard gage tracks. The St. Charles line, it is recommended, should enter the city in the downtown direction on Carondelet Street and return on St. Charles Street. This rearrangement of routes from the uptown section will equalize the street car traffic on these various streets and should reduce congestion materially.



Routing for New Orleans Proposed in Beeler Report

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Federal Judge States Situation Impartially

While Ordering Receivers of Kansas City Railways to Rebuild Half-Million-Dollar Elevated Structure, Judge Kimbrough Stone Explains Clearly Why Railways Should Not Be Required to Carry Unnecessary Burdens

AN ELEVATED structure, owned by the Kansas City Railways and connecting the two Kansas Cities across the "West Bottoms" and the Kansas River, was recently condemned and railway service across it was discontinued in December, 1922. The railway, however, has been giving a partly equivalent service over the "Inter-City Viaduct" owned by the two cities. For this privilege the receivers pay $30,000 per year.

On May 10, Judge Kimbrough Stone of the United States District Court for the western division of the western district of Missouri, on complaint of the Kansas City Refining Company, and after proper hearings, ordered the reconstruction of the elevated structure at a cost not to exceed approximately $500,000 and on condition that the two cities relieve the railway of any obligation to use the viaduct and pay rental for the privilege of using it.*

Accompanying the order Judge Stone explained explicitly the local conditions leading to it. He pointed out also that as a general proposition the burdens placed upon an electric railway property which have no relation to the furnishing of its service to the public should be removed. These burdens consist of paving, viaduct building, street cleaning, license taxes and other like exactions. An abstract of part of his statement follows:

In the long-buried past exactions such as those mentioned were excusable if not, indeed, justifiable, but the conditions upon which such exactions originally rested have forever disappeared. Then every one used street cars because there was no other general means of city travel and the street railway companies, because of lack of strict regulation as to fares and earnings, could and often did make considerable earnings upon the investments. Under such conditions it was not unfair, either to the public or to the companies, to require payments of this character. They, usually, came out of the surplus earnings and constituted a form of indirect taxation.

Now, close public scrutiny and regulation of capitalization, earnings and fares prevent the companies from earning more than reasonable returns, even if street railway business conditions were such as to permit earning a surplus beyond such reasonable returns. But the business conditions now and permanently surrounding this business have affected and will continue to affect drastically the earning power of street railways. These changed business conditions are caused primarily and chiefly by the enormous use of private automobiles. The important effect of this element is shown by the circumstances that although the receivers of the Kansas City Railways are operating more cars over as much or more mileage as used in 1917 (shortly before the more general use of the private automobile began to be felt) and although the service is good and the public feeling toward the receivers seems favorable, yet the earnings, in subsequent years, of the business have never equalled those of 1917. In these two cities of approximately 500,000 people there are more than 50,000 licensed automobiles. Most of these are in daily use and much of that usage replaces what would otherwise be street-car travel. As the poorer classes of citizens only are compelled to use the street cars, the indirect taxes, such as those referred to above, now fall upon only a portion of the community, and this portion is made up largely of those least able to bear tax burdens. Therefore, these exactions are unfair and unjust to the public. Also, they aid in preventing, if they do not in themselves prevent, reductions of fare. In some cases they may necessitate raises in fare. They affect fares for the following reasons: The companies are entitled to receive a reasonable return on the fair value of the investment; the courts will enforce this constitutional right; the private automobile has made it very difficult for street railways to earn this reasonable return; the only substantial source of revenue is the fares; therefore, any substantial payments taken by the cities from the fare revenue are likely to be reflected in the rate of fare.

Under present and, so far as can be seen, future conditions there is but one way to secure for the people this transportation so vital to them and these communities, and to secure it upon a basis fair alike to public and serving company. That way is to relieve the business and its patrons from all of these burdens; let it confine its expenditures to furnishing good service and to paying those general taxes which all must bear; closely supervise service with a view of making and keeping it good; closely supervise all expenditures to secure economy in operation; closely supervise net earnings with a view of confining such to a reasonable return upon the fair value of the property; keep fares at the lowest point which will furnish the required service and the reasonable return.

*Exceptions to this order were taken by the Continental & Commercial Trust & Savings Bank and E. F. Swinney, trustees under the first mortgage or deed of trust Appeal was allowed to the Circuit Court of Appeals for the Eighth District and the appellants are given until June 10, 1923, to file assignments of error and bond.

How a Railway Can Help Out in an Emergency

THE accompanying views show how obsolete cars proved useful to house many members of a district devastated by fire. Last October an area of approximately 1,200 square miles in the woodlands some 300 miles north of Toronto, known as the Haileybury district, was swept by a forest fire, which rendered many of the inhabitants homeless. A committee known as the Northern Ontario Fire Relief Committee was organized, and eight days after the fire began, or on Oct. 12, the committee shipped to Haileybury eighty-five old cars which were formerly operated by the Toronto Railway to assist in providing temporary shelter to some of the families.

The views published below show three of the cars after they had been placed and fitted up with shades and stoves and otherwise made suitable for improvised houses for the refugees.

These Cars Made Very Comfortable Homes, Even in a Northern Latitude, in a District Which Had Been Swept by Fire

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The Readers' Forum

More About Pavement Heaving Outside of Track Area

LEHIGH VALLEY TRANSIT COMPANY

ALLENTOWN, PA., May 8, 1923.

To the Editors:

The track construction described by A. Swartz on page 769 of the issue of the ELECTRIC RAILWAY JOURNAL for May 5, 1923, while very substantial, would seem not to take care of frost penetration along the edge of the adjoining highway. Mr. Swartz's letter was brought out by an article in the April 21 JOURNAL, page 677, in which certain construction in Allentown was described.

It is also a question whether the seepage that must occur within the track area and along the rails is taken care of, as no mention is made of any center drain to serve as an outlet.

We feel that the curb wall, to be effective, must be wholly outside of the track area, constituting a part of the adjoining roadway. The cost of this would be a part of the cost of the roadway, whereas in the case described by Mr. Swartz the railway assumes the full burden of what would seem to be rather expensive construction.

C. C. SMITH,
Engineer of Maintenance of Way.

[EDITORS' NOTE.—Mr. Smith's letter was forwarded to Mr. Swartz, who replied as below.]

TOLEDO & WESTERN RAILROAD

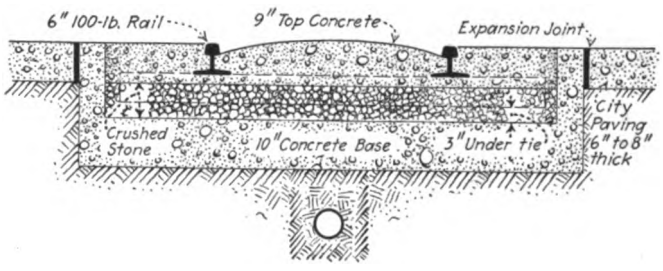
SYLVANIA, OHIO, May 15, 1923.

To the Editors:

I take pleasure in replying to the questions raised in Mr. Smith's letter as follows:

When I wrote the letter published in your issue for May 5 I was under the impression that the construction used in Allentown was practically identical with that which I described, but believe now it is not quite the same.

Our construction is shown in the accompanying cross-section, where it will be noted that we first built a



Cross-Section of Concrete-Trough Track Construction

trough in the shape of a channel which is entirely separated from the adjoining pavement on either side by means of the expansion joint. Theoretically, the cost of the curb wall ought to be a part of that of the city pavement, but our idea in paying for it was that if there should be any bad results to the paving outside the track the expansion joint would make so distinct a line of demarcation that there would be no question as to which party was responsible for the results.

The additional cost due to the use of the curb is not great, and most municipalities would be willing to assume a portion of its cost and that of the expansion joint. I believe that the village of Metamora, mentioned in my letter, did assume a portion of this cost.

As for the frost penetration of the edge of the trough, the greatest detrimental results would be to the adjoining pavement and not to the track pavement. The railway company has no interest in the outside pavement if the municipality does not make its pavement of such depth as to resist frost.

As the Toledo & Western handles heavy freight traffic, the construction is so substantial that the bottom of the foundation is approximately 25 in. below the top of the pavement. This is below the average frost line in streets.

To take care of the seepage in the track area, we put in drainage outlets in the center of the track at intervals. In places where the subgrade is soft, it would be advisable to lay a drain tile in the center of the track strip, covering it with cinders and connecting it with the drainage outlets where they occur.

A. SWARTZ,
Manager for Receivers.

Number of Conductors on Three-Car Train Is Purely an Operating Question

DEPARTMENT OF STREET RAILWAYS

DETROIT, MICH., May 22, 1923.

To the Editors:

We note in your issue of May 12 the question of the number of operators required for our contemplated three-car-articulated train has brought forth some comment, and while we may overlook a bet sometimes, we have not in this instance. We cannot conceive at present of a more flexible unit for operator economy, as there is a free inclosed passage from car to car, thus allowing the placing of the three cars in charge of but one conductor. The number of conductors to be used is purely an operating matter, and will probably be determined after a careful study of traffic conditions, but if the maximum was decided upon there would still be a slight saving in man-power.

It may eventually be found that the density of traffic has some bearing on the advisability of reducing operator power to the minimum. On this question the past affords some guidance. Thus, when the first electric cars were found inadequate from the standpoint of size, there was an immediate switching to the heaviest street cars that could be built. When these were found to be expensive to operate, the other extreme in the single-truck safety car was supposed to end all trouble, regardless of service conditions. Experience with it hardly proves this to be true. The principle of determining the proper sphere of usefulness for the various ideas and using them in their places would have saved some money and worry in the past and perhaps may apply in the one-man car situation.

A. C. COLBY,
Superintendent of Equipment.

The Detroit municipal railway is putting in the hands of all its carhouse foremen a blueprint book giving miscellaneous information of help to them in specifying parts which they use. This information includes the names of parts of the trucks and car equipment which might give out, a list of the fuses used, etc. The purpose is to have a standard nomenclature on the system for these parts. The pages measure 8½ in. x 11 in.

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Association News & Discussions

Collisions as the Motorman Sees Them*

Education of Automobile Drivers and Electric Railway Employees Is Necessary if the Collision Evil Is to Be Controlled—Author Makes Concrete Suggestions

By Elton S. Wilde
General Manager Union Street Railway, New Bedford, Mass.

BEFORE discussing this topic let me submit, as a basis, the following figures obtained from the experience of the company with which I am associated:

MILES OPERATED PER ACCIDENT

	1910	1915	1920	1922
Car collided with auto driving out of intersecting street, driveway or garage	435,948	62,841	44,615	47,259
Auto driving out of intersecting street, driveway or garage collided with car	116,252	58,830	29,171	26,300
Car and auto going in opposite directions on straight track collided	348,758	95,346	32,622	37,807
Car and auto going in same direction on straight track collided	1,743,791	106,347	19,080	20,163
Car while going around corner, taking curve or turnout, collided with auto	249,113	230,419	50,564	57,067

To the classification "passenger car and automobile going in same direction on straight track" is assigned the cause of most of our auto accidents in New Bedford. These accidents, I may add, are caused mostly by our extremely narrow streets. Automobiles park alongside our tracks. Then without warning they turn into the track area, and we are very lucky if we only hit the automobile turning onto the track, for usually the one we hit is pushed or jammed into a second automobile parked ahead of it, thus causing damage to two automobiles.

I am sincere when I give as my opinion that the drivers of automobiles are more alert in preventing accidents today than the old time wagon driver. The old time driver had a partner in his horse, sometimes good and sometimes bad, but taking the automobiles and horse-drawn vehicles on an equal basis as to numbers I would rather take my personal chances with the automobile.

The analysis of Chauncey Hubbell of the State Registry of Motor Vehicles is interesting and bears out our own experience. He claims that in 1919 the ratio of deaths to automobile registration was 0.00223 and in 1922 it was 0.00113. In 1919 the same ratio was 0.06243 and last year it was 0.0331.

Holding no brief for the automobile driver and being on the other side of the fence, I don't know that I should cite these favorable figures. In order that we might get first hand information on "Collisions as the motormen see them" I requested some of our motormen to state their views, and here are some of their replies:

"Of all the causes of collisions with autos, it seems to me that high speed on the part of one or both operators is the most frequent. If one is careful he usually can save the other fellow, but when both are speeding no amount of skill can save them. Defective brakes are another cause. This applies almost wholly to the auto, for except at times of slippery rail the motorman, with the aid of a level head and plenty of dry sand, can generally stop where he likes. Inattention to duty is often the cause of collisions. The motorman or the auto driver may be looking behind him or have his mind diverted to something else. Before he knows it an accident has happened."

"The cause of a great many collisions with automobiles is the carelessness of the automobilist who will not wait a few seconds. For example, an auto and a trolley car are going north and an auto parked on the street tries to cut between another auto and the trolley car. The motorman may bring his car to a slow pace, but this cannot be done in all cases, for the trolley car sometimes is speeding so fast that the auto driver 'shoots' across the track and causes an accident. Accidents usually are due to negligence of one of the parties; therefore, one must be always on the alert and not take any unnecessary chances. Autos are often started from the curb without first giving any signal."

The auto and auto driver do create new problems for street railways and I feel the main cure is education, not only for chauffeurs but for our own employees. It is a fifty-fifty proposition. Everything in safety propaganda pays. The employers have a duty. Employees will lose interest and enthusiasm in any accident prevention movement if the management is indifferent.

All faulty equipment should be eliminated or corrected.

Managers of street railways should co-operate to try and establish Federal regulations, more particularly as to traffic laws. The obligations and rights of the driver and the pedestrian should be definite and should be uniform in all states. Who can tell whether it is permissible in the next town to pass a street car on the left side, turn in the middle of the block or run by a standing car? Managers of street railways should co-operate with safety councils toward abolishing the parking on car lines in the business district.

I would recommend a Federal law so that all gear shifts would be uniform; that is, I would have the gear shift of the Buick car, for instance, identical with the Cadillac and all other makes of cars. I would recommend that the registrar of motor vehicles in sending out license plates and operators' licenses accompany them with pamphlets preaching the gospel of safety. I would also recommend that the executives of street railways co-operate with their local Chambers of Commerce and endeavor to induce them to organize and maintain safety councils as a part of the organization.

*Abstract of address at the second annual conference of the Massachusetts Safety Council, Springfield, Mass., April 25-26, 1923.

Specifications for Paint Pigments

SPECIFICATIONS for analysis of white, yellow, orange, red and brown paint pigments containing iron and manganese, and of dry red lead, have been approved as tentative American standards by the American Engineering Standards Committee. They were presented by the A.S.T.M., which has been designated as sponsor for these specifications. The specifications include methods of determining specific gravity, tinting strength of the color pigments and moisture, and detailed methods for various chemical determinations.

National Investigation of Coal Situation

THE Federated American Engineering Societies have appointed a committee to direct a national investigation of the storage of coal in co-operation with the United States Coal Commission, the Department of Commerce and the Bureau of Mines. W. L. Abbott, chief operating engineer Commonwealth Edison Company, Chicago, Ill., is chairman. The main committee will work through state committees, studying local conditions through local engineers in an effort to find a solution for the problems of coal consumers, from the small household to the largest industry.

The factors involved include the question of financing and providing means whereby coal in storage may be used as collateral; amounts of coal consumed

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at different periods, particularly by industries; provision by industrial organizations to aid the workers of the nation in securing coal supplies during the summer at a low cost; methods of handling and storing; effect of storage on the heating value of coal; transportation facilities; allaying labor unrest, and reducing the number of mines and miners.

The first full meeting of the engineering investigating committee was scheduled to be held in Washington, D. C., on May 25, and a preliminary report on the progress of the inquiries will be submitted to the executive board of the American Engineering Council, the executive body of the Federated American Engineering Societies, at a meeting to be held in St. Paul, Minn., on June 8 and 9.

Public Utilities Advertising Association

ACCORDING to a statement by W. P. Strandborg, Portland, Ore., president of the recently formed Public Utilities Advertising Association, his organization will hold a formal get-together business meeting in connection with the annual convention of the Associated Advertising Clubs of the World at Atlantic City, June 3 to 7. The organization is now an official member of the Associated Advertising Clubs' family, and one of the twenty-three departments in the National Advertising Commission. At the convention there will be three formal sessions, on Tuesday morning and afternoon, and Wednesday morning. At the Tuesday sessions there will be addresses of importance from the standpoint of public relations and technical advertising, while the Wednesday morning session will be devoted to the business affairs of the association.

Among the speakers who have already agreed to address the meeting are P. H. Gadsden, vice-president United Gas Improvement Company, Philadelphia, Pa.; Francis H. Sisson, vice-president Guaranty Trust Company, New York, N. Y.; W. H. Boyce, general manager Beaver Valley Traction Company, New Brighton, Pa., and Grover T. Maxwell, former secretary Ohio Public Service Commission. There will also be talks by a number of members of the association, giving the results of their experiences in publicity work.

Annual Convention of Southwestern Association

THE Southwestern Public Service Association and the South Central Gas Association closed their three-day annual conventions, held jointly, in Fort Worth, Tex., on Thursday, May 17. Joe H. Gill, general manager Dallas Power & Light Company, was elected president of the Southwestern Public Service Association, which hereafter will include the South Central Gas Association, the latter having been merged in the larger organization. Other officers elected are C. B. McKinney, Dallas, first vice-president; H. E. Bolton, Calvert, second vice-president; George I. Plummer, Dallas Railway, third vice-president; F. J. Gannon, Fort Worth, treasurer. The selection of the convention city for next year as well as the election of a secretary was left to the executive committee.

New members of the executive committee are: G. W. Fry, Abilene; F. M. Hoag, Dallas; E. T. Keck, Dallas; C. M. Armbruster, Shreveport; H. B. Flowers, New Orleans.

Resolutions of regret at the death, during the year, of Judge M. B. Templeton of Dallas, one of the founders and at the time of his death a member of the general counsel for the Texas Electric Railway, and of Charles Dillon, of the Shreveport Traction Company, were adopted at the closing session.

More than 200 executives and other officials of utility companies in the Southwest were present when the convention was called to order Tuesday morning by R. J. Irvine of Jacksonville, Tex., president of the association. The president in his annual address attacked the use of improved highways by motor trucks in the transportation of freight and passengers as wasteful competition with the electric and steam railways.

Mr. Irvine stated forcefully that the hard surface highways were being destroyed by heavy hauling, and that millions of dollars of the money paid in taxes by the public generally was going to enrich the few motor truck operators who paid little or no taxes. The principle of taxation for highway construction and upkeep is wrong, he said, declaring that those who use the highways most should be made to pay most for them.

"Where our highways parallel steam railways and interurban lines, and are used to carry freight and passengers for hire, the detrimental effect is to reduce revenues of those companies which pay a very large portion of the original cost of highway construction and also most of the cost of maintenance. Such abuse of our highways renders them unsafe and unfit for the purpose intended," Mr. Irvine declared.

In discussing dealings with the public, Mr. Irvine declared that he is inclined to assume the attitude that the public is always right and charged those attending the convention to be attentive to small grievances and seek to establish a thorough friendship for their company.

The speaker also dealt with the use of electric motor trucks in handling of house to house deliveries and asserted that electric trucks will show a great saving over gasoline-driven trucks for such service and that the greater the number of stops the greater the saving that will be shown.

The second day of the convention was given over largely to a discussion of the relations between the public utilities and the general public, and all the speakers stressed the importance of maintaining close and friendly relation with the public. W. B. Tuttle of the Public Service Company of San Antonio was chairman of the session, and introduced H. B. Abell of New York, chairman of the committee on public utility information of the National Electric Light Association. Mr. Abell pointed out the necessity for concerted efforts on the part of all utility companies to keep in close contact with the public and the advantages of adjusting all differences promptly and satisfactorily.

"The public and the newspapers," he said, "should be curious for the facts, but should not be suspicious. Their greatest interest is in good service and a fair price."

He referred to the cries of men whom he styled as "demagogs," who, he said, are continually crying that utilities abrogate their contracts and he asserted that public utilities are in a vulnerable position for adverse attacks by such men. He attacked unregulated competition and suggested education as its cure.

George H. Clifford, vice-president and general manager of the Northern Texas Traction Company of Fort Worth, spoke on the subject: "Telling the Utility Story Through Utility Employees." He asserted that one member out of every twenty families in Texas is employed by a public utility, and pointed out that this fact affords great possibilities for spreading the message of the utilities among the people. He said that if utilities will take advantage of this fact the problem will be an easy one. He suggested that vocational education of employees will greatly increase the value of employees for improving public relations and will give them a better insight into their problems.

E. D. Shurter of the University of Texas and head of the American Citizenship League of Dallas declared that speakers in the schools of Texas offer an excellent avenue to spread information on the operation of public utilities and to improve public relations.

Earl H. Hodges, director of the Arkansas Public Service Information Bureau of Little Rock, in an address said that one man on a Little Rock car line makes it an absolute rule to say "good morning" to every person getting on the street car. Mr. Hodges said he found it a little boresome himself, but it is a big hit with the general public. To the average man this conductor is the company and the company is judged by him. It is important to impress people with the fact that utilities have the interest of the state at heart and desire to assist in developing it. It is important to carry out the idea that the company is interested in development as well as in dividends.

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Standardization and the Purchasing Agent

AT THE meeting of the National Association of Purchasing Agents, held in Cleveland during the middle week of May, a paper on the effect of standardization on the work of the purchasing agent was read by Dr. P. G. Agnew, secretary, American Engineering Standards Committee. He claimed that hundreds of millions of dollars could be saved annually by municipal and state governments and by the industries of this country through the unification and standardization of purchase specifications. He pointed out that industrial standardization means to single out specific products and materials, to settle upon their properties and dimensions, and to concentrate upon them in production and in use, all to the end of bringing about the greatest over-all industrial effieciency possible.

This standardization involves (1) nomenclature; (2) purchase specifications; (3) methods of tests; (4) uniformity in dimensions necessary to secure interchangeability of supplies and the interworking of apparatus and of parts; (5) provisions for safety; (6) concentration upon the best number of types, sizes and grades of manufactured products.

American Association News

Executive Committee

THE executive committee of the American Electric Railway Association met in New York on May 25. The attendance was comparatively small. Those present were President C. D. Emmons, W. H. Sawyer, C. E. Morgan, J. H. Hanna, J. N. Shanahan, L. S. Storrs, R. P. Stevens, J. H. Pardee, C. L. Henry, C. R. Ellicott, E. P. Waller, A. A. Hale, Barron G. Collier; Mr. Haskell, representing S. W. Curwen and Executive Secretary J. W. Welsh.

Mr. Sawyer, reporting for the membership committee, pointed out that there are a large number of companies which are receiving the benefits of the Association through the membership of an affiliated company, without paying any dues. This resulted in a good deal of discussion as to whether this situation should be permitted to continue and how best to correct it. On motion the membership committee was directed to study this problem and recommend some definite basis of treating the question of dues of affiliated companies, possibly looking toward an amendment of the constitution if necessary.

President Emmons suggested the personnel for the committee on nominations and the executive committee gave its approval. J. H. Pardee will serve as chairman of this committee. The other members will be announced later.

The committee discussed the advisability of indorsing the work of the National Transportation Institute. As further information was desired as to the purposes, the cost to members, and whether it meant duplication of effort, action was deferred until the next meeting of the executive committee. Meantime President Emmons and Mr. Storrs will investigate and report.

Application for membership in the association was approved for the following railway and manufacturer companies: Alabama Power Company, Birmingham, Ala.; Cumberland Traction Company, Bridgeton, N. J.; Chicago & West Towns Railway Company, Oak Park, Ill.; T. H. Symington Company, New York; Yellow Coach Manufacturing Company, Chicago.

The next meeting of the committee will be held at New York on Friday July 13.

Entertainment Committee Appointed

PRESIDENT C. D. EMMONS has appointed the following men to serve on the entertainment committee for the annual convention of the American Electric Railway Association in October:

J. C. McQuiston, manager department of publicity, Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., chairman; L. H. Palmer, general manager United Railways & Electric Company, Baltimore, vice-chairman; J. H. Hanna, Washington; C. H. Beck, New York; E. F. Wickwire, Mansfield, Ohio; F. D. Burpee, Ottawa, Canada; Martin Schreiber, Camden, N. J.; George R. Lyman, New York; J. P. Barnes, Louisville; J. V. Sullivan, Chicago; William Arthur, New Haven, Conn.; E. C. Faber, Chicago; K. A. Simmon, East Pittsburgh; C. C. Pierce, Boston; Harry L. Brown, New York; H. Fort Flowers, Findlay, Ohio; J. S. Bleecker, Springfield, Ohio; E. P. Waller, Schenectady, and Harold Hegeman, New York.

Equipment Committee Puts Finishing Touches on Year's Work

A MEETING of the committee on equipment of the American Association was held in New York City on May 17 and 18. Those present were F. H. Miller, Louisville, Ky., chairman; Walter S. Adams, Philadelphia, Pa.; L. J. Davis, Brooklyn, N. Y.; Charles Gordon, Chicago, Ill.; J. L. Gould, Wilmington, Del.; A. J. Miller, Ramapo, N. Y.; M. O'Brien, St. Louis, Mo.; E. D. Priest, Schenectady, N. Y.; E. S. Sawtelle, Cincinnati, Ohio; P. V. C. See, Akron, Ohio, and C. W. Squier, New York, N. Y. C. Bethel and W. H. Phillips, Pittsburgh, Pa., represented J. M. Hipple.

The several sub-committees submitted their final reports, the extensiveness of which showed that much work had been accomplished during the past year. The sub-committee on gearing presented a tabulation of answers received through a questionnaire, together with further recommendations for submitting data regarding the standardization of web holes in gears.

The sub-committee on trolley contact devices also is tabulating data received from a questionnaire. These will be added to the data collected during previous years.

A third sub-committee reported activity in reviewing existing standards. All the standards and specifications relating to equipment have been gone over very thoroughly and recommendations were made for bringing these up to date so as to correspond with specifications of the American Society for Testing Materials and of the American Railway Association. The sections relating to miscellaneous methods and practices involving equipment had been studied carefully and submitted to manufacturers for criticism. As these appear to be out of place in the permanent form of manual now contemplated the equipment committee's recommendation to the committee on revision of the manual is that they be omitted from the bound volume.

The study of spring supports for railway motors which has been under consideration by a fourth sub-committee has proved interesting. Much information has been collected and several recommendations for general use will be submitted, which should aid materially in overcoming difficulties experienced from various motor supports.

Recommendations for standard designs of dust guards were submitted by another sub-committee. These are in shape for final report.

This was the final meeting of the equipment committee before the convention.

Significant Conference on Education

AT THE invitation of Chairman Edward Dana of the American Association committee on education, several representatives of member companies met with the committee in New York City on May 11. The purposes of the meeting were to block out the report of the committee preparatory to its completion by a sub-committee, and to secure toward this end the experience of companies which have been active in educational work.

The morning session of the committee was occupied with accounts of recent actual experiences. F. J. Gannon, Fort Worth, Tex., told of the foremanship class held in that city last year under the State Board of Vocational Education. Shop courses are also conducted. Instructors are sent to Austin for training. Similar classes are held in Houston, Dallas and El Paso.

J. F. Hyatt, Highwood, Ill., described the work which has been done on the Chicago, North Shore & Milwaukee property. This company got into its

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educational activities during the war through its Americanization program for track men. It has now developed until one man is employed to give his whole time to the work and an extensive program is in operation. An interesting feature is that there are now four classes in public speaking at the expense of the men. H. O. Allison, New Brighton, Pa., said that the Beaver Valley Traction Company has two schools in operation. In one a course of thirty-six lessons dealing with everyday subjects is given, and in the other home problems are dealt with.

N. E. Stubbs, Baltimore, Md., stated that the United Railways & Electric Company co-operates with the Johns Hopkins University and other institutions in providing instructions for employees, of whom 250 are doing some school work. The company pays one-half of the fees on completion of the courses. A business course at J.H.U. costs $20 and a technical course $40.

These notes will serve to indicate the general tenor of the discussion, which was participated in by all of the committee members and visitors present. Besides those mentioned, there were in attendance the following: George A. Barnes, New York City; C. R. Ellicott, New York City; H. H. Norris, New York City; M. B. Lambert, Pittsburgh, Pa.; C. E. Morgan, Brooklyn, N. Y.; James McFall, Connellsville, Pa.; C. F. Schmidt, Indianapolis, Ind.; C. P. Rexford, New Bedford, Mass.; A. M. Robinson, Philadelphia, Pa., and W. H. Timbie, Boston, Mass.

Specifications for Air Reservoirs

A MEETING of the Engineering Association committee on specifications for non-fired pressure vessels was held in New York City on May 17 with a 100 per cent attendance of the committee, namely, R. H. Dalgleish, Washington, D. C., chairman; L. J. Davis, Brooklyn; and J. A. Leefer, Pittsburgh, Pa.

A preliminary specification was discussed by the committee. This had been previously sent to a number of the equipment men for consideration and, as the committee on equipment was in session while the pressure-vessel committee was holding its meeting, the specification was submitted to the equipment committee. It was decided that after recommended changes had been made, the specification will again be submitted to the equipment committee.

It was stated that while the boiler code committee of the A.S.M.E. has not yet completed its investigation in this field, it is understood that the committee will consider acceptable those tanks in which the longitudinal seam has been welded. This decision is consequent upon an extensive test of seam-welded tanks made by the United States Bureau of Standards in February. The Engineering Association committee was of the opinion that it should recommend tanks with longitudinal seams either welded or riveted.

The question of enameling the interior of the tank was discussed, and it was decided that the specification should cover both enameling and galvanizing.

Power Distribution

A TWO-DAY meeting of the power distribution committee of the Engineering Association was held in New York, May 21 and 22. Members present were M. B. Rosevear, chairman; J. W. Allen, L. W. Birch, H. G. Burd, R. W. Eaton, C. L. Hancock, C. R. Harte, sponsor, H. D. Hawks, C. J. Hixson, A. Hughes, Jr., C. H. Jones, H. S. Murphy, W. Schaake and F. J. White.

Mr. Hughes, chairman of the subcommittee on revision of the power distribution sections of the engineering manual, reported that it is desirable to get incorporated in the revision of the manual any changes that are to be made. Certain of the sections can be included as they stand.

The section covering specifications for sherardizing or galvanizing line material has been referred to the A.E.S.C., which plans a conference of manufacturers to determine if an American standard for galvanizing and sherardizing should be formulated. Mr. Hixson said that there is a great difference of opinion among the manufacturers and users as to the methods of protection in general, and that some standardization should be made on this point also. Several other specifications are now referred to the A.E.S.C. for action leading to adoption of American standards.

The section on clearances for overhead working conductors has been referred to the heavy electric traction committee.

The 600-volt overhead trolley construction section of the manual has been submitted to the A.E.S.C. This is a contruction specification only and does not include materials, which are covered in other specifications. Some changes were recommended. There was some discussion on the subject of ground sleeves for tubular steel poles. In cases where they are used it was felt that they should be beveled at the top joint to assist drainage. Also, the poles should be set so that the sleeves will extend at least 12 in. above the ground.

It was the sense of the meeting that the sections on signaling, which cover signal aspects, can be combined and simplified to some extent, and that the section on car registering signals can be simplified materially, and also modified to conform to standard practice.

The sub-committee on catenary construction, Mr. Jones, chairman, reported on a specification which includes the location of trolley wire on curves.

Mr. Murphy, chairman of the subcommittee on trolley wire wear and specifications, read the preliminary draft of a report covering a study of the composition and relative wear of trolley wire which has been made, looking toward a joint specification for hard-drawn trolley wire. This subcommittee reports that it has virtually reached an agreement with the similar sub-committee of the A.S.T.M., thus making the trolley wire specifications of the two associations uniform. The sub-committee hopes that this action will be ratified by both associations at their next annual meetings. In this connection it was decided to recommend to the executive committee that a research be conducted to determine the extent to which various factors influence the wear of trolley wire. It was felt that the problem is intimately connected both with the design of the overhead and of the collecting device, and that any study to be made should include these factors.

It was also decided to request that a test be made of trolley wire wear in connection with the test of rail joints now being arranged for.

It was the sense of the meeting to recommend that work on signals, which has been under this committee for several years, be placed under an independent standing committee at the next convention. This will permit of more attention being paid to the work of other associations dealing with signaling.

Suggestions were made that, in addition to the subjects already before the committee, concrete poles and rail-joint bonding be added for next year's program.

Committee activities of the A.E.S.C. regarding wire and cable specifications were reported on by Mr. White, who is secretary of the sectional committee. He gave a brief progress report on the work of the twelve technical committees handling this work in the A.E.S.C.

Mr. Harte reported on the status of the sections of the manual relative to wood and other poles.

Accident Prevention

The committee on accident prevention of the Transportation & Traffic Association held a meeting in New York on May 18-19. Those present were: H. B. Potter, chairman; M. W. Bridges, A. W. Koehler, E. M. Walker and H. Restofski of the T. & T. committee, together with H. O. Allison, chairman of the corresponding committee for the Claims Association. The meeting was taken up principally with a discussion of the returns from a questionnaire sent out to member companies. Replies have been received from 110 companies in the United States and Canada, representing thirty-eight states. The tabulated returns give a comparison of reasons for accidents. These have been well analyzed, and form a basis for a better organization of work in accident prevention. The returns also indicate that despite increasing street traffic, the situation regarding accidents is more encouraging than it has been in the past. The data collected will form a part of the final report to be presented at the October convention.

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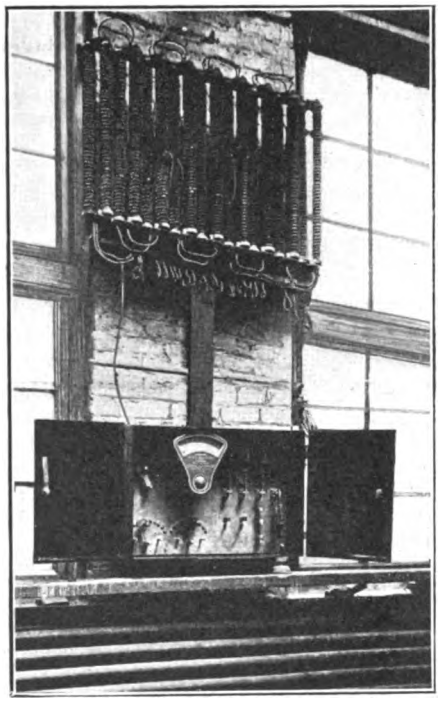
Maintenance of Equipment

Testing M-U Control Under Service Voltage Conditions

FAILURES in the control mechanism on cars equipped with multiple-unit control, such as the turret type or the switch group type, are often caused by the decrease in line voltage as the train approaches a feeder end. The control may "notch up" in a satisfactory manner under inspection, as the line voltage may be high in the shop due to its location near the source of power. However, at terminals, which are often single-end fed, the voltage may drop off as much as 40 per cent. The operating mechanism, such as the pistons and valves of an electro-pneumatic control apparatus, will not function properly under these low-voltage conditions, and such inoperation may cause considerable delay.



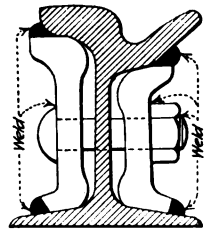
Apparatus for Producing Various Line Voltages

A testing outfit to reproduce various line voltages has been installed in the shops of the Northwestern Elevated Railroad, Chicago. The apparatus was built in the company shops and consists of suitable resistance coils mounted on the wall, and a switch cabinet with slate panel on which is mounted a direct-reading voltmeter and knife switches, switch levers and contact points, and suitable fuses. The line current is carried through the apparatus and delivered to the collector, either shoe or trolley pole, at any voltage the control man may desire. The voltmeter gives him directly the voltage condition under which he is testing the control mechanism. Adjustment of the mechanism is then made so that it will function properly under voltage conditions worse than those experienced on the road.

Since the installation of this apparatus no failures from faulty control mechanism have occurred on the cars served by this particular shop.

Large Seam Section for Welded Joints

THE joint plates used by the Lehigh Valley Transit Company for repairs to 96-lb. and 116-lb. grooved girder rail are cast in its own steel foundry. In order to give an ample cross-section for the weld along the seam a plate similar to that used by the Third Avenue Railway System, New York City, is used. This was described in the issue of the ELECTRIC RAILWAY JOURNAL for Nov. 18, 1922, page 808.



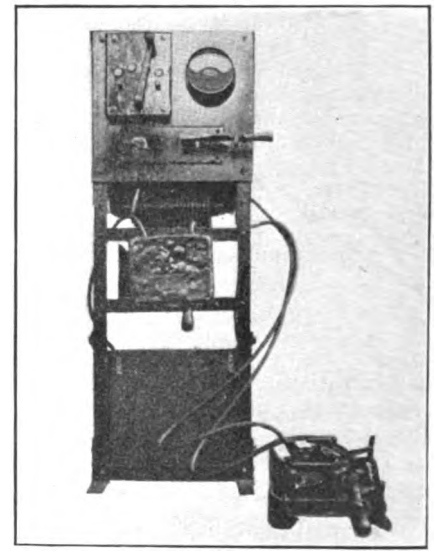
Cross-Section of Rail Joint Showing Provision for Insuring Large Section of Welding Metal

Completed Welded Joints as Installed by Lehigh Valley Transit Company

The outside portion of the joint plates projects outside the railhead so as to provide a V-shaped groove for the welding metal. The bottom of the plate is shaped so as to permit the laying of the seam weld back at the edge of the rail base. The bolts used to hold the plates in position during the welding are welded around the heads, and the nuts are welded at the contact surface and also at the thread.

Circuit Breakers Tested Under Low Voltage

CAR circuit breakers are calibrated and tested according to the number of amperes at which they will open. Hence, they can be tested just as easily with low voltage as with high. Nevertheless, the trolley voltage is usually employed, because that is available and a lower voltage is not.



Circuit Breakers Are Tested with Storage Battery Current by This Board

The Cleveland Railway, which has been a pioneer in many directions, conceived the idea, or at least Terence Scullin, master mechanic of the company, did, of testing circuit breakers with 6 volts, and that is the voltage used at the Harvard Avenue shops of the company. The accompanying line drawing and halftone show the construction of the circuit-breaker testing outfit.

The current used for testing is obtained from a 6-volt storage battery, type MVS-21, made by the Electric Storage Battery Company. Other parts of the testing equipment con-

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sist of a circuit breaker set at the maximum limit of 500 amp., suitable resistance grids, a four-point control switch, a 500-amp. meter and a single-blade knife switch.

This low-voltage testing outfit has several advantages besides the one that very little power is used by it. The principal one is that as there is no danger of shock or flash, the test is easy to carry out, and it is done

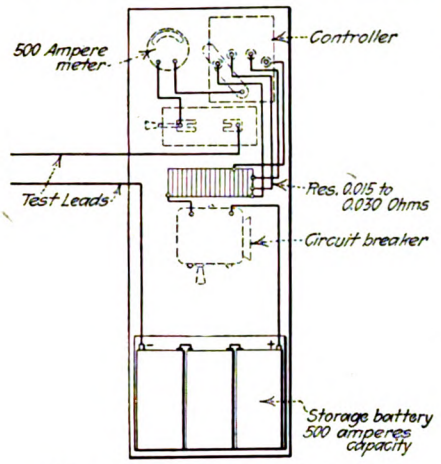


Diagram of 6-Volt Circuit-Breaker Testing Board

at Cleveland at the repair bench. Then if any defects, such as short-circuited magnet coils, poor contacts, excessive friction or other trouble are discovered, they can be corrected before the breakers leave the repair bench.

It has been found necessary to recharge the batteries only about every three weeks.

After being tested at the repair bench in this way, car circuit breakers are also tested under 500 volts on the car. This is done in the car yard on a special section of trolley wire which is fed through a circuit breaker calibrated to about 350 amp. The motors on the car are cut out and the current is put through resistances on the car.

Interlocking Door Operation with Control

TO PROVIDE for interlocking the operation of the doors with that of the control equipment, so that cars cannot be started until all doors are closed, the Lehigh Valley Transit Company, Allentown, Pa., makes use of the following attachments.

On the company's center entrance type of car there are four doors with operating shafts. Fiber drums with necessary copper contacts are installed at the bottom of these door-operating shafts, and a finger block with two fingers makes the necessary contact for the opening and closing circuits. With the doors closed, the circuit is connected in series with the line switch operating wire, so that the advancing of the controller handle will then energize the coil of the line switch and bring this in.

In regular operation the controller handle can be placed on its first operating notch, and the closing of the doors will then close the circuit to the line switch, so that this will be brought in as soon as the doors are closed.

Reducing Armature Failures Over 50 per Cent

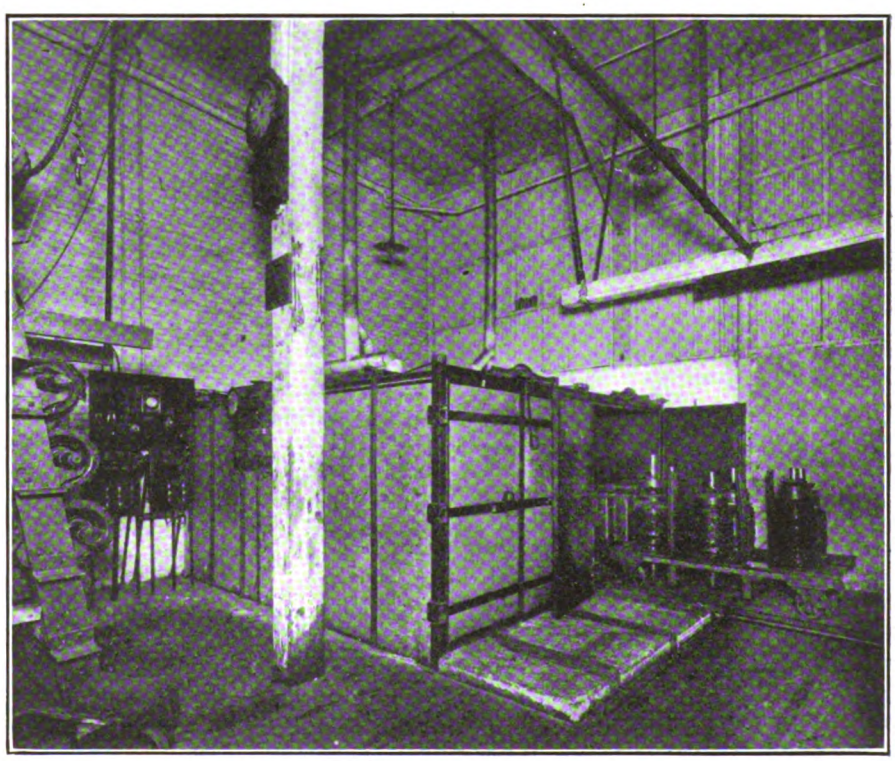
BY JOHN S. DEAN
Westinghouse Electric & Manufacturing Company

AN EXAMPLE of what can be accomplished by dipping and baking railway motor armatures is furnished by the experience of one city railway property located in a section of the United States where the average monthly precipitation of rain and snow is approximately 4 in. This railway operates 1,800 railway motors, of which 70 per cent are of the non-commutating-pole type and have been in service for many years. Due to the age of the equipment, an increasing number of yearly armature failures here would naturally be expected. However, this company has noticeably reduced its motor failures since 1919, when it began to dip and bake the armatures. The record is shown by the following tabulation:

Year	Average Armature Failures per Month	Per Cent Reduction in Failures
1919	67	..
1920	38	44
1921	26	61
1922	24	64

In this work a Westinghouse type R3 electrically heated oven is used. It is fitted with thirty type C heaters with a total power consumption of 69 kw. at 550 volts. With the present facilities approximately fifty armatures can be treated per week. The whole operation of dipping armatures, loading and unloading the trucks and taking care of the oven is handled by one man. It is estimated that about 1½ gal. of varnish is used for each armature. The approximate cost to remove an armature from the car and to replace it with another, and to dip and bake it, including labor, material and power to heat the oven, is between $6 and $7.

The master mechanic on this property feels that this expense is justified, and he estimates it will prolong the life of his armatures approximately five years. One noticeable fact in this connection is that the pile of bad-order armatures on the armature room floor has been reduced from an average of fifty to ten or less, and the pull-ins from service due to armature troubles have also decreased very noticeably.



One Man Cares for Dipping and Baking With This Oven

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Sectionalizing Overhead Special Work

By G. H. McKelway
Distribution Engineer Brooklyn Rapid Transit Company

MANY railways are opposed to cutting section insulators into the trolley wire on curves. Conditions frequently occur, however, at intersections where it is desirable to connect the lines physically by connecting curves and still keep them apart electrically. Section insulators must then be cut into the wire on the curve, or they must be cut in on one of the lines extending either side of the intersection but far enough away to be outside the frogs, so that the special work, including the through wires on both lines, can be fed from a single feeder. With this construction, if the feeder is killed for any reason, the whole of the special work is dead and cars on both lines are tied up unless it is possible to coast across the dead section on the line whose feeder is alive. This may be possible in some instances, but generally the first intimation that a motorman has that the intersection is dead is when his car runs onto it and becomes stalled. Even if the crossing is unobstructed it is often dangerous to coast across a busy intersection at high speed unless there is a traffic officer present, or some one who can control passing vehicles while the car is moving across the dead portion.

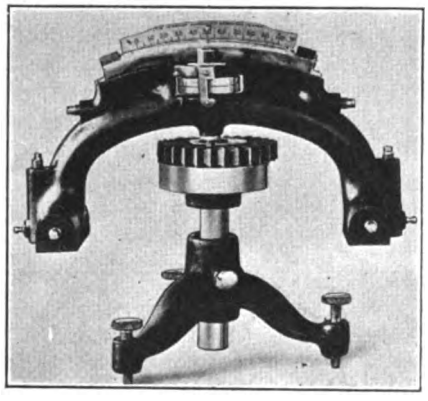
The intersection can be kept alive by installing a double-throw switch to connect either of the two feeders to the trolley on the intersection, and also installing section insulators in the two trolley wires on all sides of the intersection. This arrangement makes a separate section of the intersection and allows the special work to be fed from the feeder of either of the two lines. While such an arrangement is entirely practical, it is not often installed because it is rather expensive and the maintenance of two section insulators in each wire is also troublesome. Its best use is at points of heavy traffic.

In most cases, however, the simple cutting of an insulator into the trolley wire of the curve will be found to be entirely satisfactory and will be much cheaper. Where most of the traffic is straight through the special work, there is seldom any excuse for installing either of the other schemes, as the insulator in the curve will give no trouble. Of course, trolley wheels will follow a smooth trolley wire, in which there are no breaks, more easily than any combination of the wire and something else, but the number of wheels that will leave at the section insulator will be negligible if the insulator is properly installed and maintained.

New Equipment Available

Novel Device for Testing Hardness

EDWARD G. HERBERT, Ltd., Manchester, England, has just placed on the market the Herbert pendulum hardness tester. The instrument is shown in the accompanying illustration placed so as to test the hardness of a milling cutter which is mounted on a tripod stand. It consists of a pendulum, of the peculiar form shown, which rocks on a ball of steel or ruby 1 mm. in diameter, held in a chuck in the center. Six screwed weights are provided whereby the position of the center of gravity of the whole instrument may be adjusted to coincide with the center of the ball or otherwise. The center of gravity being at the center of the ball, the instrument is in neutral equilibrium when supported by the ball on a hard level surface; that is, it tends to remain in any position in which it may be placed. For standard tests the center of gravity of the instrument is lowered until it is 0.1 mm. below the center of the ball, when the time of a single swing on a very hard surface is ten seconds. The swing of the pendulum is indicated by means of a bubble in a curved glass tube, attached centrally to the top of the instrument, and a curved scale mounted over the tube and graduated from 0 to 100.



A Hardness Tester in Which the Measurement Is Made by the Time or Amplitude of Oscillation of a Pendulum

This instrument provides two means for testing the hardness of a material: (1) By the arc through which the pendulum swings when it is released from a position in which the bubble stands at zero. On glass, this, as indicated by the bubble scale, is 97; on tempered high-speed steel it is 75, and on annealed carbon steel it is 41. (2) By the time of a single swing of the pendulum. On a very hard surface this is ten seconds; on hard steel it is from five to eight and one-half seconds, and on soft steels from two to four seconds. The time test is recommended.

The fundamental principles involved in these two hardness tests are these: (1) When the pendulum is deflected to the end of the swing and released, the ball rolls out or elongates the slight indentation made in the surface of the material under test. The energy absorbed in thus displacing the metal is taken from the potential energy of the pendulum as is shown by a shortening of its first swing. This gives the basis for what are known as the "scale" tests. (2) The time of oscillation is related to the hardness of the material because when the ball indents the surface the length of the pendulum is shortened and the time is correspondingly shortened in accordance with the law of the compound pendulum; that is, the time is inversely proportional to the square root of the length of pendulum. Obviously, as the full length of the pendulum in this case is only 0.1 mm., a slight indentation serves to affect the length considerably.

An empirical relationship between the time-test scale and the Brinell hardness scale has been established experimentally

Triplex Ammeter for 3-Phase Circuits

THE Roller-Smith Company, New York, N. Y., has brought out a new type of ammeter which permits the simultaneous reading of the current in the three phases of a three-phase circuit. The ammeter mechanisms are independent, but are all mounted in one case 7½ in. in diameter. Each mechanism has a capacity of 5 amp. and its scale is marked according to the ratio of the current transformer to which it is connected. The mechanisms are of the electromagnet type, with an air-damping scheme.

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The News of the Industry

Improvement Program Planned

Georgia Railway Files Petition Promising Railway Betterments, Organization of Bus Service and Increased Ticket Sales

WITH the idea in mind of furnishing Atlanta with better, safe, quicker and more extensive electric railway service the Georgia Railway & Power Company on May 11 filed a petition with the Mayor for presentation to the City Council outlining a constructive plan for the solution of the city's present traffic problems and its future transportation needs. The company makes a strong plea for the co-operation of the city and the public in helping it to attain its ambitions — to provide transportation service to 500,000 people—a goal toward which all residents of Atlanta are working.

The program submitted for enlarging the service includes improvements to the electric railway system, organization of a bus system to supplement the street railroad and increased sale and use of tickets.

The improvements to the railway system embrace general improvement in track, cars and the electric system, the speeding up of cars and a general improvement in service as a basis for increased travel. The company states in its petition that before launching the proposed program of increased service it succeeded in providing more than $1,300,000 for general improvements during 1923, but could not succeed in securing any money for extensions. This work is now going on.

Because of the fact that it will be many years before the company can extend its service by building tracks in developing areas the plan seems feasible to provide motor bus transportation. It, therefore, is the intention of the company to provide a responsible, dependable service backed by ample capital and thoroughly regulated. A coordinated system is what is proposed which will bring bus transportation under the existing laws regulating electric railway service as to schedules, fares and routes. This, in the opinion of the company, is the only way that the public can get any benefit from such service.

Instead of selling fifteen tickets for $1 the plan is to sell three tickets for 20 cents, or multiples thereof. The idea back of this plan is to increase the sale of tickets, thereby eliminating some of the delays caused by the fact that at present most of the car riders pay cash fare and the loading of cars is delayed in making change. Increased use of tickets will speed up the cars.

The company states that there are many conditions which definitely limit the company's ability to carry on and develop the public transportation service. These present handicaps include private and public automobiles, unregulated jitney competition, unnecessary congestion of the streets, lack of enforcement of traffic regulations and the greatly increased cost of both materials and labor.

The existence of these conditions means that the service being furnished is unprofitable. The company contended that the operating ratio has risen from a fraction more than 50 per cent in 1909 to more than 72 per cent in 1922. Under these circumstances the company claims it is impossible to make extensions no matter how much the communities need transportation. It is in order to correct these conditions that the company has prepared the constructive program just described.

In carrying out its proposed program the co-operation of the city is asked in the following two particulars:

1. Regulation of jitneys by vigorous enforcement of existing laws and the passage and enforcement of all regulations necessary to prevent unfair competition.

2. Traffic regulation.

With respect to the regulation of jitneys, the company in its petition states that it is unfair to permit jitneys, unregulated and untaxed, to compete with the public service company; that it is the duty of a community to protect its transportation agency when it has invited the investment of vast sums of money in providing that service. Further, that the city actually loses money through the operation of every jitney on the streets of Atlanta. The jitneys contribute nothing to the construction and upkeep of the streets, while the city gets $983 every year from every street car operated. It is further charged that the jitney contributes to a considerable extent to the congestion on the streets.

On the subject of traffic regulation, the petition states that 250,000 passengers who use the electric railway cars daily are being subjected to ever-increasing delays owing to the fact that proper regulation of traffic is not enforced. It recommends the adoption of all necessary additional laws to relieve this congestion on the downtown streets. Further, that the individual must be convinced that it is to his personal interest to observe strictly the traffic ordinances because they save his time whether he uses an automobile, a truck or a street car.

Municipal Ownership Advocate Elected in Denver

Ben F. Stapleton, former postmaster of Denver and candidate of Governor William E. Sweet of Colorado, was elected Mayor of Denver on May 15 in one of the most bitterly contested elections ever held in Colorado. Governor Sweet openly announced that he would not back a candidate who did not favor municipal ownership of utilities.

Of the seven candidates in the race, all but two, Mr. Stapleton and D. C. Bailey, who was defeated for re-election, expressed themselves unequivocally on this point. The other candidates, however, harped on the issue as a subject of widespread interest.

Decision as to possible municipal ownership will probably be made during the term of the recently elected Mayor and this accounts for the subject being injected into the spring campaign. Mr. Bailey openly opposed the idea of municipal ownership.

Mayor-elect Stapleton's platform on the subject of public utilities as advertised prior to the election provided:

> The Mayor should make known to the public the facts as to the value and cost of operations of the tramway and gas and electric properties. Our home rule charter requires the submission of all questions of ownership and franchise to the people for final decision. The duty of the city administration is to carry into effect intelligently the mandates thus expressed.

The agitation for municipal ownership which has now resulted in the election of Mr. Stapleton to office is generally credited as being largely the result of the aftermath of bitterness and misunderstanding growing out of the Denver Tramway strike of 1920.

Ten Per Cent Wage Increase in Toledo

In a new wage contract which became effective on May 22 the platform men of the Community Traction Company, Toledo, will receive a wage increase of approximately 10 per cent. The entire boost will raise the operating expense of the company, about $13,000 a month.

From a scale of 45 cents for the first three months, 47 cents for the ensuing nine months, and 50 cents an hour thereafter the scale has been boosted to 50, 52 and 55 cents for the same periods of service. The scale was agreed upon after a four-day conference participated in by representatives of the company and the men. The men had asked rates of 60 and 65 cents. Shop men received a corresponding wage increase.

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Increase of Five Cents

Arbitration Board on Wages of Cleveland Railway Employees Finds Sixty Cents Maximum

As was announced in the ELECTRIC RAILWAY JOURNAL of May 5, wages of motormen and conductors of the Cleveland Railway were increased 5 cents an hour beginning May 1. The decision, which was the result of arbitration, fixes the scale at 55 cents for the first three months, 58 for the next nine months and 60 cents at the end of the first year. The men had sought an advance amounting to 15 cents an hour.

In fixing the wage award the board of arbitration took into consideration two methods, one of which was termed relative based on the history of increases in the cost of living, of wages, etc., and the other absolute, based on present and future conditions and actual costs of living.

EMPLOYEES MADE A FAVORABLE IMPRESSION ON BOARD

It was brought out that 2,750 trainmen were employed by the company, of whom 2,060 were regulars and 690 extra men. The board characterized the men in general as clean cut, efficient, courteous and careful in their personal habits. Further, that the men worked under favorable surroundings while on the road. But there were hardships to take into consideration, namely, the irregular and unusual hours and the working on Sundays and holidays.

The board prepared a table compiled almost exclusively by using the figures quoted in Arthur Sturges' exhibits submitted in behalf of the union beginning with May 1, 1918, and ending with May 1, 1924. In determining the wage scales set forth therein studies were used that were made from time to time by the United States Bureau of Labor Statistics and founded on 1918 actual expenses of actual families. These were submitted as the only authoritative data on the cost of living in Cleveland. To the table the board added an estimated index for March, 1923, of 173.4, assuming thereby that the cost of living had increased three points since December. It was remarked that since this estimate was made the financial editor of the *Iron Trade Review* was quoted as saying that the cost of living was 59 per cent only above 1914 according to the index of the National Industrial Conference Board.

Summing up the tables, the results were that, if based only on relative increased cost of living, the maximum decision of the board for the ensuing year should be 52 cents; that if it is assumed that the wages were lower than necessary to the extent of 10 per cent, which is really when analyzed, the position that the men took in 1918 and in 1919, the wage scale for the next year should be 57.1 cents. But the board went further and calculated that if it were to adopt the wage scale which most closely approximated the history of the past, namely, the one that assumed an addition of 15 per cent to the bare cost of living, the rate would be 59.8 cents. The last rate to be considered, assuming a 19.1 per cent increase over and above the cost of living, is 61.9 cents.

The board also took into consideration the fact that in 1919, considered as the boom year, the men secured their maximum demands, namely, 60 cents, and in that year the cost of living was considerably higher than it was now, according to everybody's testimony. The board said that the maximum wage in 1923 should be 60.5 cents. This figure was arrived at by consulting the trend from month to month of the average pay-roll earnings of nearly 2,000,000 employees in forty-three industries, according to the Bureau of Labor Statistics and taking into consideration the average of May and June, 1920, as the standard.

In making its decision the board considered the various standards which were submitted by way of budgets. Among them was that of $1,661 submitted by Arthur Sturges, which was a compilation of the expenses of 245 families in Cleveland by the Bureau of Labor Statistics, 180 of which families saved money on that income and sixty-two had a deficit. It was also brought out that a considerable percentage of the railroad men, especially of the extras who were working for $3.30 a day, must be unmarried. The board reconciled these budgets with a proposed budget for a single man, and taking the figures submitted to the effect that the average day's work was eight and one-half hours and assuming 313 working days, a maximum rate was arrived at somewhat less than 60 cents.

The board in conclusion recommended the improvement of working conditions, especially the abolition of the runs whose spread was more than eighteen hours.

MEN'S REPRESENTATIVE DECLARES AWARD UNFAIR

The award was approved by Judge Fielder Sanders, former City Street Railway Commission, and Thomas P. Schmidt, representing the company. Judge Frederick Walther, representing the men, dissented from the award of 55, 58 and 60 cents on the ground that he could not agree that that rate constituted a fair living wage. He said that in his opinion the American standard of living required that not only should a man be entitled to a decent living wage, but that he should be permitted to earn such wages without being compelled to work seven days each week, and that every man is entitled to have at least one out of seven free from being compelled to work at his usual labor. Further, his own budget of $1,763 for a family consisting of husband, wife and three children would not provide for savings, old age or any luxuries.

He further argued in his statement that it was the very great exception when any trainman actually puts in his eight and one-half hours in straight time. It was his contention that the testimony before the board of arbitrators showed that with the exception of opportunities for regular runs as a result of new lines and additions to the service, a motorman or conductor is frequently compelled to serve as long as eight years before he obtains a regular run. During a large part of this time he "bucks the list." He said that he was both unwilling and unable to subscribe to a rate of wage which he considered entirely inadequate.

Pittsburgh Employees Receive Increase of Seven Cents

After negotiations lasting six weeks officials and employees of the Pittsburgh Railways entered into a compromise agreement on May 22 whereby the men will receive an increase of 7 cents an hour effective May 1. The vote was 836 for acceptance and 667 for rejection with the alternative of arbitration between 60 cents an hour, the present rate, and 80 cents, which was the original demand of the carmen.

The new and old wages in cents per hour are as follows:

	New	Old
For the first three months.....	60	54
Next nine months.....	65	58
After the first year's service....	67	60

When the wage matter first came up for discussion the receivers offered 66 cents an hour maximum in answer to the carmen's demand for 80 cents an hour, but the employees rejected this offer by a vote of 2,177 to 9. The next step was the proposal advanced for arbitration of the matter between 66 and 74 cents an hour and later between 66 and 72 cents an hour. It is said the men wanted 70 cents an hour, which would have restored the old 1920-1921 wage schedule.

In the matter of working conditions a number of minor changes were obtained by the carmen. Under the new agreement the average length of day is eight hours and fifty-one minutes.

$1,000,000 Electrification Work to Proceed

Construction of the interurban line from Dallas to Denton, Tex., through electrification of the lines of the Missouri-Kansas-Texas Railroad by the owners of the Dallas (Tex.) Railway, is expected to begin by June 15, according to Richard Meriwether, vice-president and general manager of the Dallas Railway. This announcement was made following a decision by the State Supreme Court of Texas, in which the motion was denied that had been made for rehearing in the injunction proceedings brought in the District Court at Dallas and appealed through the courts to the court of last resort.

Surveys for the electrification of the line have already been made under the direction of B. R. Brown, chief engineer. The work is expected to cost about $1,000,000 and is to be completed within a year from the date that work is begun.

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$4,000,000 Expenditure Before Public

Pershing Square Subway Franchise for Pacific Electric to Be Determined by Los Angeles Voters

Recently the Pacific Electric Railway applied to the City Council of Los Angeles for a subway franchise from Pershing Square westerly to First and Glendale Boulevard. The City Council on May 16 adopted a resolution to place the issue on the ballot for the election of June 5.

The City Attorney in passing on the matter states that the question of "easements or rights-of-way" offered the only possible obstacle to the construction of the proposed subway terminal under the city's park property. The city attorney further states that should the voters decide in favor of the construction of the subway under the park the action would possibly be sustained by the court.

The Pacific Electric Railway's plan calls for a series of subways branching from Pershing Square, with view of removing its interurban trains from the streets of Los Angeles. Its suggestion had the approval of the Community Development Association, Los Angeles Planning Commission, Los Angeles Traffic Commission, Los Angeles Chamber of Commerce and several other prominent associations interested in the traffic problem of the city. The company states that it is essential that an early decision be reached by the city in the matter of the franchise for the proposed Hollywood rapid transit subway; that is, whether the subway should end at the Hill Street terminal of the company or under Pershing Square. The railway, it is stated, has held up its plans to construct a subway to terminate at its Hill Street station pending a decision on an alternate plan to have the terminal underground at Pershing Square. The subway, for which the railway received a franchise sometime ago, will provide for rapid transit service to the Hollywood district as well as the San Fernando Valley territory. It will cost approximately $4,000,000. The alternate plan will make the Hollywood and San Fernando Valley subway a unit of a comprehensive subway system serving all parts of the city. It is stated that work on either one or the other plan will be commenced just as soon as the June election is over.

Following is the resolution placing the Pershing Square project on the ballot, as passed by the Los Angeles City Council:

Shall the City Council and the Board of Park Commissioners authorize and require the Pacific Electric Railway to construct and operate below the surface of Pershing Square certain subway tunnels and appurtenances, under plans to be approved by the city and so designed as to become a part of a general and comprehensive subway system; such authorization to be upon fair and reasonable terms for the protection of the city's needs; provided that such construction shall not interfere with the use of the surface thereof for park purposes, except for the necessary approaches to the subway?

The city's action in deciding to submit the issue to the people at the June 5 final municipal election was based on the city attorney's ruling that it is "feasible and proper" that the matter be put to a vote, as under the authority of the Los Angeles city charter, the city attorney held that the City Council and the park commission have authority to grant easements and rights-of-way to public utility corporations over public parks.

Immigration Restriction Permanent

Official circles in Washington favor establishment of the immigration quota on the 1890 basis. This arrangement would make it possible to draw immigration largely from the North of Europe. It is believed, however, that no matter what the basis may be that is finally decided upon, the restriction of immigration will be unquestionably permanent. Any relief from the present immigration law will come from a revision of the basis, and not by any general relinquishment of limitation. Public sentiment is strongly opposed to any large increase in immigration, since it has been learned that the public must take care of the unemployed in the off peak period, and, furthermore, because the capacity for assimilation is already taxed.

$4,000,000 Needed for Improvements

Manager for Receiver at St. Louis Sees Need for This Expenditure—Says New Franchise Should Be Passed in Interest of Company and Public

Invited to a meeting of a civic association in St. Louis recently to tell why extensions of car lines had not been built or when they would be built, Col. A. T. Perkins, manager for the receiver of United Railways, St. Louis, stated he hoped for and expected a decision in the valuation case by July 1, and that he is preparing a budget of proposed improvements to be presented to the reorganization committee. If he has anything to do with the property after it is reorganized he will ask for at least $4,000,000 to make service extensions.

Besides an adjustment of the valuation case by the Missouri Public Service Commission, necessary in order to get capital under a reorganization, Colonel Perkins said in his opinion the second requisite should be an entirely new franchise to run for fifty years, and so framed as to give the city the right of purchase. Existing franchises, he said, are complicated, and in many respects are not fair and just.

In the present situation, said Colonel Perkins, the proper thing to do is for the public to go into the matter of a franchise fully and fairly and decide upon a grant to permit healthy growth of the railways for years to come.

Just how much of their taxes the car riders desire shall be paid through the fare boxes is one of the points to be decided, and they should be fully advised as to the facts. The company last year paid more than $1,800,000 in straight taxes, plus $477,000 for paving. Almost eighteen and one-third mills from every car fare goes for taxes.

The management has built 101 motor cars and purchased fifty trailers and ten one-man cars. There are 100 more motor cars of the 700 type under construction in the company's shops. Seven new substations have been constructed.

The management of United Railways, said Colonel Perkins, is disposed to follow the plans of the City Plan Commission as far as possible in contemplating the building of new lines and the rerouting of old ones. Rerouting is greatly needed. The old constituent companies were in competition and the result was a duplication of service.

As to extensions, he explained that under the receivership the Federal Court permits the management to go as far as funds will permit in reconstruction work and to improve the property as it stands to take care of growing traffic, but for several reasons extensions are not possible until there is a reorganization. Bondholders and creditors from all parts of the country are ready to come into court at any time and oppose the spending of money which they think might affect their interests. So the court's order is that the property be conserved for the benefit of creditors pending reorganization.

There has been much loose talk about the pending valuation case, said Colonel Perkins. It has taken years of study to see what is in this enormous property. While the management does not expect to get a valuation within millions of the present reproduction cost, it does expect a fair figure from various standpoints. In the meantime, he added, the city's representatives should have worked in harmony with the management instead of setting up an arbitrary figure. If the city's figure were accepted, he declared, the property would be thrown into the courts and tied up for years with remote chances of extensions of service.

In a round-table discussion, a number of points relating to the transportation situation were brought out in answers to questions by members of the association, as follows:

Colonel Perkins was about to lease a number of buses some time ago to serve as feeders but was informed he could not do so under the Federal Court's general order. Under a reorganization he would favor the purchase of buses as one of the first moves to be made.

Most of the delays in service are caused by blockades in the congestions of downtown streets. There have been very few failures in car equipment.

Weekday traffic in January, February, March and April of this year has been heavier than in any other four months of the company's history, but Sunday travel is lighter probably on account of the increased use of the private automobile.

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Baseball crowds are not profitable to street railways.

The zoo, in Forest Park, and the Missouri Botanical Garden are drawing the largest crowds, and a special loading station will soon be provided for the zoo.

A rainy day means a loss of from 50,000 to 200,000 passengers.

A reward of at least $1,000 would be paid by the United Railways to anybody who will invent a machine to dress paving blocks. This work is now done by hand.

One of the longest car rides in St. Louis without changing cars is on the Bellefontaine lines—16½ miles.

Experiments with the weekly pass system in other cities is being watched closely. Reports so far do not indicate much success.

Fares in St. Louis County should be readjusted because they are inequitable. On some lines passengers are paying for more than they get, and on others not enough.

Asked about municipal ownership, Colonel Perkins expressed the opinion that in view of Seattle's experience and the necessary restoration of a 10-cent cash fare, three tokens for 25 cents out there, St. Louis is not likely to favor this idea.

There are 20,000 citizens in the United Railways' family, he concluded, and they expect a fair deal from the people of St. Louis.

The Grand-Meramec Improvement Association gave Colonel Perkins a vote of thanks for his visit and speech.

Wage Situation Critical in Chicago

Indorsement of President Henry A. Blair's attitude on the demands for higher wages was made by the board of operation of the Chicago Surface Lines at a meeting held on May 23. Mr. Blair in a previous meeting with the representatives of the employees' union, Division 241 of the Amalgamated, had pleaded inability to pay the increase of 10 cents an hour over the present wage scale of 65, 68, and 70 cents, unless an increase in revenue is obtained. With this endorsement by the board there is little chance of a wage increase. The wage scale has lately become the principal issue under discussion, with the other two original demands, namely, one day a week off with pay and elimination of one-man car operation, receiving little or no consideration. The stand taken by the board was communicated to the representatives of the union at a meeting held on May 25. They will in turn present the decision to the men at a special meeting to be called on May 28.

Representatives of the unions have asked the Governor to use his influence with the Illinois Commerce Commission to urge it to recommend an increase in rates of fare for the Surface Lines in order that the company may meet their wage demands.

A meeting between Mr. Blair and Mayor Dever was held on May 24, which resulted in the appointment of a committee to thrash out the controversy before a strike is called. The success attained by a similar committee last year in abatement of the strike after it was called led the Mayor to make the appointment in anticipation of the strike this year.

A conference held on May 22 between Britton I. Budd, president Chicago Elevated Railways, and officials of Division 303 developed a dead-lock which might have broken off negotiations entirely, but for the hope that some outside influence to provide the company with increased revenue would develop. Mr. Budd had informed the representative that the company could not meet the 10 cents an hour wage increase without an increase in fares. Negotiations will, however, be continued at a meeting to be held on May 29, at which time the attitude of the men as voiced at their meeting on May 26 will be represented.

Schenectady Railway Enjoins City

Secures Temporary Order Restraining Mayor from Enforcing His Dictum Directing Non-Operation of Cars

The Schenectady Railway on May 18 obtained a sweeping injunction order from Supreme Court Justice Edward M. Angell of the Fourth Judicial District compelling the city to appear in the Supreme Court at Hudson Falls on June 9 and show cause why it should not be permanently restrained from enforcing Mayor Whitmyer's dictum directing non-operation of cars during strike. When on the following day George B. Smith, Schenectady counsel, in special term before Justice Edward M. Angell moved for modification of the injunction order it was denied.

The original order restrains the city from interfering in any way with the Schenectady Railway in its efforts to operate cars during a strike of its employees. Mr. Smith told the court the order virtually prevented police officers from maintaining peace and order and enjoined them from doing their sworn duty.

In connection with these moves it should be recalled that just before the strike vote was taken John E. Cole, Commissioner of Public Safety, told the men that in the event of a strike the cars would be kept in the carhouses. The city administration has been openly sympathetic with the strikers.

State Industrial Commissioner Bernard L. Shientag telegraphed from New York to Harry B. Weatherwax saying that unless satisfactory adjustment, temporary or otherwise, of the street railway strike is reached before Tuesday afternoon he would hold a public inquiry as to the cause of the strike pursuant to the provisions of the labor low. Mr. Weatherwax replied that he had determined upon a definite time for resuming operation, but that he did not propose to give out that information.

Mr. Weatherwax reiterated his willingness to arbitrate with all of the men, but not with the union. He denied that he was opposed to the principles of collective bargaining, but asserted he was opposed to the leadership of the union.

On May 21 100 strike breakers arrived in Schenectady and were quartered in the Fuller Street carhouse. The same day the city engineer submitted a report to the Common Council designating practically every street over which the railway operates in the city to make paving repairs. Under the law unless the company undertakes the work within thirty days after being notified so to do the city itself can perform the work and charge it to the company. The railway company operates about 25 track-miles in the city. Figuring on a basis of $12 per lineal foot for concrete ballast, this would mean an expenditure of about $1,500,000 for paving repairs.

A plan advanced on May 23 by a citizen's committee would reinstate all "men on strike" in their former positions as of May 16; representatives of the company and a committee of the men to formulate rules, fix wages and working conditions for the ensuing year, meeting within ten days after the resumption of operation. The operatives voted to accept a compromise offer if the old working contract would be included in arbitration, the opening paragraph of which reads: "This agreement shall be entered into between the Schenectady Railway and Local Division 576 of the Amalgamated Association."

This interpretation Mr. Weatherwax declined to accept on the ground that it would be recognizing the union.

Approves Modified Ordinance.—The bond owners protective committee of the bankrupt Saginaw-Bay City Railway has given its approval to the modified street car-bus ordinance. A special election has been ordered by the City Council for Monday, June 25.

Wages to Be Arbitrated.—Men of the Eastern Massachusetts Street Railway, Boston, have voted to accept the recommendations of the wage conference committee which were recently submitted for their approval. The question of wages will now go to arbitration.

Mistake Made in Wage Announcement.—The Cedar Rapids & Marion City Railway, Cedar Rapids, Ia., has increased the wages of its trainmen 5 cents an hour effective May 1. It was incorrectly stated in the ELECTRIC RAILWAY JOURNAL, issue of May 12, that the wages had been advanced 10 cents. Prior to May 1, the maximum wage was 45 cents an hour. The maximum is now 50 cents.

Five New Books in One Week.—This is the record of the McGraw-Hill Book Company during the week ended May 26. The five books just published are: "The Ore Magmas," 915 pages, by J. E. Spurr, "Principles of Chemical Engineering," 637 pages, by Professors Walker, Lewis and McAdams; "Applied Mechanics," 293 pages, by Professor Poorman, "Foundations, Abutments and Footings," 414 pages, and "Structural Members and Connections," 611 pages. The two last mentioned are the first of a series of six volumes of a structural engineers' library compiled by a staff of specialists, with Professors George A. Hool and W. S. Kinne of the University of Wisconsin editors-in-chief.

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Financial and Corporate

Receiver's Report Encouraging

Traffic Returning in Kansas City, Mo., but End of Receivership Is Apparently a Long Way Off

The total railway operating revenue of the Kansas City (Mo.) Railways in 1922 was $10,404,744, an increase of $424,698 over that of 1921, or 4.26 per cent. The auxiliary operating revenue of the property showed a decrease in 1922 of $236,993, so that the total operating revenue made a net gain for the year of $187,705. It is explained that the reason for the decrease in auxiliary operating revenue was due to the discontinuance by the Kansas City Light & Power Company of purchasing a portion of its electrical energy from the railway during the year 1922, when the power company completed its own generating station. It will be noted, however, that a material reduction in auxiliary operating expenses has offset this loss of revenue.

The income statement shows gross income of $1,490,525 in 1922, as compared with $1,370,012 in 1921, an increase of $120,512 or 8.80 per cent. No deduction is made in these figures for depreciation. The gross income, however, is arrived at after deducting all operating expenses, including taxes, and after providing for all personal injury and damage claims incurred during the receivership, and after payment in 1922 of $77,100 allowed by the court for rental of the Intercity viaduct from date of the receivership to Dec. 31, 1922, and for which rental no accrual had been previously set up.

The receivers report the gross income for the first quarter of 1923 as $388,550, being an increase of $43,332 over the corresponding three months of 1922; the 1923 figures are after setting aside $43,649 for additional maintenance of way and structures when weather conditions are favorable for such work.

The number of revenue passengers carried in 1922 was 136,076,541, against 130,843,482 in 1921; transfer passengers carried in 1922 numbered 68,191,873 and in 1921, 63,880,843. Including employee and free passengers carried the lines transported 205,544,606 passengers in 1922 and 196,023,605 in 1921. The revenue derived from paying passengers averaged 7.51 cents in 1922, against 7.56 cents in 1921. The average fare collected per revenue, transfer and free passenger during 1922 was 4.97 cents and in 1921, 5.01 cents.

There has been no change in fares in almost four years past; tickets are still sold on a 7-cent basis, token fares at 7½ cents and cash fares at 8 cents per passenger; these rates were last extended from November, 1922, to May 18, 1923, by the Public Service Commission of Missouri. The same rates are in effect in Kansas. Children's fares are practically half the regular rates.

The number of revenue passengers carried in 1922 was the second largest in the history of the property, but still approximately 1,000,000 less than in 1917, although in this interval the population of Kansas City, Mo., and of Kansas City, Kan., has increased from 415,000 to 470,000, or 13 per cent. The receivers estimate that in 1922, 24,000,000 more passengers were carried in privately-owned automobiles than were carried in such vehicles in 1917. It is explained by the chairman of the protective committee for the holders of the first mortgage bonds that the elimination of jitneys, which has been practically accomplished, is the one thing that has made possible the operation of this property on such a basis that operating expenses and taxes have been paid out of earnings. Had the jitneys not been curbed, either a considerably higher fare would have been necessary or the loss to the property would have been so serious that consideration would necessarily have been given to the abandonment of service.

INCOME ACCOUNT OF THE KANSAS CITY RAILWAYS

	1922	1921
Total railway operating revenue	$10,404,744	$9,980,046
Auxiliary operating revenue	257,008	494,002
Total operating revenue	$10,661,753	$10,474,048
Railway operating expense	$8,605,735	$8,375,225
Auxiliary operating expenses	145,306	312,538
Total operating expenses	$8,751,042	$8,687,764
Net operating revenue	$1,910,711	$1,786,284
Taxes	$533,593	$478,622
Operating income	$1,377,117	$1,307,661
Misc. non-operating income—joint	14,133	16,598
Gross income—joint	$1,391,251	$1,324,259
Net surplus income above 6 per cent—Mo.		
Gross income joint—company's proportion	$1,391,251	$1,324,259
Interest on securities owned	$91,977	$38,470
Interest on bank balances	7,275	7,282
Bond exchange fees, etc.	21	....
Misc. non-operating income—company	$99,274	$45,753
Gross income company	$1,490,525	$1,370,012
Interest on:		
Funded debt	$1,683,810	$1,683,810
Receivers' certificates	.....	3,776
Notes payable	159,454	164,734
Injury and damage cert., Mo.	5,714	5,714
Injury and damage cert., Kan.	1,863	1,863
Other obligations	4,603	353
Amortization of discount on funded debt	4,028	50,861
Miscellaneous debits	32	530
Interest on:		
Mortgages payable	820	1,257
Wyandotte Co. bonds	16,504	16,504
Bondholders' pro. com. notes	32,198	32,198
Total deductions from gross income	$1,909,030	$1,961,604
Net income	$*418,504	$*591,591

*Deficit

On Dec. 29, 1922, the receivers by direction of the court abandoned service on the elevated road between Kansas City, Mo., and Kansas City, Kan., as a result of the report of the engineers of the receivers and of the two cities that the continued operation of cars over the structure would be extremely dangerous because of the fact that the structure is worn out. The engineers also reported that repairs to the structure are impossible as the structure is so light and the wear has been so great that repairs cannot be made.

On Jan. 31, 1923, certain members of the first mortgage bondholders' committee, certain members of the noteholders' committee and a representative of the second mortgage bondholders met in conference in Chicago and it was the unanimous sentiment of the representatives of the security holders that some material concessions should be sought with respect to obligations now imposed against the property in the event the rebuilding of the structure be ordered at the expense of the estate. The estimated cost of such reconstruction is $550,000. Due to the abandonment of service over the elevated road, routes formerly operating thereover have been detoured on other lines at some increase in cost due to the lengthening of haul. At an informal discussion of the matter with the court, M. A. Traylor, chairman, Silas H. Strawn and Richard J. Higgins, counsel for the committee, presented the views of the security holders to the court. No order has been made by the court requiring the rebuilding of the structure, but the matter is still pending.

The principal liabilities of the property outside of secured debts are the claims for personal injury and damages, which must be disposed of before reorganization is possible. Representatives of these claimants have raised the issue of priority of these claims over that of the first mortgage bonds and secured notes. The question has not yet been argued before the court, but it is hoped that the matter will come up for disposal in the near future.

The Kansas City Railways' franchise in Kansas City, Kan., expired by limitation on Dec. 25, 1922. The operations of the receivers in Kansas City, Kan., have continued without interruption or question. This grant is regarded as unfavorable in many respects to the owners of the property, so that the expiration of the franchise is not considered a detriment to the property.

New Interests in Control of Quebec Property

Actual change of control of the Quebec Railway, Light, Heat & Power Company has been brought about, according to the *Canadian Financial Post*, by the acquisition by the Shawinigan Company of a large block of shares in the Quebec Railway, sufficient to give the Shawinigan Company control of the situation.

As noted in the ELECTRIC RAILWAY JOURNAL for May 19, page 863, the

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president, E. A. Robert, has resigned, and a new board of directors has been appointed which includes some of the former directors of the company who have been interested in its operation for a long time and representatives of the Shawinigan Company. Julian C. Smith, Montreal, vice-president and general manager of the Shawinigan Water & Power Company, becomes president.

Mr. Smith indicates that the company's properties will require very substantial sums to be expended in the railway, light, power and gas departments in order to provide adequately for the additional business which is available. The new directors are:

Julian C. Smith, Howard Murray, W. S. Hart, C. E. Taschereau, M. P., J. H. Fortier and James McCarthy, representing the new interests, and Lorne C. Webster, J. P. B. Casgrain, A. Turgeon, D. O. L'Esperance and Charles G. Greenshields, of the former board.

Julian C. Smith, president; Howard Murray, vice-president; W. S. Hart, treasurer; James Wilson, secretary, and Arthur Lemoine, assistant secretary.

The question of the relationship of the Quebec Railway with the citizens of Quebec comes up now. Mr. Robert planned to make arrangements with the city for operation of the tramways and gas service on the service-at-cost basis, but the attitude of the new management toward this proposal is not known.

Utility Engineer and Accountant Named in Louisvilile

In a recent communication to the lower board of the General Council, Mayor Quinn of Louisville announced the appointments of George W. Hubley and Charles Rosen as engineer and accountant respectively of the new public utilities supervising bureau.

The Utilities Bureau was formed to supervise the utilities, its principal work being in accounting and recording of costs, and being a sort of third party in deciding questions of rates allowed utility companies, when a need of adjustment of rates is shown. The bureau will not cost the city a nickel, as the Louisville Railway, Louisville Gas & Electric Company and Louisville Home Telephone Company each agreed to pay $10,000 a year for the upkeep of the bureau. Heretofore there were no records available in disputes and the matter of rate adjustment was a hard one to handle.

Detroit Income $80,978 in April

The net income of the City of Detroit Department of Street Railways during April was $80,978, being obtained after meeting all the usual operating expenses and providing reserves to meet sinking fund and interest payments. The net income during March was $98,025, but it is explained that March had thirty-one days, of which five were Saturdays and four Sundays, while in April there were five Sundays and four Saturdays. The highest revenues are obtained on Saturdays, whereas Sundays usually show a falling off.

During April 31,745,805 revenue passengers and 9,939,732 transfer passengers were carried, a total of 41,685,537. In March the total of passengers carried was 43,227,309.

Operating expenses for April were $1,290,077, as against a total passenger revenue of $1,693,767. The daily average expenses were higher than in March, due to increased maintenance work, which better weather conditions made possible.

April marked the first month the Detroit Street Railway has been placed on the departmental budget system. It is believed with the issuance of the June report it will be possible to make comparisons with the similar month in 1922 for the first year of operation by the city has now been ended.

City and Company $6,000,000 Apart

Report of City Engineer at Norfolk, Va., Indicates Wide Difference Over Valuation in Case Before Commission in Which Company Is Seeking Seven-Cent Fare

The inquiry into the financial and physical condition of the railway division of the Virginia Railway & Power Company at Norfolk, Va., ordered by the city of Norfolk as a result of a petition by the company for a 7-cent fare has been completed by Edwin Wortham, consulting engineer of Richmond. The survey was made with the co-operation and assistance of Walter H. Taylor, 3d, city engineer of Norfolk. On the recommendation of the engineers that a 5-cent fare is feasible in Norfolk the city is fighting the petition before the State Corporation Commission.

The appraisal by the engineers for the city was made upon the theory of reproduction cost new, less depreciation, plus a value for the enterprise as today established and developed in excess of figures ascertained from inventory, and prices prevailing during the year 1922.

The reproduction cost new was found to be $7,242,195. The property is declared to have depreciated to the extent of 27.1 per cent ($1,962,005), and, therefore, to possess a sound value of $5,280,190. To this the engineers added development expense of $792,028, making a total of $6,072,218, upon which the company is entitled, if it can, to earn an inviting return. The report says :

As is well understood, the property has not been maintained as it should have been. Large sections of track and other structures must soon be rebuilt. This reconstruction, as deferred maintenance, in large part should be cared for from revenue. Because of recent compliance with this sound business idea and upon the theory of continued compliance therewith for several years to come, and for the reason hereinabove set forth, we admit and suggest a value of $792,028 in excess of the present worth of the physical property.

Three years have passed since an appraisal of this property by the firm of Stone & Webster. During this period the company has engaged extensively in new construction and repairs, and has at the same time removed track of more than equal lengths to the track laid. We have found it almost impossible to connect the very minutely recorded work of Stone &

COMPARISON OF NORFOLK VALUATIONS

Statement of estimated cost to reproduce new, the property used in railway operation in Norfolk City and County, as of 1920, by Stone & Webster, and the estimated cost new, with its "sound value," as of January, 1923, by the City of Norfolk.

	Stone & Webster Cost, 1920	City Cost New, 1923	City "Sound Value," 1923
Right-of-way	$255,785	$146,033	$146,033
Land	893,764	331,264	331,264
Grading, Ballast, Ties, Rails and fastenings, Track, special work, Track, laying and surfacing, Paving	3,337,961	2,756,570	1,650,452
Roadway tools	4,419	4,133	3,422
Bridges, trestles and culverts	532,284	331,582	233,443
Crossings, fences, etc.	10,320	9,082	7,266
Signals	.....	.....	20
Telephone and telegrapn	5,024	4,521	3,617
Poles and fixtures	80,319	84,823	64,558
Underground conduits	16,725	16,490	11,447
Distribution system	373,043	348,706	243,599
Substation bldg.	46,627	.....	.....
Shops and car houses	341,544	212,080	180,422
Miscellaneous buildings	110,203	94,718	73,675
Docks and wharves	78,531	116,596	73,868
Substation equipment	260,830	.....	.....
Shop equipment and tools	42,527	23,534	10,000
Park and resort property	490,545	.....	.....
Revenue cars	921,419	1,031,849	696,562
Electrical equipment of cars	517,918	511,623	360,052
Other rail equipment	31,530	25,071	16,219
Miscellaneous equipment	28,177	27,160	10,608
Furniture and fixtures	4,082	2,858	2,287
Contractors' services	516,570	.....	.....
Taxes during construction	101,773	69,260	69,260
Interest during construction	838,079	213,662	213,662
Administrative organization during construction	116,259	78,000	78,000
Legal expenses during construction	77,506	52,000	52,000
Engineering cost	232,517	150,000	150,000
Organization Prior to Construction			
Preliminary investigations(a)	15,017	.....	.....
Cost of selling securities(b)	567,000	366,000	366,000
Permanent organization(c)	106,571	50,000	50,000
Interest on a, b and c	165,261	.....	.....
Material and supplies	104,869	128,200	127,346
Minimum cash balance	118,400	.....	.....
Totals	$11,343,399	$7,242,195	$5,280,190

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Webster with the physical properties, as they stand today, and therefore, have not been able to debit and credit the inventory preparatory to applying new unit prices. It has been necessary to a very large extent to prepare an entirely new inventory. The items of the Stone & Webster report though paralleled by us, cannot be weighed and compared, except as to totals, representing periods three years apart. We have not included in this inventory property to the value of $1,717,199, which for sound business reasons should not be classified as railway property.

By deducting this $1,717,199 from $11,343,339, the total of Stone & Webster's appraisal of approximately the same inventoried properties, we have $9,626,200. To this must be added capital expenditures of $877,272 for the years 1920-21-22, less cars retired, $223,176, making a total of $10,280,296, in comparison with reproduction cost by the city as of Jan. 1, 1923, of $7,242,195.

All of the above items, except worn-out cars, have value as stated, but according to our convictions do not belong in the column of assets of railway property, intended to establish a fair value for rate making purposes.

A study of the company's statements of bonds and stock allocated to the Norfolk Railway division lead the engineers for the city to conclude that the percentage of fixed interest bearing liabilities was higher than it should be and that this in turn accounted for the abnormally high amount per year for fixed charges.

The engineers say there has been a marked improvement in all branches of the service and conditions of the property since the war. They then say:

Since the first of this year the company has been figuring its depreciation and renewal reserve on the basis of 3 per cent of railway depreciable property, ordinarily a sound and sufficient amount. Had this policy been started sooner, the funds available for this purpose would have been more nearly in keeping with the requirements. It is our conviction, however, that because of accrued depreciation a greater amount must be made available and spent for this purpose from revenue for the next few ensuing years, as hereinbefore stated.

The ordinary expenses of the Norfolk system compares favorably with other places. Certain economics of operation, however, should be adopted which would speed up the net running time, thereby reducing the expense of hauling each passenger, which in turn would mean higher net earnings and dividends to the company, as well as better service for the rider.

Much has been said of the expenses of this company due to franchise requirements, as these requirements regulate paving upon the streets of the city of Norfolk occupied by the tracks. You recall an agreement upon this point when phrasing a new franchise to the extent that in paving a street initially, the city should pave from curb to curb including the car track area, but that the maintenance of this pavement ever after should be an obligation of the transportation company. This we think fair and correct.

Of the local traveling public, it was found by the engineers that 85 per cent or more avail themselves of the street cars and less than 15 per cent ride in jitneys. The day has not yet arrived, say the engineers, when capital will invest in jitney transportation in cities of the size of Norfolk sufficiently to establish a dependable service. There can be no doubt as to a choice between the two systems, should it become necessary to make such a decision. The city's engineers realized that both are here to stay, but they do say that if possible the two modes should be so regulated as not to injure one another financially. When this is not the case the 85 per cent of traveling public suffers for the benefit of a comparative few favored citizens.

Appreciation Expressed for Company Co-operation

In calling attention to exhibits Nos. 6 and 10 the engineers say that the present earnings of the company during the twelve months prior to this report, except for the short period of the strike, evidence a net return of 7.1 per cent upon the "sound value," found by them. In conclusion they express the opinion that the initiation of additional economies in operation, relief from unjustified short-haul jitney competition, and legitimate credit to the Norfolk Railway division of revenue from holdings in other companies, would permit the return to a 5-cent fare, with a reasonable charge for transfers.

Appreciation is expressed by the engineers of the courtesies extended by President Wheelwright of the Virginia Railway & Power Company in furnishing them information promptly and in permitting access to the company's records.

The figure of 7.1 per cent noted previously as being the net return upon the "sound value" is disputed by the Virginia Railway & Power Company on the ground that $50,000 a year interest on bonds of the Norfolk Light & Power Company owned by the company is included in its makeup. The company holds that this $50,000 revenue from holdings in the light and power company should not be included in this figure, which would bring the 7.1 down to about 6 per cent.

Valuation Ruling by Supreme Court

Highest Court Reaffirms Its Stand that Contemporary Cost Must Be Considered in Valuations

Reaffirming and strengthening its previous position that contemporaneous reproduction costs must be taken into consideration in fixing rates for public utilities, the United States Supreme Court on May 21 reversed the Missouri Supreme Court which had upheld an order of the Public Service Commission directing the Southwestern Bell Telephone Company to reduce rates.

The court was unanimous as to the reversal in this specific case, but Associate Justice Brandeis filed a separate opinion, with which Associate Justice Holmes concurred. Associate Justice McReynolds read the majority opinion, which dwelt at length upon the necessity for taking into consideration costs of physical reproduction at the time new rates are ordered by a regulatory body. Justice Brandeis agreed with his associates of the court in the reversal on the ground that the rates declared by the Public Service Commission were not sufficient to insure a fair return on a "prudent" investment, but in his separate opinion he declared that the theory of contemporaneous reproduction costs is "legally and economically unsound."

A few days after Aug. 1, 1919, when telegraph and telephone lines were released from federal war-time control, the Missouri Public Service Commission issued an order to the Southwestern Bell Telephone Company to show cause why exchange rates should not be lowered and installation and removal charges abolished. The rates and charges then existing had been fixed by order of the Postmaster-General. Appraisals at St. Louis, Caruthersville and Springfield, which had been made before the war, were used by the commission at the hearing. The company contended that reproduction costs at the time of the hearing were considerably greater than the figures shown in these appraisals. Various items of expense also were disallowed, such as rental paid to the American Telephone & Telegraph Company for apparatus. Reductions were

Conspectus of Indexes for May, 1923

Compiled for Publication in this Paper by

Albert S. Richey
Electric Railway Engineer
Worcester, Mass.

	Latest	Month Ago	Year Ago	Since War	
				High	Low
Street Railway Fares* 1913 = 4.84	May 1923 **6.88**	Apr. 1923 **6.89**	May 1922 **7.14**	May 1921 **7.24**	May 1923 **6.88**
Street Railway Materials* 1913 = 100	Apr. 1923 **175**	Mar. 1923 **174**	Apr 1922 **157**	Sept. 1920 **247**	Sept. 1921 **156**
Street Railway Wages* 1913 = 100	May 1923 **208**	Apr. 1923 **207**	May 1922 **211**	Sept. 1920 **232**	Apr 1923 **207**
Steel—Unfilled Orders (Million Tons) 1913 = 5.91	Apr. 30 1923 **7.29**	Mar. 31 1923 **7.40**	Apr. 30 1922 **5.10**	July 31 1920 **11.12**	Feb. 28 1922 **4.14**
U.S. Bank Clearings Outside N. Y. City (Billions)	Apr. 1923 **15.00**	Mar. 1923 **15.43**	Apr. 1922 **12.24**	Mar. 1920 **18.54**	Feb. 1922 **10.65**
Business Failures Number	Apr. 1923 **1,638**	Mar. 1923 **1,677**	Apr. 1922 **1,954**	Jan. 1922 **2,722**	Sept. 1922 **1,460**
Liabilities (millions)	**51.66**	**60.62**	**73.09**	**105.7**	**32.51**

	Latest	Month Ago	Year Ago	Since War	
				High	Low
Eng. News-Record Construction costs 1913 = 100	May 1923 **216.7**	Apr. 1923 **213.5**	May 1922 **184.6**	June 1920 **273.8**	Mar. 1922 **182.0**
U.S. Bur. Lab. Stat. Wholesale Commodities 1913 = 100	Apr. 1923 **159**	Mar. 1923 **159**	Apr. 1922 **143**	May 1920 **247**	Jan. 1922 **138**
Bradstreet's Wholesale Commodities 1913=9.21	May 1 1923 **13.67**	Apr. 1 1923 **13.93**	May 1 1922 **11.70**	Feb. 1 1920 **20.87**	June 1 1921 **10.62**
Dun's—Wholesale Commodities 1913 = 120.9	May 1 1923 **192.9**	Apr. 1 1923 **193.1**	May 1 1922 **166.1**	May 1 1920 **263.3**	July 1 1921 **159.8**
U.S. Bur. Lab. Stat. Retail food 1913 = 100	Apr. 1923 **143**	Mar. 1923 **142**	Apr. 1922 **139**	June 1920 **219**	Mar. 1922 **139**
Nat. Ind. Conf. Bd. Cost of living 1914 = 100	Apr. 1923 **159.1**	Mar. 1923 **159.2**	Apr. 1922 **154.8**	July 1920 **204.5**	Aug. 1922 **154.5**

*The three index numbers marked with an asterisk are computed by Mr. Richey, as follows: Fares index is average street railway fare in all United States cities with a population of 50,000 or over except New York City, and weighted according to population.

Street Railway Materials index is relative average price of materials (including fuel) used in street railway operation and maintenance, weighted according to average use of such materials.

Wages index is relative average maximum hourly wage of motormen and conductors on 105 street and interurban railways in the United States, operating more than 100 passenger cars each, and weighted according to number of cars.

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ordered. The company sued for relief from the order in the Cole County Circuit Court. That court upheld the order, as did the State Supreme Court, whereupon the company appealed to the United States Supreme Court on the grounds of confiscation.

In the majority opinion, the court of last resort declares that "obviously the commission undertook to value the property without according weight to greatly increased costs" of reproduction. A fair return must be assured, the court said, and "estimates for tomorrow cannot ignore prices of today."

Regarding the commission's action in disallowing rental paid the American Telephone & Telegraph Company for apparatus, the majority opinion declares that this appears to be a fair system, not extraordinary in business, and adds that "it must never be forgotten that while the state may regulate with a view to enforcing reasonable rates and charges, it is not the owner of the property of the public utility companies and is not clothed with the general power of management incident to ownership."

Elimination of Tax-Exempt Securities Improbable

The best opinion in Washington is that the proposed federal legislation to eliminate tax-exempt securities is doomed to fail. The relief from the impositions on such issues, sought by large users of money, such as the public utilities, whose securities are taxable, will have to be sought in other directions. This matter failed to come to a vote in the last Congress, but it is expected it will be brought up again before the next Congress. Passage of such a measure, however, is considered very unlikely.

Sale of Toledo & Western Will Be Advertised

A decree in foreclosure against the Toledo & Western Railroad, has been issued by Federal Judge John M. Killits at Toledo and sale will probably be advertised shortly for a date in June. The receivers, Harry A. Dunn, Joseph A. Yager, and Albert Swartz, were made special masters to conduct the sale at the headquarters of the company at Sylvania, Ohio.

Underlying mortgages covering the property are the Toledo & Western Railway, first mortgage 5 per cent bonds for an aggregate of $1,250,000 dated July 1, 1901, which with coupons due since July 1, 1920, amount with interest to a total of $1,477,580; the Toledo, Fayette & Western Railway, first mortgage 5 per cent bonds for an aggregate of $250,000 dated Nov. 1, 1902, which with unpaid coupons from July 1, 1920, and interest amount to a total of $295,516. There was a second mortgage issued on April 1, 1905, known as first consolidated and refunding mortgage securing an issue of 5 per cent bonds. The principal amount was $2,500,000 but only $500,000 was issued and outstanding. With coupons due since Oct. 1, 1905, this issue amounts to a total of $1,192,048.

Bids must be accompanied by a deposit of $55,000 in cash to insure good faith. The Cleveland Trust Company, as trustee, brought the action for foreclosure.

The line is about 60 miles in length from Toledo to Pioneer, Ohio, with a 20-mile branch line to Adrian, Mich.

B.R.T. Properties Sold Under Foreclosure

The Central Union Trust Company, as trustee of the Brooklyn Rapid Transit Company, acting under a decree issued by Federal Judge Mayer on April 5, sold for $25,000,000 on May 21 first mortgage bonds of the New York Municipal Railway Corporation to the face value of $57,735,000. Later in the afternoon E. Henry Lacombe, special master appointed under the decree, sold for $10,000,000 all the holdings of the Brooklyn Rapid Transit Company.

At both sales there was only one bidder. Alfred E. Mudge of Rushmore, Bisbee & Stern, representing the Brooklyn Rapid Transit reorganization committee, presented bids on behalf of Albert H. Wiggin, Gerhard M. Dahl and Frederick Strauss, the purchasing committee under the reorganization plan. His bids, aggregating $35,000,000 for the mortgage bonds and for the B. R. T. assets, were accepted and will be presented to Judge Mayer for approval.

A third sale, that of the property of the New York Municipal Railway Corporation and the New York Consolidated Railroad, its operating company, was to have been held, but it was postponed until May 29.

The sales of the bonds and property of the company are a step in the reorganization of the Brooklyn Rapid Transit Company, which is expected to take it out of the hands of the receiver. This is expected to take place within a few days. In anticipation a new company, the Brooklyn-Manhattan Transit Corporation, was incorporated on May 24 as the successor. On the same day the court confirmed the sale of the assets conducted on May 21 and referred to previously.

Auction Sales in New York.—At the public auction rooms in New York there were no sales of electric railway securities this week.

I. T. S. Merger Plan Approved.—The Illinois Commerce Commission on May 18 approved plans submitted to it for the consolidation of the Illinois Traction, North American Light & Power and other companies. Reference to this application to the commission has been made previously in the ELECTRIC RAILWAY JOURNAL.

Bonds Called for Redemption.—All Evansville & Princeton Traction Company bonds bearing the date of April 1, 1903, have been redeemed by the Southern Indiana Gas & Electric Company at 105 per cent of par and accrued interest. The total amount that remained outstanding on April 1 was $250,000.

Redemption Date Announced.—All of the outstanding first mortgage 5 per cent gold bonds, dated Oct. 1, 1919, due July 1, 1924, Series A, and all of the outstanding first mortgage 6 per cent gold bonds, dated Oct. 1, 1919, due July 1, 1924, Series B, of the Paducah Electric Company have been called for retirement and will be paid on June 1, 1923, at their face value and accrued interest at the office of State Street Trust Company, trustee, Boston.

$44,000 Note Issue Authorized for Improvements. — The Madison Railways, Madison, Wis., has been authorized by the Wisconsin Railroad Commission to issue $44,000 of notes, $37,000 of which will be used to provide funds to pay improvements to its East Johnson Street line.

Change of Name Contemplated.—The stockholders of the Scioto Valley Traction Company, Columbus, Ohio, will vote on June 7 on changing the name of the company to the Scioto Railway & Power Company. The question of taking care of the $1,426,000 of first mortgage 5 per cent bonds, due Sept. 1, will also come before the meeting for consideration.

New Director for Lake Shore Road.—Harris Creech, who succeeded the late F. H. Goff as president of the Cleveland Trust Company, has been elected to succeed Mr. Goff on the directorate of the Lake Shore Electric Railway, Cleveland, Ohio. He has also been named to the board of the Cleveland, Painesville & Eastern Railroad, as the successor Mr. Goff.

Sale of Carhouse Property Confirmed.—Judge Julius M. Mayer in the Federal District Court at New York, has confirmed the sale at auction of the carhouse property of the New York Railways, bounded by Fourth and Lexington Avenues and Thirty-second and Thirty-third Streets, New York City. The property was purchased by Harry Newmark, Fred Brown and another, for $1,600,000. The New York Railways is in the hands of a receiver.

Sale Under Foreclosure Ordered.—A decree has been entered in the United States District Court ordering the sale of the property of the Michigan United Railways to the highest bidder on June 30. The minimum bid to be received has been set at $5,000,000. The sale will be held at Jackson, Mich. The plan under which it is proposed to carry out the reorganization of the company has been reviewed previously in the ELECTRIC RAILWAY JOURNAL.

Bonds Extended.—The $500,000 first mortgage 5 per cent bonds of the Lehigh Traction Company, Hazleton, Pa., due on June 1 next are being extended for a period of ten years at the same rate of interest. On June 1, however, the bondholders will receive a bonus of $7.44 upon each $100 of bonds. The payment of the bonus will reduce the amount of the principal invested and by receiving the sum ten years in advance of the extended maturity date gives the investor 6 per cent instead of 5 per cent on his money.

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Traffic and Transportation

Accident Map Useful

Los Angeles Company Emphasizes Places of Danger by Means of Red Buttons

The Pacific Electric Railway of Los Angeles, Cal., is constantly emphasizing the need of more care on the part of motormen in avoiding traffic accidents, and repeatedly urging the trainmen to "use more care."

This campaign gains its principal incentive through the medium of efficiently organized and active safety committees.

There are three division safety committees, one for each of the three divisional operated lines, and a central safety committee.

There are four safety meetings each month; one for each of the three division committees and one for the central committee.

Various methods are adopted for impressing more care upon the trainman's part, such as campaign drives of impressive talks to trainmen by the general claim agent and other representative operating officials. Examples of carelessness are vividly brought to the attention of the men to stimulate the element of precaution.

Furthermore, the employees' magazine each month devotes a page or two toward interesting the trainmen in this vital subject.

In this respect the company has pointed out that the vast number of automobiles now traversing the highways and streets, and parked along the curbs, has greatly increased the accident hazard and created a situation which makes it imperative that all concerned substitute "extraordinary care" for ordinary care if the accident record is to be lowered. The company has explained to the trainmen what is meant by "extraordinary care":

Less speed, operating under absolute control.
Keep a *safe* distance back of the vehicle ahead.
Being *sure* of clearance when passing vehicles.
In knowing that every congested area is a *danger point.*
In applying *brakes* earlier when traffic jam occurs.
A more frequent use of *gong* and *whistle.*
In knowing that any automobile may do the *unexpected.*
In taking *no chances;* the automobile fellow will do that.
And, notwithstanding all your care, if there should come a time when you do have an accident, get all the witness cards as a personal favor to you, that you may clear yourself of any liability.
Automobiles are becoming more numerous every day, which means an ever increasing army of irresponsibles, indifferent to the meager traffic laws or to the rights of others. Everything depends upon the care we exercise.
Ordinary care will not meet existing conditions, therefore, we must use *extraordinary care;* begin today!

Recently the company adopted a novel method of concretely impressing upon trainmen the necessity for precaution. At each of the division points in several cities a large map of the city is prominently displayed which shows routes of the company's lines and the city streets traversed and crossed.

Whenever a street car has a collision with a vehicle on any street or at some particular street crossing, a red button is stuck on the map at the location of the accident. If several accidents happen at this particular location at subsequent periods of time, additional red thumb tack buttons are stuck on the map at the particular place. While trainmen are congregated about divisional headquarters before assuming or after leaving their runs, a point is made to impress upon them the value of this map record of accidents. The appearance of several buttons at one given location is, of course, an automatic signal of danger at that particular location.

Ladies Taken to Task by Portland Mayor

The somewhat strenuous efforts of the Housewives' Council of Portland, Ore., to resurrect the jitneys for the purpose of securing lower transportation rates have met with failure at the hands of a stern, unfeeling group of City Fathers, headed by Mayor George L. Baker.

The Housewives' Council is made up largely of ladies who are politicians first and housewives second if at all. The members turned to the jitney idea after their efforts to force the Public Service Commission to reduce the present 8-cent fare on the Portland Railway, Light & Power lines back to the lowly nickel had come to naught.

Mrs. Josephine Othus, president of the Housewives' Council, explained to the commissioners that they tried to get a 5-cent fare restored, and couldn't, and then decided that the next best move was to request the city authorities to repeal all existing laws governing jitney operation and allow the buses to run in competition with the trolley cars.

After a lengthy statement had been made by Mrs. Othus, supported by several other members of the delegation, Mayor Baker explained that he held no brief for the railway, but that he was unalterably opposed to allowing the jitneys again to run wild in the streets. He said:

We have had experience with the jitneys and know that they are a menace to the people and that they do not give adequate service. They are placed on the short runs, while the people in the outlying districts get no service at all. The voters of Portland have spoken, and unless the voters decide to return to jitneys I will oppose amendment of any ordinance that would bring about a return to the hectic days of jitney service.

Other members of the City Council took a similar position with the result that the request made by the Housewives' Council was placed on file.

Offers Plan for Traffic Relief in La Crosse

Pursuant to a request from the city authorities of La Crosse, Wis., for traffic rule suggestions, to the end that collisions between autos and street cars may be avoided and the number of other accidents lessened, R. M. Howard, vice-president of the Wisconsin Railway, Light & Power Company, operator of the local system in La Crosse and the line between La Crosse and Winona, Minn., has outlined a plan to alleviate the situation.

Mr. Howard first suggests the establishment and marking of arterial highways with the rule that all cars crossing or turning into these highways from a cross street be required to come to a full stop. Further, that parking should be prohibited on the principal streets of La Crosse for a distance of two blocks and that this principal street be one of the arterial highways. A third suggestion is that a rule be made, and penalties established to enforce it, prohibiting the crossing of streets in the business district by pedestrians at any point except on the established crossing.

Mr. Howard said he would like to have a month's trial of the plan of designating the principal street as an arterial highway with parking eliminated for a distance of two blocks or four blocks. He believed that the results in speeding up traffic and relieving the present congestion would be so satisfactory that the plan would be extended to other streets.

Withdrawal of Paving Obligation Ends Fare Controversy in Madison

The controversy between the city of Madison, Wis., and the Madison Railways in regard to fares and paving has at last been settled.

The settlement ordinance releases the Madison Railways from all obligations to bear any part of the costs of paving between the car tracks. The company must, however, bear the additional costs due to the presence of the railway tracks in the street. In consideration of such relief the company agrees to extend its tracks on East Johnson Street and to extend its tracks on Monroe Street as far as Crandall Court.

The Madison Railways immediately upon the passage of the ordinance withdrew its request to the commission for an increase in rates. The commission has ordered the company to extend its tracks, for it feels that the revenues of the company warrant an extension and that the part of the city in question is not being properly served at present.

The company will, no doubt, take steps at once to carry out the extensions and double tracking. Officials of the railway and the commission indicate that the likelihood has thus been removed of any increase in fares now or in the future.

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Ten-Cent Fare in Seattle on June 23

According to present plans, fares in Seattle will return to the 8½-cent basis on June 23, as Mayor E. J. Brown states that he will not veto the ordinance for higher fare passed by the City Council. The measure will be allowed to become a law without his signature.

The 5-cent fare has been in force since March 1, and the railway has consistently lost money until railway and city officials realized that a return to the higher fare is absolutely essential. The fare will be 10 cents cash, with three tickets for 25 cents.

With the higher fare voted, the way is now open to negotiate with the bondholders for an extension of the term of the railway purchase bonds, Council members point out. Four plans have been tentatively discussed, three of them providing for extension of the bonds to forty years, with interest at 4, 4½ and 5 per cent. The fourth plan provides for paying a fixed sum annually in addition to the interest so the bonds would be retired at the end of about forty years.

Queens County Adopts Boston Type of Transfer

The New York & Queens County Railway, Long Island City, has adopted the Moran type of transfer used on the Boston Elevated Railway, as described in the issue of this paper for Aug. 26, 1922. The only changes made from the Boston type were to print the transfer conditions on the face of the transfer instead of on the reverse side, thus saving a printing process, and to have the p.m. transfer good until 3 a.m. instead of 12 midnight. The object of this change was to eliminate the necessity for men working late straight runs to carry a supply of a.m. transfers to be used after midnight.

The New York & Queens County Railway is now operating a 100 per cent one-man service, and the adoption of this particular transfer was largely because it does not have to be punched after the car leaves the terminal.

Public Will Be Asked to Discuss Beeler Recommendations

It is planned by the Commission Council of New Orleans on the suggestion of Commissioner Maloney, of the Department of Public Utilities, to invite the public to a conference to be held in the Council Chamber on the 125 or more recommendations submitted in the Beeler report for the improvement of the New Orleans electric railway service.

The members of the Commission Council desire to hear from the public, in open discussions, on the recommendations, before taking definite steps toward adopting the recommendations in part or as a whole. The Commission Council has been prevented from taking this step sooner by reason of the absence of its members by illness or otherwise, during the past two months. This delay has interfered with important paving projects and other works of civic improvement, that cannot be taken up until the electric railway matter is disposed of.

Jitney Lines in Houston Will Be Abolished July 1

In accordance with the instruction of the City Council of Houston for the submission of plans for the rerouting of jitneys the routes were presented to the Council on May 16.

After much discussion and very little progress in rerouting a motion was carried by a vote of three to one abolishing all jitney lines in the city effective July 1. This action by the Council was unexpected.

The jitney men wanted the Council to submit the question to a vote of the people, but it refused. However, the jitney men can force the matter to a vote by obtaining a referendum petition. Such a petition would only require approximately 2,000 signatures. No such petition is being circulated and the Houston Electric Company is now awaiting further developments.

The history of the jitney situation in Houston was reviewed in the ELECTRIC RAILWAY JOURNAL, issue of May 19.

Allows One-Man Car Operation.—The City Council will allow the Dubuque Electric Company, Dubuque, Ia., to operate one-man cars on one line for one year as an experiment. At present the company has in service a number of cars of the front-door type manned by two men, but designed for one-man operation.

Arrangements for Service Completed.—F. K. Woodring, general manager of the Northwestern Ohio Railway & Power Company, Oak Harbor, Ohio, reports that his company has completed arrangements by which interurban service from Marblehead and all points west of Toledo will be joined with the White Star Steamship Line for Detroit beginning June 1.

I. T. S. Opposes Bus Applicant.—The Illinois Traction System, Peoria, Ill., appeared before the Illinois Commerce Commission at Springfield on May 2 to oppose the issuance of a certificate of convenience and necessity to the Benld-Wilsonville Motor Bus Transportation Company to operate between Gillespie and Staunton via Benld and Sawyerville. The commission took the case under advisement.

Offices of Chicago Surface Lines Being Moved.—Most of the offices of the Chicago Surface Lines have now been moved from 105 South La Salle Street to 230 South Clark Street, occupying the eleventh and fourteenth floors of the new Illinois Merchants Bank Building. It is expected that the other half of this structure will be completed by May 1 next year, at which time the surface lines' offices, as well as the board of supervising engineers,' will occupy the entire fourteenth floor.

Traffic Changes Suggested.—Recommendation is made by the Johnstown, Pa., City Planning Commission that cars on the Johnstown Traction Company cross street intersections before stopping, rather than continue the present practice of stopping on the near side of the streets. The committee makes the request to relieve traffic congestion. The committee's request is especially urgent as relates to intersections where the cars turn off from one avenue to another, the commission believing that cars should make the corner turn to take on or discharge passengers. The commission also asks for the discontinuance of parking cars at certain streets.

No Fare Reduction Likely in Worcester.—Clark V. Wood, president of the Worcester Consolidated Street Railway, Worcester, Mass., speaking in relation to suggestions of reduced fares, said recently that no early reduction from the present 10-cent rate was to be expected. He said that the company's receipts to date were slightly in excess of last year, but not large enough to create a surplus and that passenger receipts had of late been on the decline, owing to the highways again being freed from a snowbound condition.

Gratifying Response by Public to "L" Improvements.—Grayson M.-P. Murphy, chairman of the board of directors of the Interborough Rapid Transit Company, New York, N. Y., said on May 15 that recent improvements on the elevated and subway lines to increase efficiency had been more successful than the company hoped. He referred particularly to the success of the additional express service on the elevated lines, and said that it had already attracted more business than anticipated, and had somewhat relieved the congestion on the subway. With the summer coming, it is the belief this service will be even more attractive. Mr. Murphy also said that the first of the sliding door cars that will eventually mean the elimination of the swinging door type now used will be put in operation on the elevated division next fall.

Six-Cent Fare to Continue.—A 6-cent fare will continue to be charged by the Little Rock Railway & Electric Company, Little Rock, Ark.. now the Arkansas Central Power Company, as a result of recent action of the City Council. The public utilities committee reported adversely on the ordinance by Alderman Connor, to reduce the fare from 6 cents to 5 cents, and recommended that the fare be continued at 6 cents. Accompanying the statement from the Councilmanic committee was the report of the engineers representing the city and the railway, the engineers having fixed a valuation of the company's properties at $7,000,000 for rate-making purposes and saying that $150,000 should be charged off annually for reproductions. The report provided that the company should dismiss within five days its appeal from the order of the Council of July 11, 1921, denying to it the right to collect a 7-cent fare.

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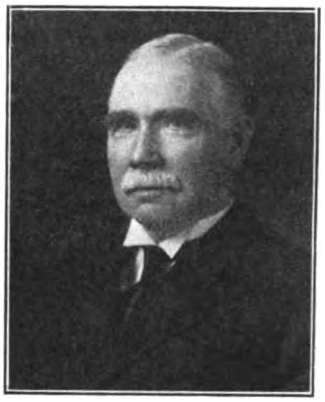
Personal Items

E. G. Stevenson, President

Head of Detroit United Railway Has Rendered Invaluable Service to Company as Counselor—A. A. Gingras Treasurer

Elliott G. Stevenson, president and chief counsel of the Detroit United Railway, was born on a farm in Middlesex County, Ont., on May 18, 1856. In his early childhood his parents moved to Port Huron, Mich., and since that time he has resided in Michigan; in Port Huron until 1887 and in Detroit since 1887. His summers, however, have been for many years and are now spent on his large farm located on the Canadian shore of the Detroit River, near Amherstburg. He did not have the opportunity to obtain and never did obtain a college education. The best that his family—whose means were limited—could do for him was to send him through the public schools at Port Huron and to supplement this by a short course at an academy at London, Ont. This constituted his entire formal school education.



E. G. Stevenson

Counsel in Many Famous Cases

In 1877 when he was only twenty-one years old, Mr. Stevenson was admitted to the bar, having acquired his legal knowledge by studying in the law office of O'Brien J. Atkinson, at Port Huron. In 1878, when he was only twenty-two years old, he was elected prosecuting attorney of St. Clair County, Michigan—the county in which Port Huron is located. In 1880 he was re-elected prosecuting attorney and held that office for another term of two years. He was Mayor of the city of Port Huron from 1885 to 1886. These were the only public offices he ever held or sought. He has stood for many years and stands now at the head of the Michigan bar. He is equally great as a trial lawyer, a wise adviser and a skillful and diplomatic negotiator.

Among the famous cases that he has successfully conducted may be mentioned the suit brought by the Dodge brothers against the Ford Motor Company and Henry Ford. In this suit Mr. Stevenson, as counsel for the Dodge brothers, obtained a decree compelling Mr. Ford, as owner of the majority of the stock of the Ford Motor Company, to distribute among the stockholders of that company $25,000,000 of its earnings for the fiscal year ended July 31, 1916. In consequence of this decree, Mr. Ford, in order that he might carry out his plans, was compelled to buy the stock of the other stockholders, and to do this, he had to pay and did pay the sum of $25,000 for each $100 of stock purchased by him. A more famous suit, perhaps, than the one just mentioned was the action of Henry Ford against the Chicago *Tribune*, tried at Mount Clemens, Mich., in 1919. Mr. Stevenson was the chief counsel for the *Tribune* company. This was a libel suit brought by Mr. Ford to recover damages because the *Tribune* had charged in a leading editorial that he was ignorant and was an anarchist. It will be remembered that in this suit, in examining Mr. Ford Mr. Stevenson asked questions which brought out from Mr. Ford the testimony that the American Revolution occurred in 1812 and that Benedict Arnold was a noted writer. In this case, Mr. Ford sought to recover $1,000,000 damages. The jury gave him a verdict of 6 cents.

Only a small part of Mr. Stevenson's extensive legal business has resulted in court trials. His attitude has been that, as a general proposition, controversies instead of being litigated should be adjusted. In effecting such adjustments, he has displayed extraordinary wisdom and skill and thus rendered his clients a far greater and more valuable service than he would had these controversies been successfully litigated in suit.

For many years, Mr. Stevenson has been the leading counsel of the Detroit United Railway and during the last year he has also been its president. The complicated and disturbed condition of this company's affairs made the task of managing its legal and executive departments one worthy of the extraordinary qualities possessed by Mr. Stevenson. Ruin could not have been averted had the person entrusted with those responsibilities possessed smaller ability. His services to the company have been invaluable. To those services more than to any other cause the present improved condition of that company's affairs is to be attributed.

A. A. Gingras

Montreal Man Is Treasurer

A. A. Gingras, the treasurer of the Detroit United Railway, became a factor in the affairs of the company about the time the negotiations were coming to a head for the purchase of the city lines of the company by the city itself. There is a large Canadian interest in the Detroit United Railway and has been for some time, and Mr. Gingras is the accredited representative of this following in the company. His position does not call for him to be in the public eye to the extent that Mr. Stevenson's post does. Neither officer courts publicity, but Mr. Gingras because of his position has been able to escape public attention whereas Mr. Stevenson by the very reason of his position has not been able so to escape. The silence of Mr. Gingras has not been studied, but the effect on the public has been the same as if his silence had been one of design. He is a factor in financial affairs in Montreal. but his activities there, while large and varied, have not been such as to focus public attention upon him. This has made him an elusive subject for anything like a fitting biography. He represents his constituents fitly, but he does it unostentatiously, so that even in Detroit little is known about the man outside of immediate company circles. He spends only a part of his time in Detroit.

John W. Hulme and George W. Dunlap Resign from International Railway

H. L. Mack, vice-president in charge of engineering of the International Railway, Buffalo, announces a redesignation of positions in his department with a specialist to handle each phase of the engineering activities of the company. The three divisions are headed by a superintendent of power distribution, which consolidates the positions of superintendent of power and superintendent of lines; engineer in charge of maintenance of way, which absorbs the duties of chief engineer, and superintendent of equipment, which includes superintendent of buildings.

With the announcement of redesignation of positions and consolidation of departments under three division chiefs, who report direct to Mr. Mack, comes the announcement of the resignations of John W. Hulme as superintendent of equipment and George W. Dunlap as superintendent of power, and the pro-

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motion of Henry E. Riexinger to the new position of engineer of maintenance of way. George Kuhn becomes superintendent of equipment and buildings and Joseph Mack becomes superintendent of power distribution.

Joseph Mack has been superintendent of power lines of the International Railway since 1910. Mr. Mack has been with the company for thirty years.

Mr. Riexinger has been chief engineer of the International Railway since 1910. He will continue to handle the duties of chief engineer in addition to his new position.

Mr. Kuhn has been associated with the mechanical department of the company for thirty-five years. For some time he has been superintendent of buildings, but for many years he has served as assistant superintendent of equipment.

R. G. Near and A. M. Farrell Assume New Duties

R. G. Near has been appointed acting general freight and passenger agent of the Chicago, Ottawa & Peoria Railway with offices at Joliet, Ill. In this capacity he succeeds A. M. Farrell, who resigned this position to assume similar duties with the Eastern Wisconsin Electric Railway at Oskosh, Wis.

Mr. Farrell has been connected with steam and electric railways for almost twenty-five years. In that time he served as chief of the traffic department of the Chicago, Ottawa & Peoria Railway. In his early days in the railway field he was associated with the Ohio River Railroad at Parkersburg, W. Va., as clerk to the general superintendent. He gave six years service to the Baltimore & Ohio Railroad, three years as chief rate clerk at the local freight office in Huntington, and three years as rate clerk of the division freight office in Parkersburg, W. Va. Mr. Farrell also served the Western Terminal Trunk Line Association and the Coal & Coke Railway in Elkins, W. Va. The position he just relinquished he had held for three years.

His successor, R. G. Near, spent one year in the transportation department of the Northern Pacific Railway, Duluth, Minn. Prior to that he had given two years in messenger service with the Adams Express Company in Aurora and three years as agent for the Adams Express Company in Duluth, Minn., and Ottawa, Ill. Later he went to the Chicago, Ottawa & Peoria Railway in Ottawa to work in the transportation department. He has been with this company nine years, two years in the transportation department, three years as agent and dispatcher and four years in the freight accounting department.

A. H. Kendall, master mechanic of Quebec district, Canadian Pacific Railway, has resigned to become manager of the Chicoutimi Pulp Company, the Saguenay Light & Power Company and the Roberval & Saguenay Railway Company, Chicoutimi, Quebec.

Mr. Maddock at Providence

Former Eastern Massachusetts Engineer Made Assistant to Superintendent of Equipment of Rhode Island Lines

R. S. Maddock has been appointed assistant to the superintendent of equipment of the United Electric Railways, Providence, R. I. On March 27, 1899, when he was fifteen years old, Mr. Maddock enlisted in the United States Navy as an apprentice. He served on several ships and stations in various capacities, including signal boy, gun-pointer and quartermaster, until March 25, 1905. He then entered the employ of the Boston Elevated as a pit helper at City Point, and after a few weeks in the pit-room was assigned part time to office and store room work. Meanwhile he attended an evening high school special course to prepare for the Lowell Institute courses at the Massachusetts Institute of Technology. During his second year at City Point Mr.

R. S. Maddock

Maddock started courses at the M. I. T., taking electrical engineering two years and mechanical engineering two years. He was graduated in 1910.

Meanwhile he had been transferred at his own request in 1907 from City Point to East Boston in order to get experience on heavy equipments and multiple-unit control, which at that time was comparatively new for surface cars. After serving for two years in East Boston Mr. Maddock went to work as inspector for the Boston & Northern Street Railway, now the Eastern Massachusetts, under E. W. Holst, who was then superintendent of equipment. His duties called for supervision of cars run from several stations over tracks of other companies. In addition he acted as foreman for short periods in different carhouses. Later he was sent to West Lynn as assistant foreman, thence to Woburn as foreman and thence to West Lynn as foreman in 1911. The following year he was made inspector of car repairs and continued to act in that capacity until August of that year, at which time he left railroad work.

Returning to the railway field in 1915 Mr. Maddock was re-employed as inspector of car repairs by the Bay State Street Railway, now the Eastern Massachusetts. Since that time he has been assistant general foreman and shop foreman at the Chelsea shop, general foreman 1920 to June, 1922, and then equipment inspector. He continued to serve in the last-named capacity until March, 1923, at which time he resigned to enter the employ of the United Electric Railways.

Obituary

Dr. Hans Goldschmidt

Prof. Dr. Hans Goldschmidt, inventor of the widely known thermit process for welding iron and steel and for producing high grade metals and alloys, also originator of many other scientific inventions, died suddenly in Baden-Baden, Germany, on May 20 after a stroke.

Prof. Goldschmidt was born in Berlin on Jan. 18, 1861. After being graduated from the "gymnasium" of Altenburg, Hans Goldschmidt studied chemistry, physics and natural sciences in general at the universities of Berlin, Leipzig, Heidelberg, Strassburg and at the Institute of Technology at Charlottenburg. He received the degree of Ph.D. from the University of Heidelberg in 1886.

In 1887 Prof. Goldschmidt entered the firm of Th. Goldschmidt, Essen Ruhr, Germany, in joint partnership with his brother, Dr. Karl Goldschmidt. The attention of the latter was applied mainly to the business management of the company, while Prof. Hans Goldschmidt devoted himself to scientific research. Under their joint guidance the firm grew to international importance, with agencies and allied companies throughout the world.

Prof. Goldschmidt's most important invention was the thermit process, now used extensively all over the world for welding iron and steel sections and for producing metals and alloys of high purity.

Prof. Goldschmidt visited this country very frequently and was president of the Goldschmidt Thermit Company, now the Metal & Thermit Corporation, from 1904 to 1916. Through his death the world loses a chemist of great knowledge and inventive genius.

Henry Woodland

Henry Woodland, secretary and treasurer of the Allis-Chalmers Manufacturing Company, died suddenly at his home in Milwaukee on May 14..

Born in Utica, N. Y., Mr. Woodland at an early age became connected with the New York Air Brake Company, Chicago. Later he was treasurer of the Gates Iron Works, Chicago. When in 1901 this company was taken over in the consolidation which formed the Allis-Chalmers Company, he became assistant treasurer of the new organization and afterward its treasurer. In 1916 he was elected secretary and treasurer of the company.

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Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Copper Buying Is Beginning Again

The Foreign Market is Uncertain, However, and Domestic Buying is Still Conservative—A Stable Price Is Likely

The present cheapness of copper in Europe appears to be due to the declining purchasing power of existing industries there, rather than to an actual abundance of the metal. The German government, which was a heavy buyer of American copper in 1919 and 1920, stopped work on many improvements at the time of the Ruhr occupation and at present has no money to carry them out. In Italy extension and repair work on telephone, telegraph and railway lines has been largely suspended awaiting the return of these industries to private operation. Copper is being bought in fair quantities in Great Britain, but in many of the smaller countries disturbed conditions have affected the market adversely.

The export of American copper is an enterprise entirely separate from the domestic market, being controlled by the Copper Export Association. Until the World War, about half of the copper sold in this country was for export. Owing to the elaborate organization of the metal trade in Europe, especially in Germany and England, and to the speculative foreign buying thus promoted, American sellers were not satisfied with the way their copper was being marketed abroad, and finally, at the close of the war, it was determined to correct some of the previous conditions. To that end, and partly to lift the burden of unsold stocks from American producers, the Copper Export Association was formed. This association, which will sell only to bona fide consumers, is temporarily out of the market.

Copper buying by domestic consumers has been conservative. Although manufacturers who use copper report a good quantity of orders on their books, deliveries have been held up in many cases by labor troubles, and they are therefore buying copper moderately. Over half the copper used in this country is used for electrical purposes, although in the last year or two, partly owing to the publicity campaigns of the Copper and Brass Research Association and private companies, and partly because of the comparatively low price of copper, that metal has been used in greatly increasing quantities for certain purposes to replace less durable materials.

Under present conditions, the principal factors that make for a large copper demand are the development of electric power by public utility companies and railroads, enlargement of telephone facilities, and an expanding building industry. The proposed electrification of steam railroads all over the world will require immense quantities of copper.

Domestic buying is beginning in earnest and a gradual recovery in price to about 16 cents may be expected. It is unlikely, however, that consumers will compete with each other so strenuously to buy copper, that the price will be greatly advanced, as has happened before. A moderately stable price may be looked for.

Secondary Copper

In the year 1921, with large amounts of scrap copper left over from the World War still available, a total of 217,300 tons of copper was recovered as secondary metal, which was equal to about 90 per cent of the virgin copper produced by United States mines. Copper appears in rejuvenated form to a much greater extent than do lead or zinc, and the amount of scrap copper available must be considered by all followers of the copper market.

General Business Depression Seems Improbable

Because of the recent slight slump in business in some fields, notably the construction field, the question has arisen as to whether this was the beginning of a general business depression. The best advised opinion in Washington is that the country is actually fortunate in having a little relief from the rapid ascent of the early months of the year, as this may give an opportunity to catch up slightly with orders and serve to stem the tide towards prices so high as to invite buyers' strikes. The country's business is considered to be passing an economic tableland and not going down grade.

The existing full employment, the absence of stocks of finished materials of almost every kind, and freedom from overproduction, certainly indicate stability. Furthermore, the unprecedented amount of money being distributed in wages represents a buying power that must surely have a tremendous influence in sustaining business. None of the elements of depression seems to be present in the existing situation.

The buying activities of the electric railway field specifically are, of course, very closely tied up with general business conditions. When there is full employment and plenty of money in circulation people ride, and when the opposite condition exists the riding falls off materially. Heavy riding at the generally fair rate of fare now prevailing means good revenue for the railways and a correspondingly active buying, which may be expected to continue as long as there is little unemployment.

As to price levels, while present prices may be slightly inflated, it is out of the question that we can get back to the 1913 levels. The rate of taxation alone would preclude that. It has been the history of industry that the real factors in reducing price levels are the improvement of production methods and increasing efficiency of distribution. Labor will hold the major part of its gains.

Cement Situation Improves

The advice of government officials was sought a few weeks ago by the cement industry in the hope that duplication of orders for cement might be avoided. A survey indicated some twenty to thirty per cent of duplication in orders. This resulted from the fact that every cement mill in the country was booked to full production for many months ahead.

The recent curtailment of buildings, however, has introduced a considerable change in the situation. The Government was considering a curtailment of highway construction as a measure of relief for private industry, for it was thought in official circles that there are certain localities where road construction could well wait rather than to draw material away from needed use under private enterprise. As it has now turned out the reduction in demand for cement which has come from the curtailment of building construction has been tremendously greater than any curtailment in the use of this material which could have been brought about through the recommendation that construction work on public projects be retarded. While it is believed in Washington that even as things now are cement manufacturers would welcome a curtailment in the highway program, such curtailment does not now seem so essential, and there is some hesitancy to take such steps for fear the pendulum might swing back too far the other way.

Metal, Coal and Material Prices

Metals—New York	May 22
Copper, electrolytic, cents per lb	15.437
Copper wire base, cents per lb	18 50
Lead, cents per lb	7 25
Zinc, cents per lb	6.875
Tin, Straits, cents per lb	42 125
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$6 875
Somerset mine run, Boston, net tons	3 00
Pittsburgh mine run, Pittsburgh, net tons	2.00
Franklin, Ill., screenings, Chicago, net tons	1.825
Central, Ill., screenings, Chicago, net tons	1.87
Kansas screenings, Kansas City, net tons	2.625
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft	$7.75
Weatherproof wire base, N. Y., cents per lb.	19.25
Cement, Chicago net prices, without bags	$2.20
Linseed oil (5-bbl. lots), N. Y., per gal	$1.14
White lead, in oil (100-lb. keg), N. Y., cents per lb	13 125
Turpentine, (bbl. lots), N.Y., per gal	$1 225

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Rolling Stock

United Railways & Electric Company, Baltimore, Md., will shortly place an order for two single-end Peter Witt type motor cars. This is for the purpose of experimenting with this type of equipment, looking toward the probable purchase of sixty or seventy cars of this type.

Dallas Railway has tentatively approved the proposal of the Supervisor of Public Utilities that the traction company purchase fifty new double-truck standard cars and put them in operation at once to relieve congestion, according to Richard Meriwether, vice-president and general manager. Orders have not been placed for the cars, but the proposal of the supervisor is being favorably entertained.

Birmingham Railway, Light & Power Company has placed orders for twenty new steel cars of the most improved design with the Cincinnati Car Company, according to an announcement on May 17, by J. S. Pevear, president and co-receiver of the company. The purchase, Mr. Pevear stated, will represent a total investment of approximately $300,000. Separate entrances for white and negro passengers are to be provided on the new cars, with effectual separation of the races in the cars. These new cars, it is announced, will be rushed to completion as rapidly as possible and put into service. Cars now in use are being remodeled to meet the provisions of the recently adopted ordinance and settlement between the city and the company.

Track and Roadway

Ford City, Ont.—The Town Council has passed a by-law providing for an expenditure of $83,218 as Ford City's share of the $966,000 scheduled to be spent for electric railway service by the Hydro-Electric Power Commission of Ontario in 1923 in the border cities.

Southern Indiana Gas & Electric Company, Evansville, Ind., has completed work on the improvement of Main Street with 90-lb. rails. The work of laying a new stretch of track about 1 mile long on West Heights, a suburb, will start soon. The company's improvements in Evansville and suburbs this year will total about $100,000.

Lewistown & Reedsville Electric Railway, Lewistown, Pa., will extend its lines from Fountain Square to Mount Rock at the Ort Valley Road. In making the extension the City Council designated that "T" rails be used, that the company remove the snow within twenty-four hours, that a 6-in. thickness of crushed limestone bed be used, that no turnouts be constructed and that lights be provided at the Logan Street extension by the company. The extension is more than 1 mile in length and connects with the traction company lines at Fountain Square. J. I. Quigley, president of the trolley company, plans to begin work immediately.

New York, N. Y.—The New York Transit Commission has awarded to McClintic-Marshall Company, 50 Church Street, the contract for construction of Section 1 of the Flushing subway extension. This company's bid was $679,838, the lowest figure named by eight bidders. This bid, however, is $63,958 greater than that of the Phoenix Bridge Company, to which the contract was originally awarded, but rejected by the Board of Estimate.

Power Houses, Shops and Buildings

Cleveland Railway is building a new storage yard on East Thirty-fourth Street, at which it will store the cars of its rapid transit line and also some other cars, including some tripper cars. This yard will be equipped with an operating inspection shop and other facilities.

Hartford & Springfield Street Railway, Warehouse Point, Conn., through Attorney Harrison B. Freeman, receiver, has petitioned the Superior Court for authority to discontinue the power station at Warehouse Point and purchase energy from the Northern Connecticut Light & Power Company. In supporting his petition at a recent hearing, he explained that the power station was twenty years old and that a saving of $15,000 or more each year could be effected through a contract with the Northern Connecticut.

Dubuque Electric Company through its officials stated that a series of improvements and additions at the power plant, which was started about three years ago, will be carried on for about eighteen months. The program now under way will change the arrangement of the plans about so that the water pumping equipment will be capable of supplying a sufficient supply of water to the boilers, regardless of variations in the river stage. The officials stated that recent improvements would amount to about $300,000. The improvements contemplated will amount to about another $100,000, it was announced. Plans are being considered for breaking ground for a new turbine room within the next ten months. It will be located on the ground near the present power plant.

Trade Notes

Rollway Bearing Company, Inc., Syracuse, N. Y., is the new name of the Railway Roller Bearing Company. This change was effected because of the fact that the trade name "Rollway" under which the company's bearings have been advertised and marketed for the past fourteen years is more generally identified with the company's product than the old name. To care for the increase in the volume of business the company has reorganized.

F. V. Shannon has been appointed western manager of the Massey Concrete Products Corporation in charge of the territory comprising the states of California, Oregon, Washington, Idaho, Nevada, Arizona, Utah, Wyoming and Montana, with offices at 65 Market Street, San Francisco.

Westinghouse Electric & Manufacturing Company announced that it has more than $4,000,000 of orders for the Pennsylvania, Long Island, Southern Pacific, Norfolk & Western and New Haven Railroads. It will build three large electric locomotives for the Pennsylvania, and an additional power house and generating equipment at Long Island City, equipment for forty motor cars for the Long Island, four large electric locomotives for the Norfolk & Western and a transformer station, twelve passenger locomotives for the New Haven and a new generating unit at Cos Cob, Conn., and two large electric locomotives for the Southern Pacific in addition to equipment for eight other locomotives.

New Incorporatior

Houston, Beaumont & Orange Interurban Railway, Houston, Tex., has been incorporated with a capital stock of $450,000. The purpose of the company is to construct an interurban electric railway between Houston and Orange, a distance of about 100 miles. Among the incorporators are: Edward Kennedy and W. V. Kennedy, Houston.

New Advertising Literature

Manganese Steel Forge Company, Philadelphia, Pa., has issued two new Rol-Man welding rod folders, one for trackwork and the other for mills, mines, furnaces, smelters, etc.

Conveyors Corporation of America, Chicago, Ill., has issued an illustrated booklet showing the construction and application of the American steam ash conveyor which it builds. This concern was formerly the American Steam Conveyor Corporation.

Rome Wire Company, Rome, N. Y., has just issued a new price list on its Super-Service cords and cables. Attractive in form, the list is 3½ in. x 6 in. in size and is printed in three colors. It has had a wide circulation among the jobbers and dealers, and copies will be sent to anyone interested.

Driver-Harris Company, Harrison, N. J., has issued "Data Book R 23 on Alloys for Electrical Resistance." Tables are given showing in detail physical and cost data for Nichrome wires and ribbons, as well as wires and ribbons of other alloys produced by this company. As the name indicates, Nichrome is a nickel-chromium alloy. It is made in several compositions, each particularly adapted to some high temperature uses. This book also contains tables of data, particularly conversion tables.

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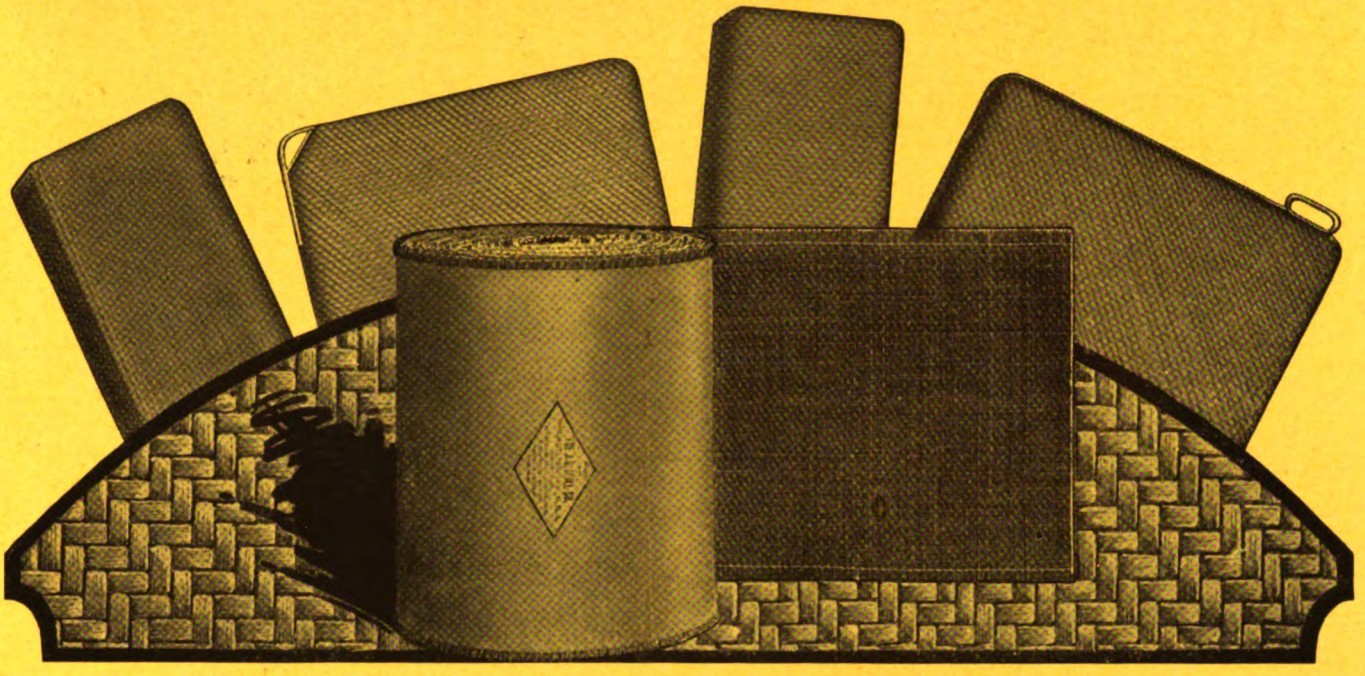

Old Seats Made New

Brill Twill-Woven Seating Rattan

Old and worn looking seats will always detract from an otherwise attractive service. To maintain the clean and attractive appearance of your cars bright new seat covering of Brill Twill-Woven Seating Rattan will prove a valuable asset.

Manufactured from specially imported cane in our own plant both the canvass-lined and unlined Rattan is ready for shipment to you in widths from 14 to 36 inches.

THE J. G. BRILL COMPANY
PHILADELPHIA, PA.

AMERICAN CAR CO. ST. LOUIS MO. — G.C. KUHLMAN CAR CO. CLEVELAND, OHIO. — WASON MANF'G CO. SPRINGFIELD, MASS.

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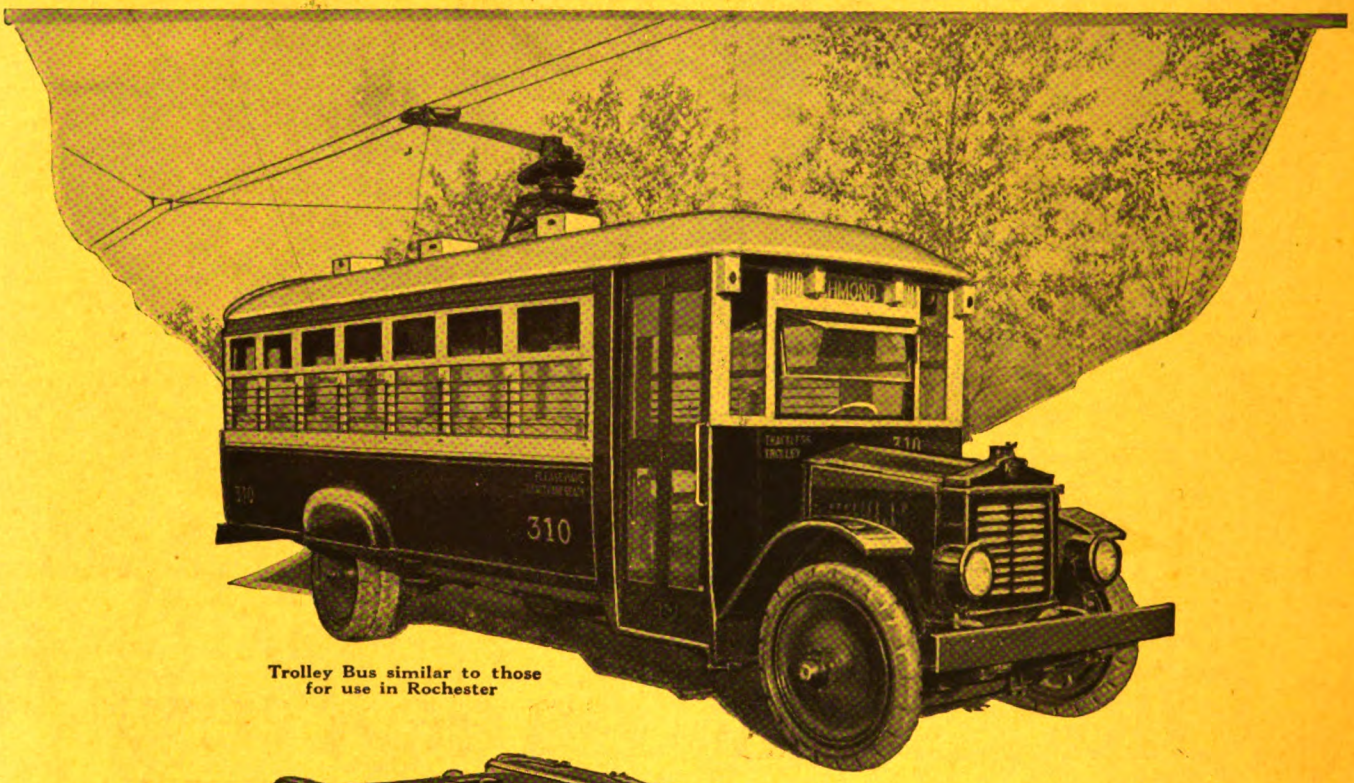
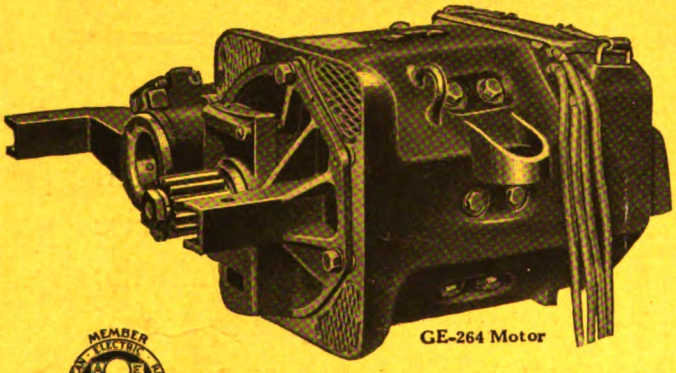
5 Trolley Buses ordered for Rochester



Trolley Bus similar to those for use in Rochester

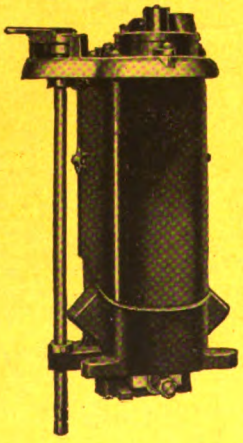


GE-264 Motor

ANOTHER road to supplement its service with trackless trolleys is the New York State Railways, which recently purchased 5 trolley buses for operation in Rochester.

These new buses will be "GE equipped" with motive equipment consisting of the GE-264 light-weight Motor and type "M" foot-operated Control.

General Electric Company
Schenectady, N.Y.
Sales Offices in all Large Cities



Master Controller and Contactor Box (cover removed)

Motive equipment which has proved its suitability for light-weight cars on electric railways all over the country is the logical power for driving the trolley bus. Considering the experience of the General Electric Company in this line, trolley buses "GE equipped" means equipped to give successful service.

GENERAL ELECTRIC

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McGraw-Hill Company, Inc. June 2, 1923 Twenty Cents Per Copy

ELECTRIC RAILWAY JOURNAL

On more than

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—All over the United States—
—In Canada and Abroad—

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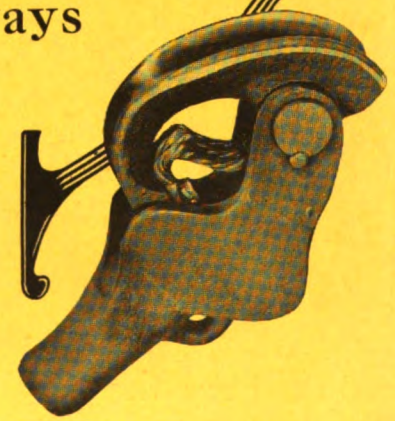


MILLER TROLLEY SHOES

Keeping Pace With A Growing Demand

As our great country grew and expanded, our inter-city steam roads increased their capacity by laying more tracks. Today, in the more congested eastern or "downtown" section of our country, four and six-track roads are comparatively common.

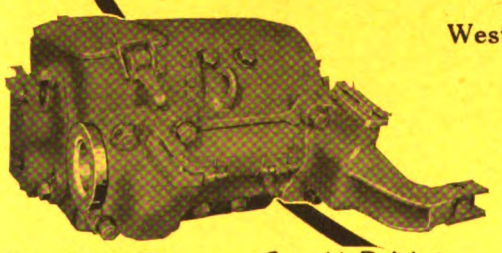
This increased trackage was constructed only after the capacity of the original tracks was exceeded, and the full benefit of the most economical length of train has been employed.

At the present time, our urban transportation systems are faced with a problem similar to that encountered by steam roads, with additional difficulties due to other surface-traffic congestion, narrow streets, etc.

Kansas City, New York, Boston, Milwaukee, Los Angeles and other large cities are finding the solution in train operation.

The illustration shows one of the trains being operated by the Cincinnati Traction Company, equipped with Westinghouse No. 510 Motors and HL Control.

Westinghouse Electric & Manufacturing Company
East Pittsburgh, Pa.



No. 510, Thirty-five H.P. Motor

MEMBER AMERICAN ELECTRIC RAILWAY ASSOCIATION AERA

W WESTINGHOUSE ELECTRIC

Westinghouse

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New York, Saturday, June 2, 1923

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Company, Inc.

HENRY W. BLAKE and HARRY L. BROWN, *Editors*

Volume 61

Track Mileage per Unit of Population Is Liberal in United States

IN THEIR publicity campaigns electric railway managers could profitably emphasize the contrast between mileage per unit of population in this country and elsewhere. For example, from the recent report of the Ministry of Transport of Great Britain it appears that on that island the mileage of electric railway track used in serving the public is 4,275. This is the single-track equivalent of 2,570 route-miles. The population of Great Britain (England, Scotland and Wales) is approximately 43,000,000, so that there are practically 100 miles of single track per million people, or one mile of track per 10,000 people.

In the United States, with its population of, say, 110,000,000 (105,710,620 by the 1920 census), there is a single-track mileage of 47,150. Thus the mileage of single track per million of population is nearly 430, or 4.3 times that in Great Britain. Correspondingly there are only about 2,335 inhabitants per mile of single track.

Of course, mileage is only one element of service, and there is in many places in this country more mileage than the traffic warrants. At the same time, liberal mileage is an indication of readiness to serve. This profusion of mileage is an evidence of the expectation of railway promoters that business would follow the track. It is an inheritance from pre-automotive days, which could not be duplicated under present competitive conditions. Public appreciation of these facts, although it would have no direct bearing on the riding habit, would tend to facilitate the reduction of the paving and other illogical burdens.

A Revival of Interest in the Subject of Paint

EVERY one who has had an opportunity recently to visit various electric railway properties has found renewed interest in the matter of car painting. This may be because for a number of years a great many companies had hardly enough money to paint the cars at all and could select only that pigment and treatment which seemed to promise the greatest protection for the least price. The present revival of interest in the subject may be stimulated by a better realization by the management of the need of improving public relations and of attracting traffic. At any rate much thought is being given by many properties now to the subject of color and color schemes, and much expenditure is being made for paint.

There is no doubt that repainting will make a dingy car much more attractive, and that in this work of repainting a certain amount of ornamentation, striping, etc., is justified. A bright looking car suggests to the passenger a desire to ride, as well also as a feeling that the company wants to give good service in other particulars besides that of the appearance of its cars. It is worthy of note that one of the first steps taken by the Interborough Rapid Transit Company, following its recent voluntary reorganization, was to paint the cars, stations and structure of the Manhattan Elevated Railway a light orange in place of the brown drab color used for so many years. This is part of a campaign by the company to win patronage back to the elevated lines.

Generally speaking, in this renewal of interest in paint for car bodies, there seems to be a reaction against the darker hues and in favor of the brighter and lighter colors, particularly the yellow shades. One advantage of yellow is that it permits the car to be seen readily at a distance, especially in the dusk. Another reason may be that yellow colors are supposed by some authorities to be very durable. Whatever the motive, the practice of keeping the rolling stock well painted is to be commended.

Subways Under Debate in Chicago, Detroit and Philadelphia

THE subject of subway construction has become a very live question in Chicago, Detroit and Philadelphia, and in each city the question has arisen as to the extent to which the proposed subway system should be adapted for the use of surface cars.

In New York, of course, the subways and elevated lines supply purely a rapid transit service. There is no use of either the subway or elevated railway lines by surface cars, and there is no general system of free transfers, as in Boston, between the surface cars and the rapid transit line. The topographical conditions in New York differ also from those in Boston and in the three other cities named. In these four cities the area served is fan-shaped, with a spread of 180 deg. or more, the business district occupying a comparatively small area at the radial focus, whereas the lower half of Manhattan Island, New York's business district, is long and narrow.

In these circumstances it is not surprising that a different kind of subway layout than in New York is desirable and that there should have arisen a demand in some of these cities for a different kind of subway, namely, not long, through routes but shorter lines whose purpose is more to relieve the congestion on the streets of a limited area downtown by putting the surface cars under ground. At the moment, the questions of the actual kind of subway to install and the routes to be followed are more acute in Philadelphia and Detroit than in Chicago. There matters relating to actual subway construction have been rather in abeyance since the Ridgway-Parsons-Arnold report in 1917, but under the new municipal administration the matter will have to be taken up in Chicago right away.

In Detroit the situation is largely the same as in

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Philadelphia. The Mayor has appointed a special rapid transit commission to consider the subject. In Philadelphia this committee has reported in favor of a distinct rapid transit system, and in both cities those concerned in the operation of the street railway system have publicly declared their strong preference for some plan which will take the street cars off the streets in the congested center.

Of course, in all this talk about subway construction, the fact should be realized that subways are expensive undertakings at best, and with the present high cost of materials and labor are more so now than ever before. With the congestion downtown in our modern cities, an expensive method of transportation may be worth while. But subways are a luxury and cities with subway aspirations must realize that the conditions under which subway transportation is thought to be given in New York for 5 cents are most exceptional in many ways. A 10-cent fare, as in Boston, is a much more likely charge, if the proposed subways are not to be a serious burden on the taxpayer.

Undoubtedly Chicago and Detroit will work out their subway proposals on a satisfactory basis and Philadelphia will decide on its form for a north and south subway to supplement that now running east and west on Market Street. Subways with elevated railway extensions are necessary in all of these three cities. It is to be hoped, however, that the plans adopted will recognize three principles: The first is that the transportation given should be co-ordinated in service at least, if not in ownership, with the present transportation facilities; second, that provision be made for a sufficiently high fare to pay for the service, and, third, whatever plan is adopted as best suited for existing conditions, there shall be provision for expansion in future along approved engineering lines.

Our Supply of Timber Must Be Conserved

FORTUNATELY for the future of the timber supply in this country there are a few prophets who have the temerity to tell us where we are heading in consuming timber much faster than it is being produced. Prophets of evil are never popular, but when their outspeaking is obviously prompted by unselfish motives they ought to be listened to and their warning ought to be heeded. The United States is so rich in natural resources that the possibility of any of these coming to an end has in the past been so remote that we have gone ahead heedlessly without regard to an ultimate depletion of the supply. It is not remote, however, in the case of timber. Price and quality comparisons of popular species of wood over a period of twenty or twenty-five years tell the tale. An important Eastern railway system reports that it paid for hemlock in 1904 $24 per thousand feet, board measure, whereas the price is now $63.50. The corresponding prices for white oak are $70 and $160. Unfortunately also while price goes up quality goes down, and for the same reason, namely, that good timber is hard to get. Shifting from the previously plentiful hemlock and white oak to cedar, pine and fir is only a temporary remedy. These woods will not last forever.

Increasing prices and difficulty in getting good timber form the principal correctives of present conditions. They bring preservative treatment into the range of economic practicability, and they stimulate the development of substitutes and the art and science of forestry. The preaching of the prophets will be most effective when, in addition to telling the industries why prices are high and quality low, it gives full information as to the availability and characteristics of preservatives and substitutes. On the other hand it is the duty of timber users to investigate these things to learn if they are using the best practices.

Sentiment will not greatly affect the deplorable timber situation, except as it bears a relation to economics. Given full information, however, timber users will gradually adapt themselves to the changing conditions and will bring pressure to bear upon the government to push reforestation. Scientific forestry as a private business rather than a public concern will also come in due course, but only when timber prices are much higher than they are now.

How Can Surface Car Trains Best Be Motorized and Controlled?

THE advantages of two-car trains have been recognized for years. Trains save man-power and electrical energy, and get through street congestion with less difficulty than when the same number of cars are run as separate units.

Two different methods of train operation are practically standard. The first is to use heavily-motored cars to haul dead trailers, and the second to couple together motor cars equipped with multiple-unit control. The first method is simpler and the first cost is less, but the available power, if sufficient to be satisfactory for train service, is too great when the motor car is operated alone and the all-day efficiency is relatively low. The second plan gives a better distribution of the motor capacity and a higher all-day efficiency, but the first cost is greater and the complication of mechanism considerably increased. It has the advantage, however, that the motor capacity may be divided between the cars in a ratio dependent on their duty. For instance, four motors on the car intended for all-day service and two on that used in the rush periods only has been found a satisfactory division of the power. The control equipment, however, usually is identical on all cars.

In order to get the advantage of motor capacity correctly apportioned for the work each car has to do, without the expense incident to independent control for the car used only a few hours a day, a new type of two-car train described in this issue has been developed by the Pittsburgh Railways Company. This result has been accomplished by equipping the second car with two motors without control. The arrangement for connecting the electrical equipments is very simple, only three wires being needed in the train line. The performance is as good as that of any other train with motors properly chosen for the work.

The great objection to this arrangement is that the second car of the train, though motorized, remains a trailer. Having no control nor trolley pole, it cannot be operated independently, and about the yards or shops it must be handled by a live car in the same manner as any true trailer. The engineers who developed this car did not consider this disadvantage serious enough to outweigh the simplicity, light weight and low cost gained by this arrangement. It will be very interesting to note whether or not this opinion will be borne out in practice, as the view usually taken is against the use of non-mobile equipment.

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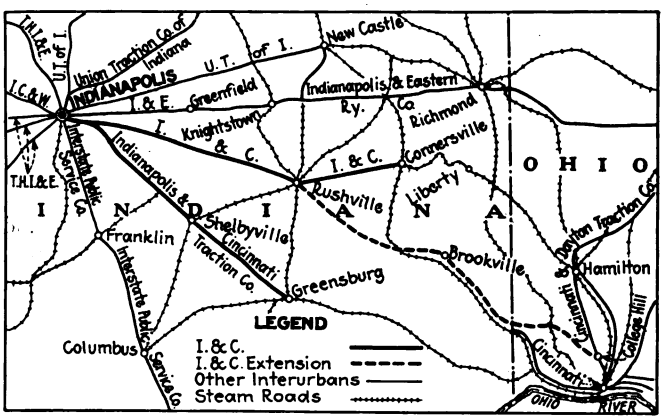
Economics of I. & C. Re-equipment

Indianapolis & Cincinnati Traction Company to Be Changed Over for Direct-Current Operation—Improved Car Designs and Progress in Automatic Substation Development Major Factors in Justifying Change—Estimated Savings Equal 14 per Cent Return on the Additional Investment

ABOUT eighteen years ago the Indianapolis & Cincinnati Traction Company, Indianapolis, Ind., equipped its lines for operation at 3,300 volts, single phase, 25 cycles. At that time the outlook was favorable for a general extension of alternating-current service for electric interurban work in the Middle West, and the adoption of this type of equipment on this system was followed by a period of high-grade service which met the requirements of the territory reasonably well. Recent developments in motors and automatic substations, however, and excessive costs of operation with this early alternating-current car equipment have thrown new light upon the relative economies of alternating and direct current service. President Charles L. Henry and other officials have lately been giving considerable thought to the possibilities of changing over the system for direct-current operation, and a few weeks ago Prof. Albert S. Richey of the Worcester Polytechnic Institute, Worcester, Mass., was requested to investigate the problem and report upon it. The company's decision to make the change followed Professor Richey's favorable recommendation. The directors of the railway approved the project on May 15, as was noted in the JOURNAL for May 19. Since then contracts have been let totaling $736,146, as follows:



Present Route of Indianapolis & Cincinnati Traction Company and Proposed Extension to Cincinnati

To the Westinghouse Electric & Manufacturing Company, which originally equipped the road, for the complete motor, air brake and control equipments for twelve new motor passenger cars, and four extra motors; four complete equipments for freight motor cars, and the full equipment for eight automatic substations, one semi-automatic substation and one portable automatic substation. The details of this order, type of equipment, etc., appear in two items on page 948.

To the Baldwin Locomotive Works for twelve pairs of passenger car trucks.

To the Cincinnati Car Company for twelve all-steel car bodies.

To the Western Electric Company for 37.7 miles of 500,000 circ.mil and 62.4 miles of 300,000 circ.mil cable.

Additional work of rearranging the present transmission lines and putting up new 600-volt feeder cable, which will be done by the company, is estimated to cost $42,000. The total actual cost of the changeover will therefore be $778,146.

The system at present consists of two lines, one route being from Indianapolis to Rushville and Connersville and the other from Indianapolis to Shelbyville and Greensburg. Cars are operated into and out of Indianapolis over the direct-current, 600-volt lines of the Indianapolis Street Railway, and the two lines of the interurban system branch from a junction about 4 miles from the center of the city. From Indianapolis to Connersville the distance is about 58 miles and to Greensburg about 49 miles. It is proposed to extend the interurban system from Rushville 73 miles to Cincinnati, reaching a downtown terminus at Canal and Walnut Streets. The proposed change to direct-current service will be made with this extension in view, all present engineering designs having been established as a part of the ultimate development of through electric transportation by high-speed rolling stock between the terminal cities for which the company is named. In fact, the decision to proceed with the changeover of the present system for d.c. operation was made conditional upon two things: First, that nothing should be done on the present system except that which would fit in as a part of the complete extended system, and, second, that whatever is done must be carried out in such a way as to avoid any additional cost resulting from doing the work in two parts. But from the very thorough study made, it appears that the changeover of the present system will result in a return of over 14 per cent on the additional investment whether the line is ever extended to Cincinnati or not.

How Changeover Was Financed

An interesting thing about the financing of this work by the Indianapolis & Cincinnati Traction Company is that the money was entirely arranged for and in the bank before any contracts were let. The project was financed by J. F. Wild & Company, a local state bank and investment banker, through the issuance of 6 per cent equipment trust certificates for the principal amount, and with a cash payment ahead of this equal to 20 per cent of the entire cost of the equipment. Against this equipment trust the bankers will issue preferred and common stock, which will be sold locally.

It will not be possible to get an entrance into Cincinnati until the latter part of 1924, because the new rapid transit and interurban loop which is being built by the city will not be ready prior to that time, but when through service between Indianapolis and Cincinnati can be established, it is estimated from a study made by engineers and by Mr. Henry that it is safe to expect sufficient earnings to pay present fixed charges, 7 per cent on the new money necessary to complete the

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line, and have sufficient remaining to pay 5 per cent dividends on the present $1,000,000 of preferred stock and 5 per cent on the present $2,000,000 of common stock. This is thought to justify the anticipations of the men who organized the project originally.

The company has had a hard time during the years it has been waiting to get a satisfactory entrance into Cincinnati and has barely paid fixed charges and operating expenses. In 1922 it fell $10,000 short of paying these. Prior to the plan to build the rapid transit and interurban loop in the bed of the Old Miami Canal there has been no way of gaining entrance to the city on any practical basis, on account of the wide gage of the local car lines, excessive cost of separate tracks over streets not occupied by the local lines, the resulting slow operation on the surface, etc.

THE ENTRANCE INTO CINCINNATI

The Miami Canal was leased to the city by the state under a specific condition that it be used for transportation purposes, and with the further specification that the track must be of standard gage and that interurban railways must have the right to use the track for reasonable rental. It will be under the control of a rapid transit commission appointed by the city. The loop will be 17 miles in circumference when completed. Of this 10 miles is now contracted for, including subway construction for part of it. When this first section of the loop is completed it will give the interurban a connection into the heart of the city, the terminus at Canal and Walnut Streets being only four squares from the Gibson Hotel.

The plan of the interurban will be to build 64 miles of new line from Rushville, Ind., to College Hill, Ohio, where connection will be made with the Cincinnati & Dayton Traction Company. Operation will continue over this company's line for 4 miles to the point of connection with the canal bed loop, with 5 miles over the loop to the terminus. As the distance from Indianapolis to Rushville is 41 miles, this gives a total distance from the center of Indianapolis to the center of Cincinnati of 114 miles, which can be easily handled in a three-hour schedule.

Following are given the engineering, economic and operating considerations which led to the decision to make the present change from a.c. to d.c. operation, in preparation for the extension through to Cincinnati. This is largely taken from the report prepared for the railway by Professor Richey.

REASONS FOR CHANGEOVER AND RESULTS EXPECTED

The interurban lines of the company are at present supplied with energy from a two-phase steam generating plant at Rushville. Energy is generated at 2,300 volts, transmitted at 33,000 volts to transformer stations and delivered to a No. 0000 trolley at 3,300 volts, single phase. Nine transformer substations are at present in service, the average distance between those on the Cincinnati division being 10.8 miles and the maximum 11.88 miles, the corresponding figures for the Shelbyville division being 11.8 and 11.96 miles.

The principal, if not the only, serious handicap under which the present operation of the system is being conducted centers around the deficiencies of the single-phase, alternating-current equipment. At the time of installation (1905) there was every evidence that the system was entirely proper for an interurban road of this character. Since then very great improvements have been made in direct-current railway operation, including the development of the interpole and self-ventilated motor, the simplification of control apparatus and the satisfactory development of the automatic rotary converter substation. Similar favorable developments have not been made in alternating-current apparatus, and for these reasons there is at present no question as to the superiority of the direct-current system for this class of work. The alternating-current system would not be considered today on a road of this character. Further, the time has been reached in the history of this road where the differences in operating costs between the two systems will pay a good rate on the money required to make the change to direct-current operation. This change involves the following:

1. Change of motors and electrical equipment on the cars.
2. Installation of substation apparatus for the supply of direct current.
3. Rearrangement of transmission lines so as to supply three-phase energy to the rotary converter substations.
4. Change in power supply to three-phase, 60 cycles.

While making the necessary changes as outlined above, a further very desirable change is that of the passenger cars themselves to take advantage of the development of the modern steel car with its lighter weight and reduced maintenance costs.

Standard pressures for direct-current operation of roads of this character are 600, 1,200 and 1,500 volts. It was not difficult in this case to determine upon 600 volts, as there are numerous connecting city and interurban lines in this territory, all of which have standardized on 600 volts.

The benefits which will be derived from the proposed change to 600-volt direct-current operation are:

1. A relief from trying delays at present experienced due to failures of various kinds in connection with the single-phase car equipments.
2. A very considerable reduction in the power consumption of the cars and a consequent saving in power costs.
3. A very material saving in the cost of maintenance of cars and car equipments.

LIGHTER CARS WITH GREATER CAPACITY

An incidental but very important feature of the change will be the introduction of new and more comfortable rolling stock, which, in connection with the improved schedules, should result in a very material increase in traffic and earnings. The twelve new all-steel combination passenger cars will be somewhat larger but considerably lighter in weight than the present rolling stock. The proposed car will be 60 ft. long over all, with a seating capacity of fifty-four. It will weigh about 36 tons completely equipped. Baldwin trucks are to be used with improved design over those already in service. The motors proposed for the new cars are of 105-hp. rating, the present motors being of 100 hp. capacity, but nearly twice as heavy as the new ones. The slightly increased capacity of the motors and the considerable reduction in car weight give the proposed motor a very decided margin of capacity over the requirements. This will permit of occasional trailer operation and will result in much lower maintenance costs than in cases where the capacity margin is small. The cars and equipment as proposed will be suitable for interchanging in all the present local and high-speed passenger service and the future local service on the Cincinnati extension. With the latter completed, the through express service will be supplied with new,

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larger cars, specially equipped for this service, including 140-hp. motors, the same as specified at present for the freight cars.

The all-steel bodies and the modern motors will result in a very considerable saving in maintenance costs, while the lighter weight of the complete car and the better efficiency of the motor equipments will result in a material decrease in power consumption. A comparison of the weights of the present and proposed cars follows:

	Present	Proposed
Car body, without electrical or air-brake equipment	43,400 lb.	33,000 lb.
Trucks, without motors	19,680 lb.	22,000 lb.
Four motors	24,480 lb.	12,700 lb.
Electrical and air-brake equipment on car body	15,460 lb.	4,515 lb.
Total weight of car	103,020 lb.	72,215 lb.

It is proposed to use the present car bodies and trucks for freight service and to equip four of these cars with new direct-current motors of the same type as proposed for the passenger cars, but of 140 hp. capacity. These motors are the same, with the exception of gearing, as would be used in the high-speed express service on a through line to Cincinnati, so that when this line is built the motor equipment would be standardized on the two sizes of 105 and 140 hp. The plan is to leave the present motors on two of the freight cars with a change in control apparatus, which will consist mainly in the removal of the transformer and other single-phase equipment and will involve operating the single-phase motors connected permanently in groups of two in series for direct-current operation. While these equipments will be less economical and somewhat heavier than new direct-current apparatus, it is believed advisable to retain them in service for line car and occasional freight use. The mileage operated with these two cars will be small, and until the freight business requires more cars in regular operation these single-phase motors will operate satisfactorily.

Full Automatic Substations to Be Used

One of the principal drawbacks in the use of direct current for a road of this type has been the labor cost of operating substations with rotary converters. Until the last few years each substation required a man in constant attendance, at least two men per substation for twenty-four-hour operation. Lately, however, automatic switching apparatus has been developed and tried out to such an extent that it is now entirely safe to rely upon it. The fixed charges on its additional first cost and the maintenance expenses are so much less than the former labor cost that its use is unquestionably advisable in such a case as the Indianapolis & Cincinnati road. If the substation is located where a man is available for the occasional operations of starting up and shutting down, the automatic apparatus may be reduced considerably in cost; such equipment is known as "semi-automatic." The present plans of the company include full automatic substations at all locations except Rushville. Here the installation will be in such close proximity to the shops that a semi-automatic equipment is proposed.

The present transformer stations are located along the lines at intervals of about 10 to 12 miles. These are suitable for the location of 600-volt direct-current substations under present service conditions. When through operation to Cincinnati is begun the required substation interval will be about half these distances, with the same substation capacities.

These capacities chosen for the new direct-current substations are 500 kw. each for the four substations between Indianapolis and Rushville and 300 kw. each for the five remaining substations. The present buildings are adaptable without change for the indoor apparatus of the new substations. A portion of the new equipment, consisting of transformers and high-tension switching apparatus, is designed for outdoor installation on land available immediately adjacent to the substation buildings.

As every substation is equipped with but one rotary converter, it is proposed to install a complete 500-kw. rotary converter automatic substation in one of the present passenger cars for use as a portable substation. This may be utilized in case of breakdown at any of the permanent substations or for any increase of capacity which may temporarily be required at any point where there are sidetrack facilities.

The present transmission lines are insulated for 33,000 volts, but are single-phase lines. One set of two wires extends from the power plant to each substation on the Rushville division and two sets of two wires each extend across country to Shelbyville, with four wires between Shelbyville and the adjacent substations in each direction, extended by two wires to the terminal substations on the Shelbyville division. This gives transmission lines in various sections consisting of from two to six wires. Under the new conditions a three-phase line of three wires will be required over the entire system. This will involve in some places taking down three wires, in some places one, and in others the erection of one additional wire, besides some additional three-wire lines. The size of the wire and the insulators at present in use is satisfactory, and unnecessary wire which comes down can be used almost entirely for the new circuits where such are necessary. While the present transmission line insulators are satisfactory, it is doubtful whether those not necessary under the new arrangement could be moved satisfactorily to new locations, and the cost estimates of the change to direct current include new insulators for the new construction.

With the source of power supply at Indianapolis for the divisions as at present operated and at or near Cincinnati for the Cincinnati extension, 33,000 volts is satisfactory for the three-phase transmission, which enables the present wire and insulators to be used.

Direct-Current Feeder Requirements

With the present distribution pressure of 3,300 volts, no supplementary feeder is required for the trolley wire. With direct-current distribution at 600 volts, it will be necessary to provide a supplementary copper feeder of 500,000 circ.mils between Indianapolis and Rushville, using one of 300,000 circ.mils on the balance of the line. The estimates of cost were based on a copper price of 20.9 cents per pound for this class of cable; the final contract for the purchase has, however, already been made at a considerable reduction on account of a lower stage in the copper market.

The present power plant at Rushville is well designed, efficient and reliable considering its capacity. It has been demonstrated, however, that for a road of this character it is nearly always possible to purchase power cheaper than it can be generated, principally on account of the better diversity factor and the load factor of a much larger station. The present generators at Rushville are two-phase, 25-cycle units, while the direct-current substations require three-phase, 60-cycle current. There seems no doubt that it would pay to arrange to purchase energy for this system rather than to make the expenditure necessary to convert the Rushville station, and the estimates are based on the plan to

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purchase energy at a conservative figure of 1.25 cents per kilowatt-hour.

Due to the proposed change from 25-cycle to 60-cycle service, and also to the elimination of the 3,300-volt alternating current now used on the trolley wire, it will be necessary to change some transformers in the service of distributing local light and power, and it will also be necessary to change some of the apparatus, such as motors, in the service of power customers. It is estimated that this outlay will not exceed $10,000.

ANNUAL CHARGES

In Table I is given an estimate of the costs which will be incurred to re-equip the road as above described. These estimates make no provision for salvage on existing equipments. It is probable that there is no salvage value in the electrical equipment of the present passenger cars except the junk value of iron and copper, and no attempt has been made to estimate this junk value. It is considered possible that the steam and electrical equipment of the Rushville station, which is two-phase, 25-cycle apparatus, may net from $75,000 to $100,000 salvage, but the estimates show that it will pay to make the change to direct-current operation, even without allowance for salvage.

Table II shows the estimated operating costs which will be affected by the proposed change to 600-volt direct-current operation, together with the estimated comparative figures under the new operation. The proposed change will have no bearing on nor should it affect any of the operating accounts not shown in this tabulation.

The operation which will be affected by the proposed change has been grouped under the four headings of power, substation operation, maintenance of cars and maintenance of track. The direct power generation costs are shown as completely eliminated, as well as the item of power station depreciation. The latter will be eliminated if and as soon as this equipment is done away with by substitution of purchased power and without question as soon as it is sold and removed. The power station building is admirably adapted for use as a shop and may be employed to advantage for this purpose whenever increased shop facilities are required, although this will probably not be until the road is extended to Cincinnati.

The cost of power under the proposed plan is based on careful estimates of the power consumption of the new car equipment, a car-mileage as at present operated, an amount of commercial power the same as at present and an estimated cost of 1.25 cents per kilowatt-hour for the purchased power.*

Under the head of substation operation, the present direct operating costs are eliminated and replaced by the cost of an inspector and repairman who will cover all substations, plus an estimated cost for maintenance of substations. The present direct cost of car maintenance, which is excessively high, has been eliminated and replaced by conservative estimates of the maintenance of steel passenger cars with modern direct-current equipments, based on the present mileage and 3.2 cents per car-mile. This figure is at present being attained by interurban roads in Indiana with cars and equipment not so modern as those here contemplated.

The maintenance of freight cars has been taken at the present mileage, but at a larger figure of 3.6 cents per car-mile on account of the wooden bodies and because of the fact that it is proposed to continue the operation of some of the single-phase motors. There is no doubt that there will be some reduction in the cost of track maintenance due to the reduction in weight of car equipment. It has frequently been estimated that 40 to 50 per cent of track maintenance costs are in direct proportion to the weight of cars, but in the present case an allowance of 30 per cent has been made, showing an estimated annual saving of $4,300.

The savings computed, with allowance for additional substation operating costs, amount to $142,280, which may be applied on depreciation of the new equipment and interest on the new investment. Allowing 4 per cent depreciation on the entire new investment, there remains $110,867 as the net saving in operation due to

*The actual cost of energy for the year 1922 was 2.16 cents per kilowatt-hour, and it is now expected that the purchased energy will be obtained for 1.4 to 1.6 cents per kilowatt-hour.

TABLE I—ESTIMATED COST TO RE-EQUIP SYSTEM FOR 600-VOLT DIRECT-CURRENT OPERATION

Passenger Cars—	
12 Passenger cars, including installation cost of trucks, air brakes and electrical apparatus	$190,236
12 Pairs trucks	35,000
12 Four-motor equipments, 105-hp. motors and control	89,400
4 Extra 105-hp. motors, at $1,500 each	6,000
12 Air-brake equipments for passenger cars, at $1,044.60 each	12,535
Freight Cars—	
4 Four-motor equipments, 140-hp. motors and control, at $9,456 per set	31,526
2 Extra 140-hp. motors, at $1,750 each	3,500
Installation of motor and control equipment, at $675 per car	2,025
1 Air compressor at $656, plus installation, $100	756
Substations—	
5—300-kw. rotary converter substations with complete apparatus for full automatic operation, at $15,025	75,125
3—500-kw. rotary converter substations with complete apparatus for full automatic operation, at $19,097	57,290
1—500-kw. rotary converter substation with complete apparatus for semi-automatic operation	16,850
Erection, installation and testing of nine substation equipments, including outdoor transformer foundations, including $1,540 for protective fences, etc.	27,500
1—500-kw. rotary converter automatic substation apparatus, installed in present passenger car for portable substation	20,000
Electric Light and Power—	
Cost of converting transformers and customers' apparatus	10,000
Overhead Lines—	
Material for changing over transmission lines from single-phase to three-phase, 2,286 poles at $10.75 per pole	24,575
Labor for taking down transmission wire from 54.8 miles, at $150 per mile	8,220
Labor for installation of transmission wire on 45.5 miles, at $250 per mile	11,375
Material for new three-phase transmission lines from Hoffman and New Bethel to Junction, 500 poles, at $5.40 per pole	2,700
Labor for new three-phase transmission lines, 10.5 miles, at $300	3,150
Direct-current feeder, bare copper strand, 37.7 miles 500,000 circ.mil and 62.4 miles 300,000 circ.mil	128,570
Material for installation of 600-volt feeder, 4,950 poles, at $1.21 per pole	5,990
Labor for 600-volt feeder	20,000
Supervision—	
Supervising and erection engineer	3,000
	$785,323

TABLE II—COMPARISON OF PRESENT ANNUAL OPERATING COSTS WITH ESTIMATED COST OF OPERATION WITH PROPOSED DIRECT-CURRENT EQUIPMENT

	Present	Proposed
Power—		
Operating costs, 1922, coal, labor, repairs and miscellaneous expense	$146,843	.....
Depreciation charges	35,768	.....
Cost of purchased power, 1,337,000 (1922) car-miles, at 3.75 kw.-hr. per car-mile plus 481,000 (1922) kw.-hr. light and power, at 1.25 cents per kw.-hr.	.....	$68,684
Substation Operation—		
Operating costs, 1922, labor, repairs and miscellaneous exp.	1,557	.....
Inspector for automatic substations	.....	2,400
Maintenance of substations, nine at $500	.....	4,500
Maintenance of Cars—		
Maintenance costs, 1922, including electrical equipment and depreciation	76,260	.....
Maintenance of steel passenger cars with modern d.c. equipments, 1,010,000 (1922) car-miles, at 3.2 cents	.....	32,320
Maintenance of other cars, wood bodies, d.c. operation, mostly modern motors, 404,000 (1922) car-miles, at 3.6 cents	.....	14,544
Maintenance of Track—		
Maintenance costs 1922 [Passenger car-mileage is 71 per cent of total]	72,302	.....
Of the expenses due to passenger cars 70 per cent are unchanged by reduction in weight, amounting to	.....	35,934
The remaining 30 per cent of the cost due to passenger car-mileage are reduced in proportion to the weight, amounting to	.....	11,100
The remaining 29 per cent of the total track maintenance costs will be the same as in 1922, as they are on account of continued use of present equipment other than passenger	.....	20,968
Depreciation, 4 per cent on estimated investment of $785,323	.....	31,413
Total	$332,730	$221,863
Net saving (14.1 per cent on estimated investment of $785,323)	.....	110,867

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the substitution of direct current, or 14.1 per cent on the estimated cost of $785,323.

Effect of Change on Operating Revenue

Entirely aside from the subject of cost of maintenance and operation, the proposed change as outlined herein should be productive of a marked increase in operating revenues, according to Mr. Richey. The present equipment is productive of many exasperating delays in the service, due to the unreliability of the single-phase motor and control equipment and the complications further involved by the necessity of operating such equipment over the direct-current lines in Indianapolis. In the past three years the times cars were pulled out of service due to electrical equipment failures have amounted to nearly 2,000, or an average of 664 per year. A study of the train dispatcher's reports for the first eighteen days of April shows 110 cases of delays to schedule sufficiently important to be included in the dispatcher's report, and including only those delays directly traceable to the single-phase equipment and which would not be expected with proper d.c. equipment.

When it is remembered that all of these delays are on a road which operates in regular service only fifteen passenger cars, it will be realized that an unwarranted irregularity in schedules must result. Such irregularity would be practically smoothed out by the substitution of modern direct-current equipment even if of the same capacity as that at present operated. The present cars weigh 51½ tons and carry a motor equipment of 400 nominal horsepower, which amounts to 7.8 hp. per ton of car. The proposed cars weigh but 36 tons and will carry a motor equipment of 420 nominal horsepower, amounting to 11.6 hp. per ton, or an increase of nearly 50 per cent over the present. This increase in relative motor capacity will still further eliminate delays, including those trips when trailers are handled. The change from an irregular and ragged operation to that of regular strict maintenance of schedules would without question produce a considerable increase in patronage.

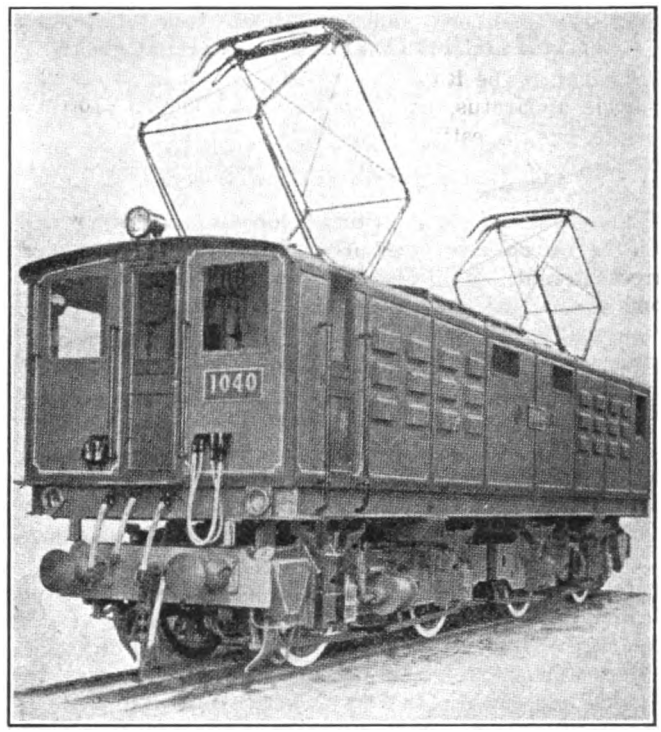
The cars contemplated in the proposed plan are of all steel construction, somewhat larger than the present cars, and will have very greatly improved riding qualities. In addition to the fact that these cars will have less maintenance and operating cost, there will be a considerable advertising value to the comfortable and attractive all steel cars. Further, it is the universal experience that the re-equipment of a road with new rolling stock brings a certain amount of new business.

Taking all of these matters into consideration, it is the opinion of the consultant that the re-equipment of the road as contemplated herein will increase the passenger revenue by an amount somewhere between 20 and 35 per cent of the 1922 revenues, or by an amount somewhere between $95,000 and $165,000. The result will depend largely on the amount of advertising publicity which is given to the change. With a consistent, aggressive advertising policy, started coincident with or a little before the new operation is begun, it will be possible to approximate the latter named increase of $165,000 annually. There is, of course, the possibility that with so large an increase in passenger business it may be necessary to operate a heavier schedule during some portions of the day, which would correspondingly increase operating expenses, and in this case the net result would not be as large as the figure quoted. However, it should be possible to increase the net revenue by some amount between $125,000 and $150,000 per year.

At the present time the total operating revenue of the light and power department is approximately $30,000. With three-phase power available it will be possible to furnish better power service than from the present single-phase lines. With these improvements in the light and power service, it should be possible to double the gross revenue of this department, especially through proper advertising and solicitation.

Japanese Electrification Progressing

THE Japanese government is going into the matter of electrifying the State Railways in a thorough and comprehensive way. In pursuance of its general plan, in 1921 the government ordered two 65-ton (130,000-lb.) freight locomotives from each of four firms. An illustrated account of the locomotives furnished by the General Electric Company was given in the issue of this paper for Dec. 23, 1922, page 975. In June, 1922, an order was placed with the English Electric Company for thirty-four locomotives, the number required for the 1923 program. (See ELECTRIC RAILWAY JOURNAL, July 15, 1922, page 140.) These locomotives are now being delivered.



Freight and Local Passenger Locomotive for Japanese Government Railways

The leading article in the *Tramway & Railway World*, London, for May 10 is devoted to an illustrated description of the later locomotives, with details of the shipping procedure. The freight and local passenger locomotives are of the 0-4-4-0 type, that is the body is supported on two 2-axle trucks without pony axles. The weight is evenly distributed on the four axles, being kept within the limit of weight per axle of 16½ tons (or 33,069 lb. to be exact) imposed by the government railways. The locomotive trucks are articulated, so that drawing and buffing stresses do not go through the superstructure. The locomotives are designed for the government standard of 1,500 volts, direct current, and each is equipped with four 306-hp. motors arranged in groups of two in permanent series.

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Seventeen of the locomotives will be used entirely for freight service and nine others for hauling local passenger trains. These are all of the type described above with the exception that the gear ratio is adjusted on the freight locomotives to give a maximum speed of 40 m.p.h. and the others a maximum speed of 53 m.p.h.

The eight passenger locomotives are of the 4-6-6-4 type. The superstructure is mounted on two articulated trucks, each with a pony truck and three driving axles. This locomotive weighs practically 108 tons (215,000 lb. more exactly), the distribution of weight being nearly 13½ tons (27,000 lb.) on each driving axle and on each pony truck. Six motors of the same type as those used on the other locomotives are included in the electrical equipment.

Why the Unlimited Pass Was Withdrawn in Youngstown

The Youngstown Municipal Railway, First Sizable Company to Try This Plan, Was Blamed for Having a 9-Cent Fare When the Actual Revenue per Passenger Was Less than 7 Cents

ON APRIL 1, 1923, use of the unlimited weekly pass in Youngstown was discontinued after a trial lasting somewhat longer than a year. Although the scheme had been tried in several smaller places prior to its inauguration by the Youngstown Municipal Railway, the experiment of this company attracted special attention because of the greater size of the city.

The arrangement inaugurated at that time, with rates of 9 cents cash, six tickets for 50 cents and 1 cent for transfer prevailing, was a weekly pass giving the holder unlimited riding privileges for $1.25. Many jitneys were then operating in the city and one of the results expected from the pass was the gradual conversion of jitney riders into regular car riders. It was thought that people would buy the pass and use the railway to the exclusion of all other means of transportation. This object was, in fact, accomplished to a large extent, but in the long run the scheme failed to produce a revenue that would yield a fair return.

Since the inauguration of the pass the gross revenue of the company has increased materially, but there was an increase in the volume of general business in the district about the same time that the railway showed a gain, and it is impossible to say how much of the latter was due to the pass and how much was due to other causes. Two years ago the steel mills were operating at not over 25 per cent of their capacity, whereas they are now operating at about 90 per cent of their capacity.

On account of the great changes in industrial conditions in the Mahoning Valley during the past few years revenue figures are likely to be misleading. Although pass riders were recorded on the fare registers, there was no way to distinguish between original rides and transfer rides. Consideration has therefore been given more to the matter of average fare than to revenue or total passengers.

In general, those people who used the railway oftener than fifteen times a week availed themselves of the pass, and those who rode less frequently paid fare by cash or ticket. If all passengers had bought passes the profit on the occasional rider would have balanced the loss on the frequent rider, but as it was, the railway lost on the latter and failed to gain on the former. The actual return per revenue passenger became less than 7 cents and was steadily decreasing at the time the pass was withdrawn.

The transferable feature of the pass deprived the railway of many fares. In one case several barbers employed in the same shop arranged their lunch hours so that one pass sufficed to take them all home for the midday meal and bring them back to work again. Canvassers, telegram delivery boys and others engaged in similar occupations used the pass to secure a large number of rides at an extremely low rate. The proprietor of two moving picture theaters located some distance apart on the same street car line and each giving three performances a day bought a pass for the messenger boy so that he could carry the films from one theater to the other. The boy traveled forty times a day on week days and eighty times a day on Saturday and Sunday. By using a weekly pass his average fare came to a fraction of a cent.

Under the so-called 9-cent fare, the company was actually receiving less than 7 cents. Yet if a stranger inquired concerning the fare in Youngstown he was told that it was 9 cents. There was more or less popular clamor against what appeared to be a high fare, although it was not bringing the railway a fair revenue. The situation was, therefore, thought by the Street Railway Commissioner to be unsatisfactory. A service-at-cost plan is in effect in Youngstown and a conference of all interested parties was called. The commissioner held that the principle of unlimited rides for a small fixed sum was economically unsound, and advocated the abolition of the weekly pass and a reduction of the cash fare.

On April 1 a new rate was inaugurated for an eight weeks trial. Under this arrangement, the cash fare is 7 cents, tickets are sold three for 20 cents, and transfers 1 cent. It was thought that this plan would produce a greater average return per passenger while at the same time reducing the high cash fare. A decrease in riding was expected to follow this change, and preliminary reports indicate that the number of passengers has decreased more than 16 per cent. One reason given for this is the bad reaction of the change upon former users of the pass. That feeling, however, is likely to disappear in a short time.

New Rate Appears to Be Inadequate

Figures compiled up to date indicate that the new fare may not be adequate, as told in the ELECTRIC RAILWAY JOURNAL for May 12. The revenue has decreased more than 15 per cent. Due to a greater use of tickets there are now actually fewer 7-cent cash passengers than there used to be 9-cent cash passengers. However, the increase in ticket sales is not enough to prove that pass holders of former times are spending just as much for carfare as before.

In spite of the falling off in revenue under the new rate, there were net receipts applicable for interest and dividends during the first month of $7,500. However, this was much less than in the preceding two months as the net revenue after all operating deductions had been made was approximately $22,300 in February, 1923, and $24,500 in March. If the present rate does not prove satisfactory at the end of the eight weeks trial an 8-cent cash rate with seven tickets for 50 cents will probably be the next step. It is hoped, however, that with the uncertainty of unlimited riding for a fixed sum eliminated, a satisfactory rate will soon be found.

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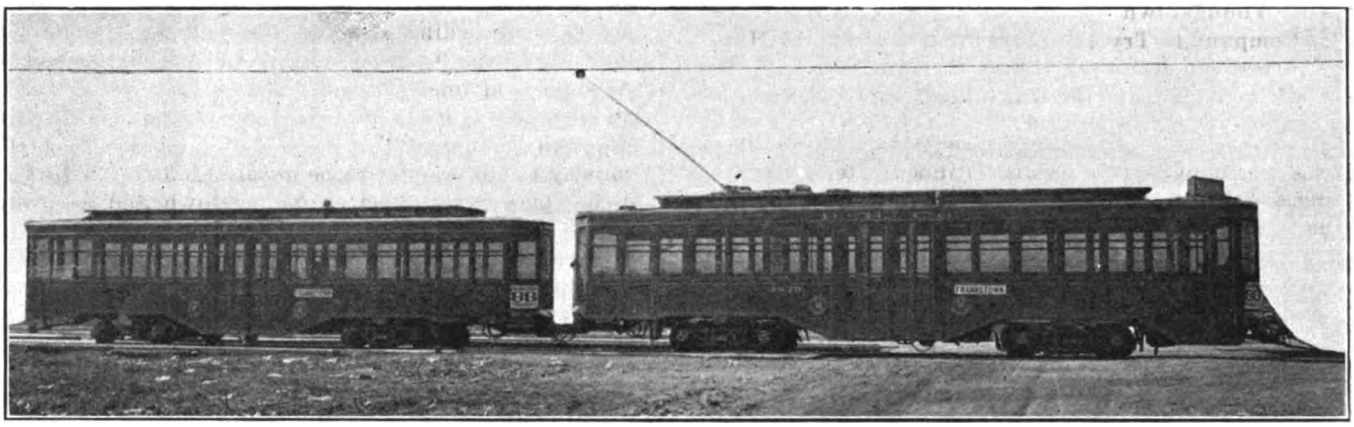
Pittsburgh's New "Light Six" Train

A Standard Light-Weight Motor Car Has Been Arranged for Operation with a Motorized Trailer—Only Slight Modifications in Platform Controller Are Required, with a Three-Wire Train Line—Emergency Braking Is a Feature

A NEW type of two-car train, composed of low-floor cars, has been developed by the Pittsburgh Railways. The salient feature is the use of two motors on the second car, arranged for forward motion only and without a separate controller. This results in simplification of the wiring on both cars and allows the use of the standard K-43 type of controller on the forward car. Only a three-wire connection between the two cars is needed, and it is energized only when power is on the motors. The regular motor car, being of light weight, is better suited for all-day operation than would be a car carrying the entire motive power for the train.



Pittsburgh Railways' Low-Floor Motorized Trailer Train

For many years the company has been using two-car trains for handling the rush-hour service. Originally these were made up with standard double-truck motor cars hauling obsolete single-truck cars from which the motors were removed, and which were remodeled for use as trailers. In 1910 a type of light-weight center-door trailer, especially designed for this service, was developed by the company's engineers. This car was distinguished by its small diameter wheels, which permitted an extremely low floor. It was described in ELECTRIC RAILWAY JOURNAL for Dec. 10, 1910.

But one type of car is available in Pittsburgh with sufficient motor capacity to stand regular daily service hauling these trailers. This type, which was introduced a number of years ago, is a standard end-entrance double-truck car equipped with four 60-hp. motors. While cars of this type can make satisfactory schedules when hauling trailers, their weight and motor capacity are excessive, as judged by modern standards. Moreover, some of these cars have been in use for such a period of time that they are approaching the end of their useful life and may have to be replaced.

Another type of motor car which has become standard with the Pittsburgh Railways is the low-floor, center-door car. The design is quite similar to that of the low-floor trailer. In fact, the first car of this type, described in ELECTRIC RAILWAY JOURNAL for Aug. 3, 1912, was one of the trailers modified, a front-entrance door being added and electrical equipment installed. It is considerably better for all-day service than the so-called trailer-hauler described in the preceding paragraph, and its four 35-hp. motors have ample capacity so that it can handle rush-hour loads admirably as an independent unit where such operation is suitable. For many of the long-haul runs in the rush hours, however, train service is preferred.

The low-floor motor car is so light in weight that it was felt by the management that it would not have sufficient traction to haul a trailer, as the wheels might slip on the heavy grades encountered on many of the Pittsburgh lines. While motors of sufficient capacity to haul light trailers might have been designed for mounting on the small wheels, still there would be the waste of energy due to hauling the excess weight around all day. Furthermore, it was considered desirable to make some arrangement whereby the existing cars with the 35-hp. motors might be utilized for train operation.

The company now has a considerable number of the trailer-haulers in all-day operation on lines where rush-hour train service is used. Since the decision had been made by the management not to re-equip the low-floor cars so they could haul trailers the question arose as to whether or not the additional equipment needed for expansion of the service should be of the older and less desirable type, merely to be able to haul the trailers for a few hours night and morning.

Tests made in Pittsburgh and elsewhere show that the power demanded by two-car trains is only 50 per cent to 60 per cent in excess of that taken by a single motor car making the same schedule speed under like conditions. The extra motor capacity required, therefore, is only about half that needed for single-car operation. A study of the situation made it apparent that if a satisfactory method of getting this additional capacity could be developed a desirable combination would be effected. In the past numerous plans have been tried by the Pittsburgh Railways and other companies for

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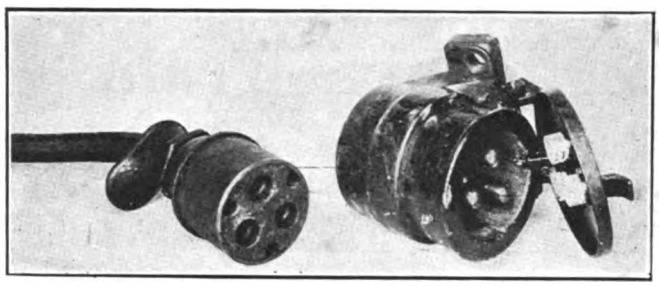


Three-Wire Cable Connector and Socket Which Has Cover that Short Circuits Motors When Closed

using a two-motor car for special service as the second car of a train in connection with a four-motor car running throughout the day. A complete individual control system for each car, with some form of multiple-unit operation, has always been employed in such an arrangement.

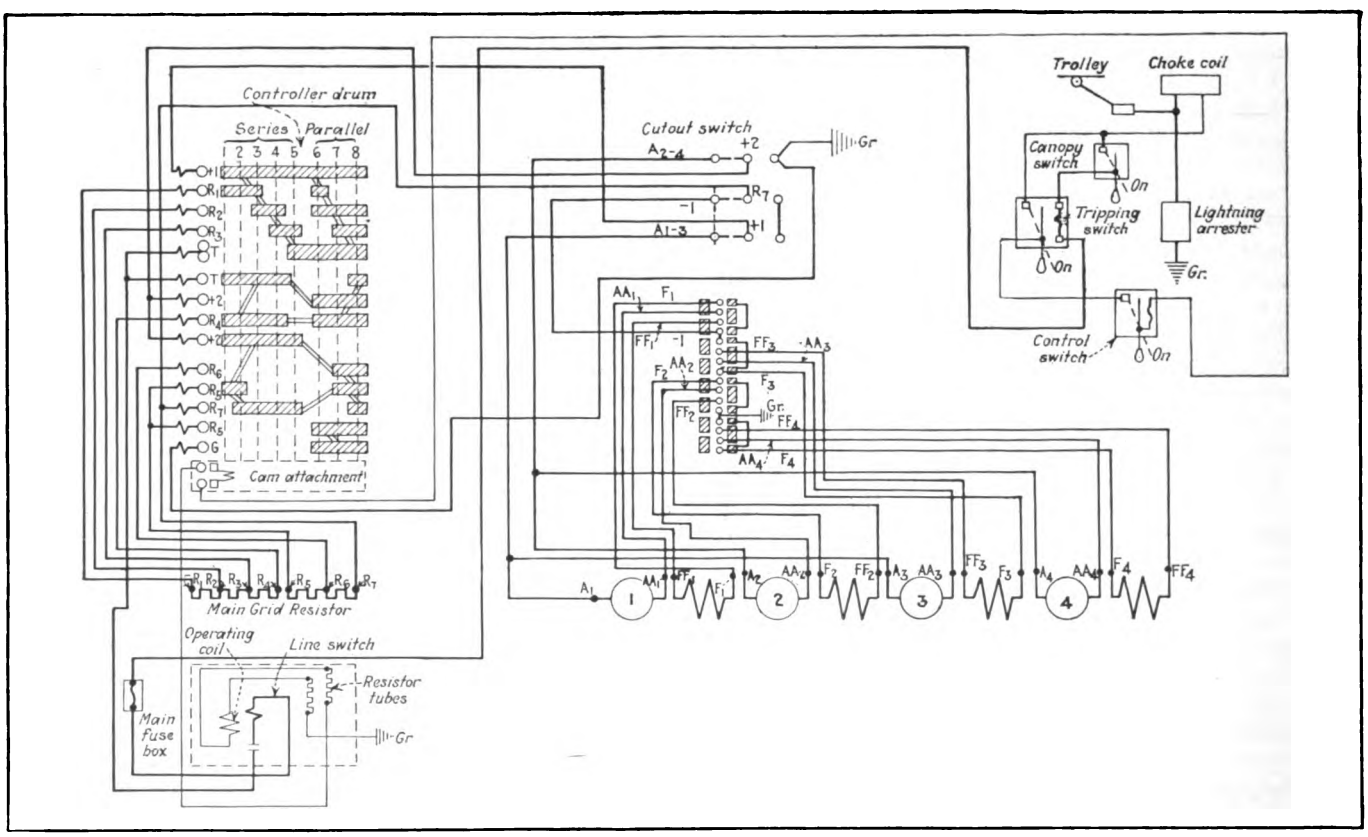
THE CONTROL SYSTEM

In designing the control and method of operation for the Pittsburgh Railways trains, for which P. N. Jones, general manager, and F. R. Phillips, superintendent of equipment, were responsible, it was decided that since the company was accustomed to handling dead trailers at the carhouses and had all facilities for doing so there would be no objection to continuing the practice. No attempt was made, therefore, to provide an independent control system for the second car of the train. While the trailer is motorized, it must be handled in exactly the same manner as a dead trailer. This, however, is not considered by the management a disadvantage sufficient to nullify the value of the plan, especially since considerable expense and complication are obviated.

The motor car of the test train is one of the company's latest low-floor cars. A description of this general type of car was given in ELECTRIC RAILWAY JOURNAL for July 3, 1915, although some minor improvements have been made in more recent orders. This car is equipped with four 35-hp. motors with K-43 control. The standard wiring for this control is shown in the first of the two diagrams.

In making the layout for train operation it was considered essential to retain the motor and control equipment intact, on account of standardization and first cost. For use with the two-car train the only modification is the addition of three contacts on the reverser drum, and the individual motor cutout switches, as shown in the second diagram. Three leads only connect the two cars. The two motors on the second car are mounted on its forward truck, and the field and armature of each are permanently connected in series for the forward direction of motion. If it is necessary to back the train, the motors on this car are simply cut out of circuit by throwing the reverser to the reverse position and the train is operated by the four motors on the leading car. Since few backward moves are made, and they necessarily must be at low speed, this is no disadvantage. It is this plan that may be considered the radical innovation, and on which the simplicity of the wiring depends.

As will be seen from the diagram, the motors of the leading car are grouped in pairs connected permanently in parallel in the standard arrangement, each pair being operated as a unit in the control. The two motors of the second car are added in parallel, one to each of the other pairs. The resistance of the grids is such that satisfactory starting will be obtained either for the motor car alone or when coupled with the motorized trailer. It has been found that, using the same grids, the variation in rate of acceleration between the operation of the four-motor car by itself and when it is coupled with the two-motor trailer is so slight that it is not noticeable. With the six motors in circuit the resistance is somewhat less in proportion to the current



Standard Wiring Diagram for K-43 Control of Pittsburgh Low-Floor Motor Cars

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demand, so that the train accelerates at about the same rate as the single motor car.

INDIVIDUAL MOTORS MAY BE CUT OUT OF CIRCUIT

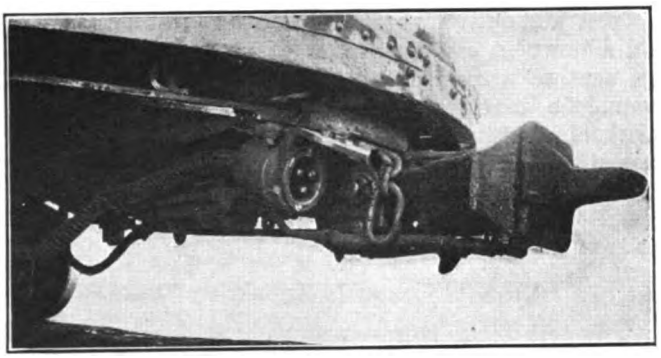
In case trouble develops in one of the motors of a standard four-motor equipment, both that machine and its mate usually are cut out of circuit by means of the switches in the controller, and the remainder of the run finished with the other two motors.

A special feature of this control is the arrangement of the connection board in the base of the controller so that a motor can be cut out independently. If any one motor of the six fails it is taken out of the circuit and the remaining five used. While there is some unbalancing of current in the series positions, due to having two motors in series with three, it is not enough to cause any trouble. In fact, it is not so hard on the machines as when two motors of a standard four-motor equipment are cut out of the circuit and the remaining pair have to haul the car. In case any two motors are disabled simultaneously, one being in each group, the remaining four motors can be used. They will be balanced in both the series and the parallel positions, and the car will operate at slightly reduced speed and with heating somewhat greater than is normally the case.

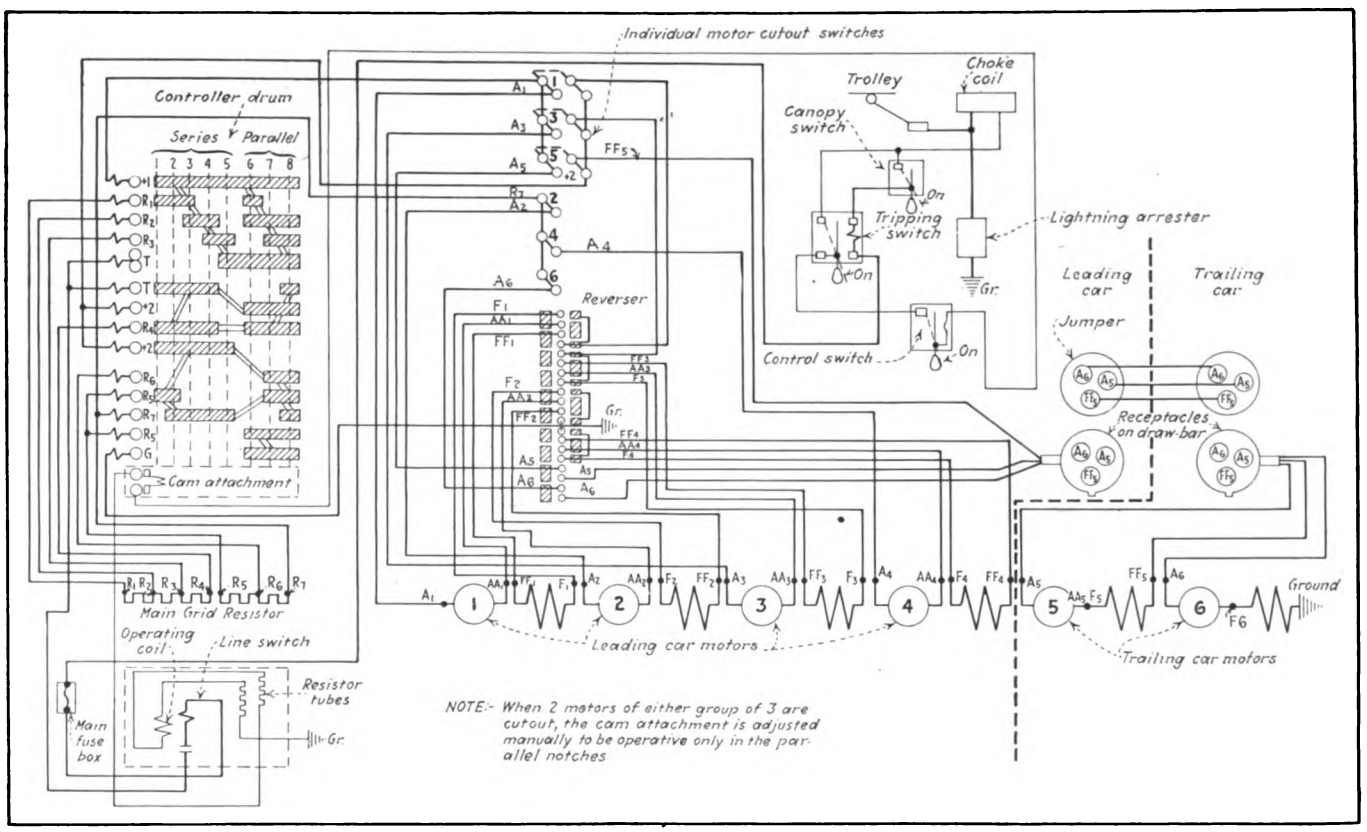
An interlock is provided by extending the cam located at the base of the main drum of the controller and used to operate the line switch. In the rare event that two motors in the same group are disabled at the same time and have to be cut out, this cam prevents the current flowing through the motors until the drum is turned to the first parallel position. In other words the control is changed from series parallel to plain rheostatic. Thus every contingency is provided for short of disability of all the motors, or of so many of them that it would be unsafe to move the cars with the remainder.

The connection between the two cars consists of a three-point receptacle on each car, with a three-line jumper connecting them. One novel feature is the provision for emergency braking. In the lid of the receptacle on the trailer car are three contacts, which appear white in the illustration. These contacts are connected together and are grounded. In case the train pulls apart the jumper will be pulled out of the receptacle on the trailer. The lid of the receptacle will then be forced down by means of a spring, and the contacts will provide a short circuit on each of the motors. Since the connection of these motors is permanently made for forward motor action it will be correct for backward generator action. In this way a powerful dynamic braking effect will be obtained. Then if the train should break in two while going up grade, the second car would begin to run backward, but would be retarded immediately by the dynamic braking, so that it would quickly be reduced to a low speed.

In tests made it was found that the train could be broken apart going up a 6 per cent grade, and the second car would at once slow down to a lower speed than a walk. A motor car following up the grade would then be able to approach the one that had broken loose and



The Socket for Making Connection Between Cars Is Mounted on the Coupler



Modified Wiring Diagram for K-43 Control for Use with Six-Motor Train

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stop it without danger. In the event a break occurred on a down grade the second car would, of course, be in contact with its leader, and the dynamic braking would be unnecessary. Of course, the car is provided with air and hand brakes, so that the above is a very remote possibility. In any ordinary case the conductor of the second car would be able to set the hand brakes when the car was retarded to a low speed by means of dynamic braking.

Energy Saving Is Shown by Tests

The test train now is operating daily on a regular Frankstown Avenue run. The motor car is scheduled to make about 150 miles per day, while the trailer is in use for two round trips or 33 miles. On this particular run the arrangement saves 925 ton-miles a day out of a total of 4,012 ton-miles that would be run if the ordinary type of 240-hp. trailer-hauling motor car were used. Additional power is saved because the motors are better suited to the size of the car. The train is better able to make its schedule in the rush hours when power is needed, while the equipment of the standard low-floor motor car is ample for the non-rush. In the preliminary tests already made the energy saving was about one-fourth of the total that would be required for the standard trailer-hauler running all day, with a trailer added for the two rush-hour trips.

One advantage observed in making a trip on the car is the absence of the jerks, due to taking up the coupler slack at starting, that are common in ordinary trailer operation. The second car starts along with the first, and while there is a slight lag of the trailer during acceleration, due to the leading car supplying more than one-half of the accelerating force, this is scarcely noticeable even to a trained observer. Tests have shown that the drawbar moves out of its normal position only about ½ in. at any time during the acceleration. This results in smoother operation, and gives greater comfort than is had with the usual motor and trailer operation.

The low-floor car loads and unloads much more quickly than the older end-door car, with its narrow passages and high steps. In service this train is making its schedule better than other trains on the same route. This is due to two reasons, its ability to load and unload quickly and the quick starting obtained.

Electric Steam Boiler on North-Eastern Railway

THE North-Eastern Railway, Great Britain, is using on its electrified sections an electrically heated steam boiler, designed by C. O. Bastian in consultation with Messrs. Merz and McLellan. *Electrical Industries*, London, gives details as follows: The boiler is of the fire-tube type, each of the 144 tubes being fitted with a Quartzalite heating element. The boiler is 3 ft. 4 in. in diameter and 3 ft. 4 in. long and is capable of supplying enough steam for the longest train handled by the railway in ordinary service. The full loading is 408 kw. and at three-quarters load, with an input of 298 kw.-hr., 970 lb. of water was evaporated at 120 lb. pressure in twenty-four minutes.

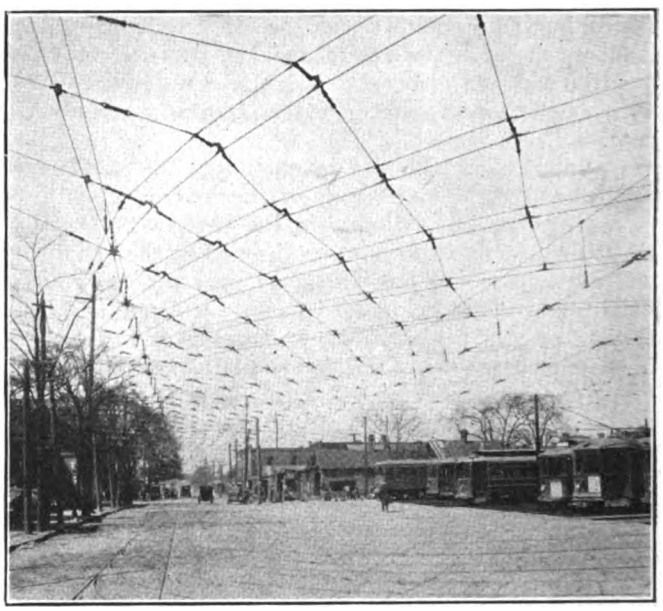
The Quartzalite element for this boiler consists of a quartz tube ¾ in. in diameter, inside of which is a close spiral heating element of Tabasco resistance wire. The tube butts onto a mica washer, in the end of a hollow porcelain terminal, which is held by spring pressure to the terminal plate of the boiler. The end of the element is silver-soldered to the terminal, which traverses the porcelain.

This heating boiler operates on 1,500 volts, direct current.

Supporting an Extensive Overhead Network

Substantial "Back-Boned" Construction with Catenary Messenger Supports Has Minimized Maintenance Work on Forty-one Branch-Offs at Butler Street Carhouse in Atlanta

ON ACCOUNT of the large number of tracks branching off from the single track on Butler Street, Atlanta, Ga., into the Butler Street carhouse and adjoining yards, unusual precautions were necessary to safeguard the overhead construction against failure. Until recently there were thirty-one tracks branching



Overhead Connecting Curve Construction at Butler Street Carhouse in Atlanta

off at this point, and the overhead construction involved was briefly described in an article in the issue of the ELECTRIC RAILWAY JOURNAL for March 20, 1920, page 563. Since that time ten tracks have been added, making the present total of forty-one.

The main trolley wire over the original installation was of No. 000 copper, the thirty-one branch wires being of No. 000 galvanized iron. In the new installation, however, both main trolley and branch-offs are of No. 000 copper.

On account of the considerable weight of this overhead construction, with the consequent tendency toward sagging over the switches and curves, two ½-in. steel messenger wires were strung along the entire frontage of the carhouse and yard. One messenger is directly over the switches and the other is just beyond the point where the tracks straighten to enter the carhouse. The trolley network is supported to a large extent from these messenger wires by the usual catenary construction. This is shown clearly in the illustration on this page.

The manner in which the network is supported is shown in the accompanying illustrations. The overhead

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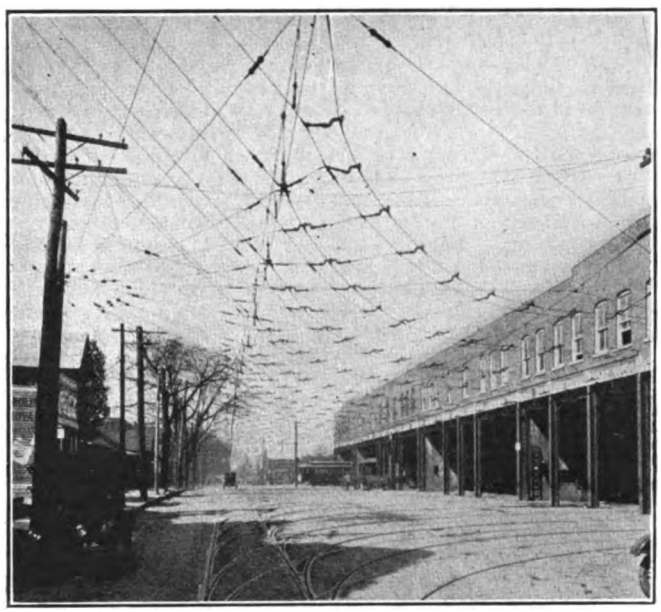
work is of the type known as "back-boning," the trolley wire on each curve being paralleled by galvanized strand, ⅜ in. in diameter.

All span wires and pull-offs in this installation are made of ⅜-in. galvanized guy strands and are attached to the trolley wire at intervals of 7 ft. The attachments to the wire are made by means of double curve pull-overs. To provide insulation, a 9-in. wood strain insulator is linked into the eye of the pull-over on the outside of the curve. A ⅜-in. guy strand (the back-boning mentioned above) is run through the insulator eye at the end away from the trolley wire, and the span wires and pull-offs are also attached to the insulator eye at this point.

A 9-in. wood strain insulator is also inserted in the eye on the side of the pull-over toward the inside of the curve, and a short span wire is run from the other end of this insulator to another insulator attached to the trolley wire on the next track. The wire over the second track is installed just like the one described.



Catenary Messenger Supports and "Back-bone" Reinforcement Insure Durability in the Overhead Network

This "back-boning" serves to keep the trolley wire off the rails in case of a break and, by allowing continuous operation in spite of a break, it prevents interruption to service. All repairs on such construction can be made by trouble crews and a considerable saving is effected in this way.

The poles on the outside of the curve, which support most of the strain, are 8 in.-10 in. standard steel tubular poles set 7 ft. in concrete. They are set approximately 30 ft. apart. The poles located on each side of the outdoor track are A-grade creosoted pine, set 100 ft. apart.

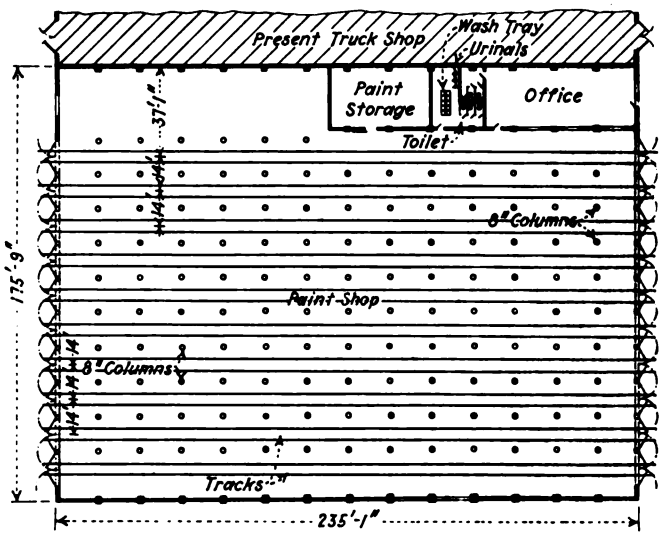
The weight of the construction over the entire ten new tracks was found to be too heavy to be supported by two lines of poles and a third line was set between the fifth and sixth tracks at intervals of 100 ft. The poles in this line are 6 in.-8 in. standard steel tubular poles. The poles at the end of the track are of creosoted pine and one pole is set for each two tracks, the wires being held in place by V-guy construction.

The cost of the new work on this installation, that is, over the ten new tracks, was about $2,420, while the whole installation over the forty-one tracks cost approximately $9,000.

$125,000 Paint Shop for Detroit

A Feature in the Construction of This Paint Shop Is the Method of Supporting the Scaffolds—The Painting Methods Also Are Described

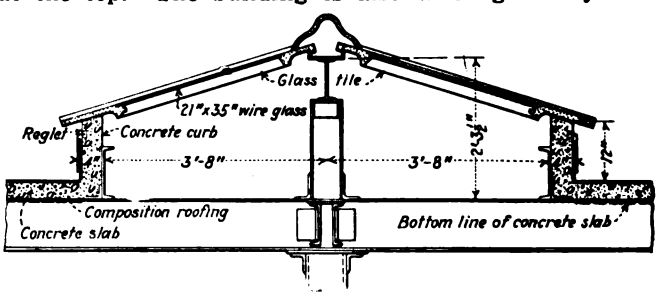
THE Detroit municipal railway is just completing the construction of a paint shop capable of accommodating fifty double-truck cars. It is being erected at Highland Park, close to the present repair shop of the system. When the property of the Detroit United



Plan of New Paint Shop

Railway was taken over by the city on May 15, 1922, the D.U.R. turned over its repair shops at Highland Park but kept its paint shop, which had recently been built. This building has since been converted by the company to office and repair shop purposes. This made a new paint shop for the municipal system immediately imperative. The one now being erected will cost about $125,000, and as it possesses a number of novel features, an account will be presented.

The building measures 175 ft. 9 in. x 235 ft. 1 in. outside dimensions, and is of steel and brick construction with concrete floor and composition roof and with monitors extending over each track. The end doors are of wood, metal lined on the inside, and steel sash at the top. The building is also well lighted by side



Section Through Monitor Roof

windows. It also contains a fireproof paint storage and mixing room.

Perhaps the most interesting feature of the building from a street railway standpoint is the method of mounting the brackets which support the scaffolding for painters. The support for the roof girders between each two tracks is a row of thirteen 8-in. wrought-iron columns, and these columns are used to support the scaffolding brackets. Inside of each column is a counterweight for balancing the weight of the

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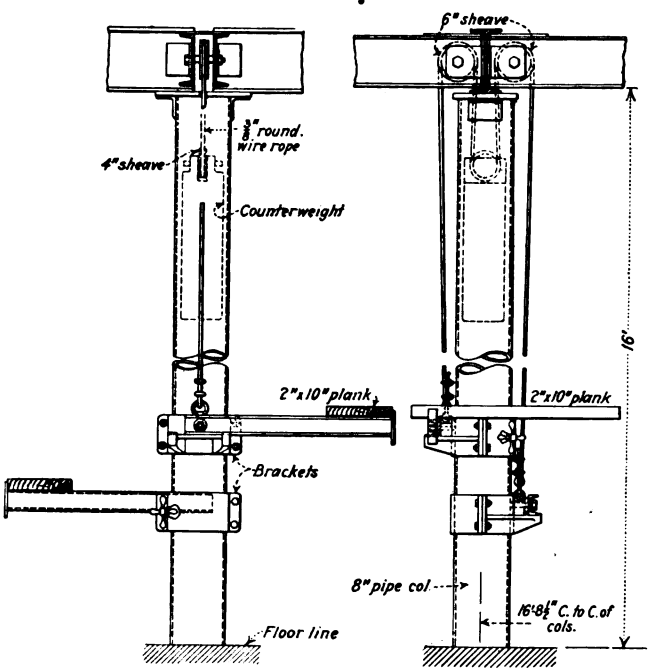
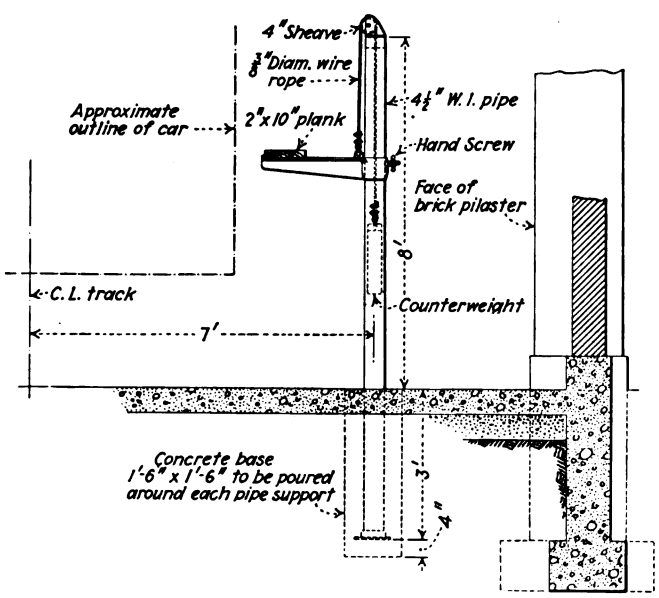
scaffold, as shown in the drawing below. A ⅜-in. wire rope is carried first around a 4-in. sheave on the counterweight and then over two 6-in. sheaves at the top of the column. The ends are attached to the brackets, which can be set in position by a handscrew. When not in use these brackets can be swung parallel to the tracks and thus be out of the way. For the bracket



Method of Supporting Painters' Scaffolding on 8-In. Supporting Columns



Method of Supporting Painters' Scaffolding on Outside of Tracks Near Wall of Building

supports nearest to the walls of the building, where there are no columns, a somewhat different arrangement is followed. The lower drawing shows this method.

Painting Methods

It is the plan of the municipal railway to use the enamel method in painting its cars, applied by spray guns. The equipment department has been using the DeVilbis spray gun, manufactured in Toledo, and will have an equipment of ten of these guns when operation begins in the new shop. It has been found that one man with this gun will do the work of three with the brush, and the brush method is used only for painting the wooden sash. The headlining of the car will be painted two coats of white enamel and all other parts one coat. London gray enamel has been adopted for the inside finish of old cars, and canary yellow for the exterior body color. The cleaning of the trucks for painting is accomplished by the use of a water jet sprayed at high velocity by means of air at 100-lb. pressure. The under side of the cars will also be painted, the paint being applied by the gun method. It is expected that cars will require only four or five days in the shops for painting.

Car Washing

While not directly connected with car painting, car washing is closely related to the preservation of the surface finish of cars, and the practice of the Detroit Municipal Railway will therefore be described. The standard practice in car cleaning, with some time studies of the approximate time required, is outlined as follows:

Car Cleaning Program

Daily Cleaning—Sweep car body, vestibule and steps. Sprinkle slightly. Brush out corners and around pipes with hand brush, and sweep refuse into basket. Spray with disinfectant. Time for double-truck car, twenty-five minutes; time for single-truck car, eighteen minutes.

Car Washing—Cars to be washed every three days, using plain water only. Exteriors to be thoroughly wet below the roof line, then scrubbed with bristle brushes, rinsed and allowed to dry. Double-truck car, sixteen minutes; single-truck car, eleven minutes. Interiors: Windows only to be washed with clear water and sponge and wiped dry with rubber window cleaner. Double-truck car, forty-two minutes; single-truck car, thirty minutes.

Monthly Cleaning—Bodies to be scrubbed with prepared car cleaner and washed. Interiors: Windows to be washed as above. Deck windows to be washed. Moldings to be wiped with oiled dustcloth. Lamps and shades to be cleaned. Curtains to be dry wiped. Side walls, vestibule walls to be washed with sponge where necessary.

Yearly Cleaning—All interior woodwork to be washed with prepared cleaning solution, rinsed with clear water and dried.

General—In bad weather, especial care must be given to windows. Keep them clean at the sacrifice of the bodies. During stormy weather, when outdoor work is impossible, devote all time of the outdoor crew to interior cleaning. Monthly cleaning to be carried on continuously; that is, do not bunch the work at the end of the month, but do a share of it daily, keeping careful record of date of monthly cleaning so that not more than a month elapses between cleanings. Car-cleaners will be required to report to carhouse foremen of any car defects noted.

For the washing every third day of the exterior, as mentioned in the program just given, the car is run through a spray shower in the carhouse, as described on page 705 of the issue of this paper Oct. 28, 1922. The car body is then scrubbed with brushes and rinsed by running through the spray shower again.

Liverpool to Abolish Two Classes on Tramways

THE Corporation of Liverpool has decided to return to the one-class tramway system. Fifteen years ago the experiment with first and second class tramcars was begun, but as the system proved unsatisfactory, a double-deck method was inaugurated—first-class passengers on the lower and ordinary fare passengers on the upper deck. Partly owing to the fact that no passengers were allowed to stand in the double-deck cars, that arrangement also has proved unsatisfactory and unprofitable. Hence the proposal to return to one-class cars.

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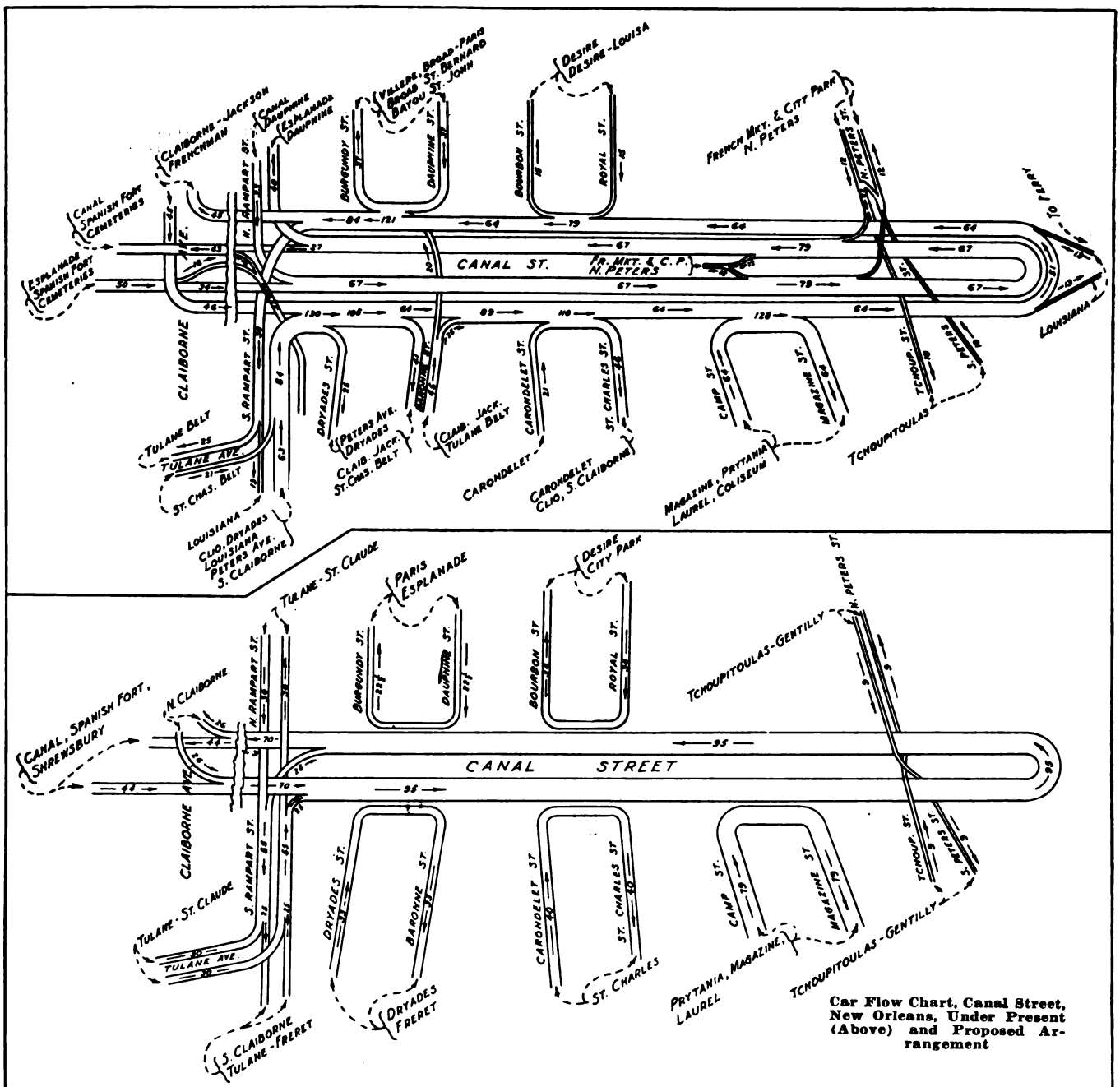
Canal Street Rearrangement, New Orleans

Car Speed Increased in Downtown Section—Amount of Track on Canal Street Reduced 50 per Cent and Special Trackwork 75 per Cent—Traffic Congestion Decreased and Street Capacity Doubled—Greater Safety for Patrons and Improved Parking Facilities for Automobiles

SECTION III of the report for the city on the local transportation system in New Orleans by John A. Beeler deals with the track facilities and traffic conditions on Canal Street, the principal thoroughfare of the Mississippi River seaport. This great thoroughfare of magnificent proportions, the report states, is the dividing line between the up and down town sections. It is as unique in its characteristics as it is important in its location. With a width of 170 ft. between property lines, it provides separate roadways for traffic in both directions, while its broad, commodious, neutral ground should afford more than ample facilities for street car tracks. Its width and plan provide an excellent opportunity for developing the easy flow of a great volume of both vehicular and street car traffic.

From the Canal Street loop to Claiborne Avenue, a distance of less than 1 mile, there are, including connections at intersecting streets, 6.91 miles of track, or the equivalent of seven tracks for the entire distance. The two gages, requiring a third rail, and the conglomeration of costly special work are an inheritance from the days of competitive lines. Every line in the city but one is now routed to cover some portion of this section of Canal Street. Despite the multiplicity



Car Flow Chart, Canal Street, New Orleans, Under Present (Above) and Proposed Arrangement

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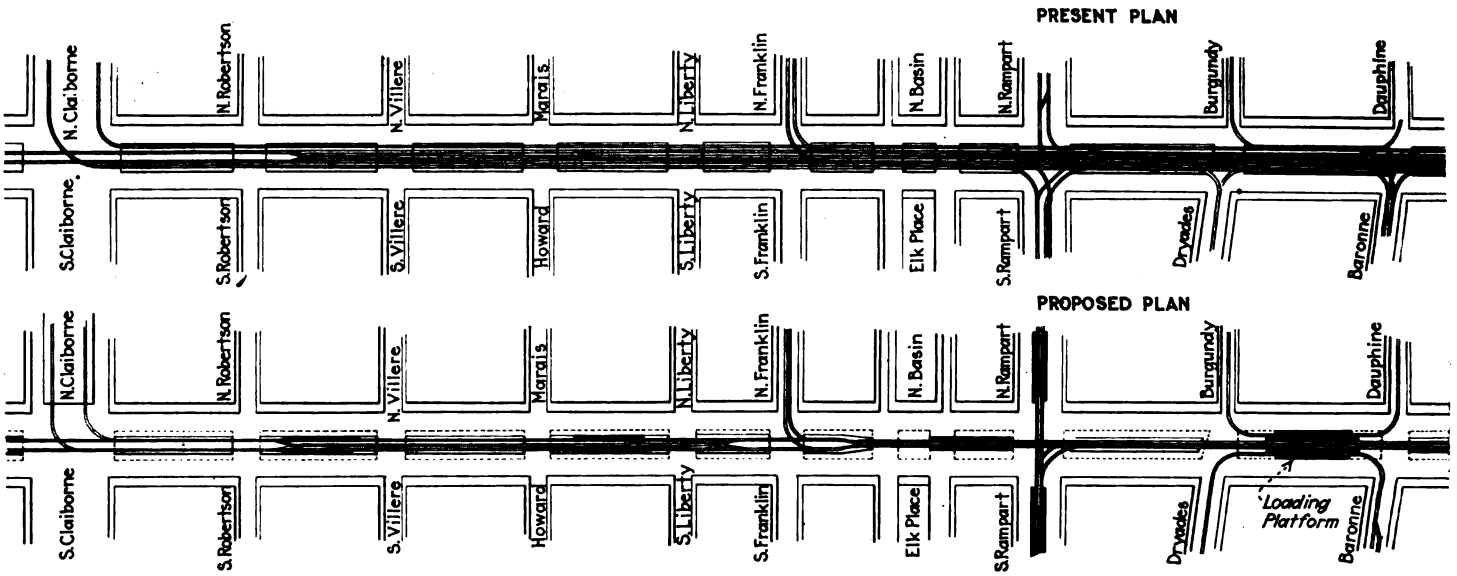

Present and Proposed Arrangement of Tracks, Traffic and Parking

of tracks, the car movements are so delayed and hampered that a speed of but little better than 6 m.p.h. is maintained through the day. During the rush hours this speed drops to 4.75 m.p.h.

During the morning and evening rush periods, it is no unusual thing to see twelve or more cars within the limits of one block. About one-quarter of these will be loading, while the rest are waiting. The slow loading; interference by turning movements of cars, especially the left-hand turns; the use of non-clearance curves; the counter-traffic movement of vehicles, and the frequency of stops, paralyze service in spite of all facilities at hand. The large number of motor cars and trucks in use, together with the demand for parking space, have so congested the roadways that general traffic fairly trickles through. Conservatively stated, the engineer points out, the utilization of roadway space for all moving traffic is now at a minimum.

An accompanying drawing shows the present and proposed track layout on Canal Street. From this it will be seen that the through tracks are reduced in general from five to two, and that the lines looping back at Canal Street are operated over separate tracks, so as not to interfere with the through movement of cars on Canal Street. This reduction in the number of tracks releases a large amount of the area of the neutral ground for parking purposes and loading platforms. The general plan so increases the capacity of the street that in the blocks where four tracks remain and with four recommended loading platforms in place there will be room for three lines of moving traffic all of the way through on either side of the tracks, and with room for standing vehicles alongside the curbs, as compared to but one line on one side and two on the other as at present. The present arrangement permits parking of cars in any block at right angles to the length of the street, thus materially reducing the space available for through traffic, whereas in the proposed arrangement, parking of cars would be permitted only in the blocks between loading platforms, where their presence would not diminish the space available for moving traffic.

The simplification of the movement of cars is most easily visualized by reference to the car flow charts, as at present and under the proposed plan, reproduced herewith. Figures behind the arrows indicate the maximum cars per hour. In comparison with the present system the proposed plan of operation reduces the number of left-hand turns from 119 to 25, the number of right-hand turns from 314 to 25, the number of left-hand car interferences from 471 to 75, and the number of right-hand car interferences from 374 to 25. This makes a reduction in both directions between Wells and Rampart Streets of from 433 to 50 turning movements, and from 845 to 100 interferences.

The report states that the movement of main-line cars will not be hampered by the intersecting lines which terminate at Canal Street, from either the up or down town section. Neither will the latter lines be interfered with or delayed by the traffic of the through Canal Street cars, as they will be completely segregated from each other. In place of the present tangle of special work and overhead wires, there is substituted a clean-cut system of independent main-line tracks and simple non-interfering curves without switches, crossings or turnouts.

The effective roadway space would be virtually doubled. This would permit at all times three moving lines of vehicles, with ample space for standing trucks or automobiles next to the curb. The area of roadways between Wells and Rampart would be increased from 206,741 sq.ft. to 280,281 sq.ft., and between Rampart and Claiborne from 133,450 sq.ft. to 195,520 sq.ft. This is an increase of 73,540 sq.ft., or 35 per cent, in the roadway between Rampart and Wells alone, where every foot should be used to its maximum capacity. It will also make available 62,070 more sq.ft. above Rampart Street.

In the blocks where the uptown and downtown lines terminate, stops would be made at loading platforms, permitting easy transfer from one line to another. These stops are located in alternate blocks. In the other blocks the present outside tracks would be removed and the space there reserved for parking, thus creating a protected parking space.

In regard to the loading platforms recommended, the report states that on Canal Street they should be not less than 200 ft. long, 6 ft. wide and 10 in. above the top of the rail. To secure full advantage of the plan, double berthing of street cars must be practiced at all times. The use of street collectors during periods of heavy loading is also recommended.

The consultant finds that the tracks and special work on Canal Street are now in such a bad state of repair that the greater part of them will have to be rebuilt during the next few years. It would seem, therefore, that now is the opportune time to make the proposed

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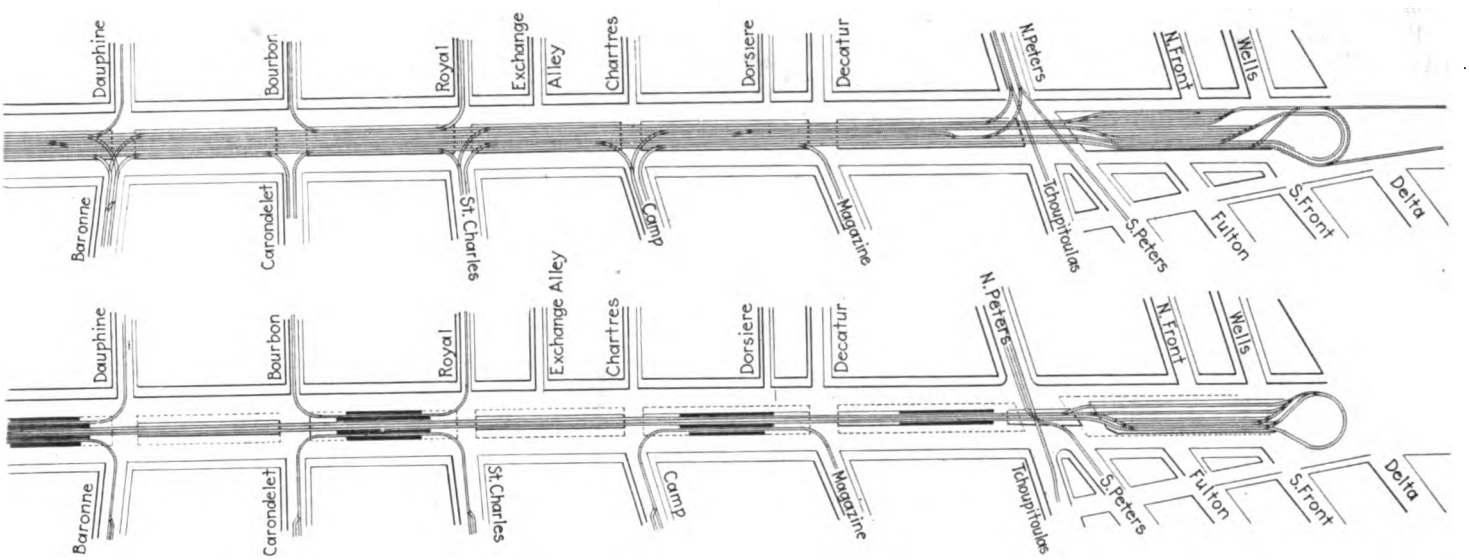

Areas and Loading Platforms on Canal Street, New Orleans

changes. If tracks and special work are renewed as they now exist, perpetuation of the present deplorable condition will continue, with the accompanying costly maintenance and cumbersome operation.

On the other hand, the installation of the proposed plan would do away with the necessity of the renewals or replacements now contemplated by the company. The track under the proposed plan could be constructed at a considerable saving over the cost of the necessary renewals, and would materially and permanently reduce operating and maintenance costs. The advantages of the new plan as to track may be seen in the brief comparison in the table in the next column.

This represents a reduction of 51 per cent of track-miles and 75 per cent in the special track and overhead work. The most important reductions are in the items whose maintenance and renewals are greatest, that is, curved track and special work.

	Present	Proposed
Track in miles	6.91	3.40
Curved track in miles	0.94	0.22
Track crossings, number	60	11
Switches, complete, including mates and frogs	60	25

This simplification on Canal Street would result in both immediate and lasting financial benefits. To renew the property along its present lines would cost approximately $410,000. The new plan can be installed for $304,000, which will be an immediate saving of $106,000. The estimated annual maintenance and renewal cost of the present plan is $62,000 as against $27,000 under the proposed plan, or an annual saving of $35,000.

Bonus Given in Racine for Saving Energy

THE Milwaukee Electric Railway & Light Company encourages the motormen on the Racine division to save energy in car operation by paying a bonus depending upon the saving made. In Racine all of the cars are of one type, namely, Birney one-man cars, except for a few rebuilt safety cars and the trains used during the rush hours. There are two types of trains, namely, a two-car train, consisting of a motor car and a trailer, and the articulated two-car three-truck train, like those used in Milwaukee. Tests have been made with each of these cars and trains to determine the power used, and to simplify the keeping of records all Economy meter records are reduced to the Birney standard.

The present plan was put in operation after it had been determined that the average energy consumption of the Birney cars under Racine conditions at the time the plan was begun was 1.3 kw.-hr. per car-mile, and the company offered to divide the gain made below this figure in the proportions of 40 per cent to the men, 40 per cent to the company and 20 per cent for the expenses necessary to keep the records of the system. Originally, this saving was divided equally among the men, but later (March 1, 1922) the plan was begun of rewarding the more efficient motormen by dividing the bonus in proportion to the efficiency shown.

To do this, it is obviously necessary that the operating conditions, so far as energy consumption is concerned, should be the same for the men compared, and it is quite possible, of course, on any system that one line may be more hilly or construction work may be going on, or for some other reason some runs require more power than others. Hence, instead of taking the standard of 1.3 kw.-hr. for each line, the average energy consumption per car-mile for each line is taken as the standard and each man is graded as to whether he does better or not so well as the average. The bonus for the entire system, based on the 1.3 kw.-hr. figure, is then divided up among the different lines according to the car mileage on each line, and the bonus for each line is divided up among the men according to their performance. For instance, in Racine during March, 1923, the total bonus earned from energy saving by the seventy-six men employed was $118.23, the average power consumption being 1.12 kw.-hr. per car-mile, on the Birney car basis. The highest man on the list, instead of getting an average of $1.56, received $3.20. His operating average was 0.94 kw.-hr. and he operated during the month 1,543 miles. The motorman using the greatest amount of power used 1.43 kw.-hr. He was penalized 26 cents and was the only man on the list who was penalized.

The way in which an individual bonus would be calculated is as follows:

Assume

a = Average energy consumption of any particular line

b = Average energy consumption of the individual

M = Total car-miles operated on the line

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m = Car-miles operated by the individual
V = Total value of the energy saved
$0.4V$ = The trainmen's share of saving made,

then any individual bonus equals a proportional share of the total bonus from energy saving based on car-miles operated, or $\left(\frac{0.4V}{M} \times m\right)$, plus the increment earned due to individual efficiency relative to the line average or $(a - b) \times m \times 0.4V$.

In other words, the individual's bonus is $\frac{0.4V\,m}{M} + (a - b)m\,0.4V$, which is equivalent to

$$m\left(\frac{0.4V}{M} + 0.4V\,(a - b)\right)$$

Of course when b is greater than a, the expression $0.4V\ (a - b)$ becomes minus, but only in exceptional circumstances would b be so large as to make the whole expression a minus quantity. It will also be observed that as every operator is interested in increasing the value of V there is an incentive for the efficient men to teach the inefficient men to operate more efficiently.

The following is a list of the amounts in round figures since January, 1921, of the savings or loss in energy measured in dollars divided among the men on the Racine system according to the plan described:

January, 1921	Loss	$29	March, 1922	Gain	$86
February, 1921	Loss	22	April, 1922	Gain	91
March, 1921	Loss	23	May, 1922	Gain	134
April, 1921	Gain	17	June, 1922	Gain	156
May, 1921	Gain	22	July, 1922	Gain	113
June, 1921	Gain	77	August, 1922	Gain	183
July, 1921	Gain	91	September, 1922	Gain	169
August, 1921	Gain	75	October, 1922	Gain	180
September, 1921	Gain	72	November, 1922	Gain	128
October, 1921	Gain	61	December, 1922	Gain	68
November, 1921	Gain	23	January, 1923	Gain	78
December, 1921	Gain	00	February, 1923	Gain	73
January, 1922	Gain	22	March, 1923	Gain	118
February, 1922	Gain	44			

It will be noted that the savings are greater in the summer than in the winter months. This is only natural when an annual standard is set, but as any inequalities even themselves out during a year and an annual standard is simpler, the company holds to that plan.

A bonus along the lines mentioned is being considered for the Milwaukee system of the company, but no definite plan has been decided upon. The combined property has 750 cars equipped with Economy meters, having installed the first 350 meters in 1917.

Carrying Safety to the Public—IV*

Visualizing the Safety Idea by Means of a Poster Campaign—Slogans of Interest Get the Attention of the Public by Widespread Display—Car Cards Also Can Be Used to Advantage

By C. W. Price
Vice-President in Charge of Public Safety,
Elliott Service Company, New York City

IN THE development of public safety the question which has claimed attention more and more is how to visualize safety, how to keep safety continuously and impressively before the public. The Washington Safety Council's solution of this problem is by the conduct, on an extensive scale, of a continuous poster campaign. The splendid record recently made of reducing accidental deaths 32 per cent is due, so its officers think, in a large measure to the poster campaign.

Each month a new poster is issued bearing a snappy slogan. For instance, the first poster read, "The Reckless Driver Is a Criminal"; the second, "The Jaywalker Is Taking a Short Cut to the Hospital," and the third poster read, "Better Be Careful Than Crippled." These posters are done in different colored inks and paper each month, and are made in three sizes—25 in. x 38 in., 16 in. x 24 in. and 8 in. x 18 in. The largest sized posters are exhibited on 100 permanent metal signboards on stanchions located at important street intersections, at gasoline filling stations, and at entrances to industrial plants. They also are posted on vacant billboards. The second sized posters are exhibited on the dashboards of all street cars, and in government and municipal buildings, including school houses. The smallest sized posters are carried on taxicabs, buses and other commercial vehicles.

The display of posters on street cars, taxicabs, buses, trucks and other commercial vehicles, which are constantly moving up and down the streets, gives an enormous distribution of the poster display, considering the number used. The posters bearing a slogan printed from type in large, bold letters are much less expensive than those done with elaborately colored cartoons, and are found to be more effective. What is needed is a poster that instantly catches the eye and can be read easily at a distance.

A snappy, gripping slogan is much more effective than either a positive or a negative statement. For instance the slogan "The Jaywalker Is Taking a Short Cut to the Hospital" will be noticed and remembered, when "Cross at the Crossing" or "Don't Jay Walk" will scarcely get a passing glance.

The posters issued thus far have received attention on both the editorial and news pages of the press. In the correspondence columns have appeared numbers of letters, some praising, and some in tart language condemning the posters, all of which is evidence that the slogans did get the attention of the public.

Widely distributed as these posters are over the city, it is not possible for a driver or pedestrian to come down into the heart of the city without being reminded a dozen times of the idea of safety; and he is reminded at the very points where the hazards are greatest. The automobile driver may read articles on safety while he sips his breakfast coffee, and by the time he backs his machine out of the garage, he has forgotten. But if on his way down town he is confronted at every dangerous street intersection with the accusing indictment, "The Reckless Driver Is a Criminal," he is compelled to remember safety. During the progress of the campaign a prominent business man said to a friend, "I am a reckless driver; I'll admit it. But those posters on the

*The fourth of a series of ten articles.

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The Month's Slogan Was Displayed on 100 Sidewalk Signs, and on Cars and Vehicles

street have got me. Every time I face one going down town I slow up."

Complete material for a poster campaign, including the posters and instructions regarding their application, are now available and on the market.

Defining the cross walks at street intersections with broad white lines is a method of visualizing safety which has been used in many cities with good results. These lines, if kept freshly painted, not only serve to visualize safety, but they help to direct the pedestrians in the "straight and narrow way."

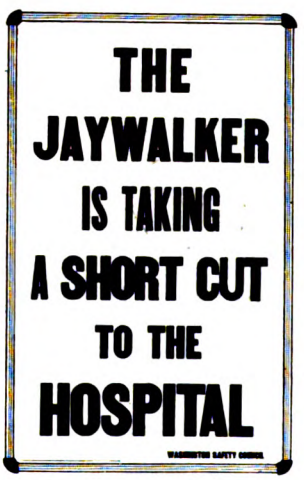
In order to give variety and a bit of color to the crossings, an arrow or a hand, with the finger pointing to the space between the white lines, should be stenciled on the sidewalk—preferably in a color other than white, the color being changed each time the lines are repainted.

The outdoor advertising companies, if properly approached, can be induced to allow large vacant billboards to be used at a nominal cost for displaying the slogan. For instance, in Washington a space 30 ft. x 40 ft. located on one of the buildings in the business section was available for two months, and on it was displayed the slogan "The Reckless Driver Is a Criminal," illuminated with electric lights.

A striking poster displayed in the cars and changed frequently offers one of the most direct and effective mediums through which electric railways can reach the public with safety suggestions bearing on their own particular hazards. The Public Service Railway of New Jersey was one of the first to use this method. This company suspended from the ceiling in the center of each car a frame about 12 in. x 36 in. in size. In these frames were exhibited posters done with cartoons and safety slogans, usually calling attention to the fatal results of carelessness.

The Traffic Tower at Fifth Avenue and Forty-second Street, New York, Was Used for Poster Display

Done in Blue Letters on Yellow, This Was Displayed in Vehicles



This Poster Was Displayed on the Sidewalk Signs. It Was Printed in Black on Green

That safety can be visualized and that lasting results of benefit to the community can be obtained are shown by the opinions of men who were instrumental in backing the poster campaign in Washington.

W. F. Ham, president Washington Railway & Electric Company and president Washington Safety Council, says: "The continuous poster campaign conducted in Washington has proved to be one of the most effective means of reaching the public and obtaining their cooperation. It has largely assisted in producing a good accident reduction in the past three months."

J. J. Boobar, vice-president and general manager Yellow Taxicab Company, states: "Results and my personal observation satisfy me that the plain marking in white of street crossings and safety zones and the display of posters with a punch at congested street corners and on street cars, taxicabs and trucks is the most efficient means of minimizing street accidents and carrying a lasting and impressive message to the pedestrians and the drivers."

Major Sullivan, superintendent of the Metropolitan Police, makes this statement: "The safety poster campaign, more than any other single activity, has helped the police department of Washington to curb recklessness and carelessness on our streets, and in two months has assisted in reducing the total number of accidental deaths 32 per cent, traffic deaths 43 per cent, and deaths to children 65 per cent."

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A Relay Which Almost Thinks

By the Use of Current and Voltage Windings the Relay Operates with a Delay Which Varies with the Remoteness of a Short Circuit—It Can Be Made Operative with Power in But One Direction

BY S. L. GOLDSBOROUGH
Supply Engineering Department
Westinghouse Electric & Manufacturing Company,
East Pittsburgh, Pa.

A RELAY which operates with a degree of promptness depending on the distance of a short circuit from the source of power supply has recently been perfected by the Westinghouse Company. It is intended for the automatic sectionalizing of transmission lines in case of short circuit, under which condition both the excess current and the low voltage are utilized to determine the time delay. It is so designed that the time is directly proportional to the voltage and inversely proportional to the current; hence it is proportional to the quotient of voltage and current, or the impedance, which in turn is proportional to the distance included in the circuit.

Since the tripping time is dependent upon the distance of the relay from the short circuit, the relay nearest the fault will trip first, those farther away automatically increasing their time of operation in order to allow the relay nearest the short circuit to close its contacts and trip its circuit breaker first, thus cutting out only that section of the line which is in trouble.

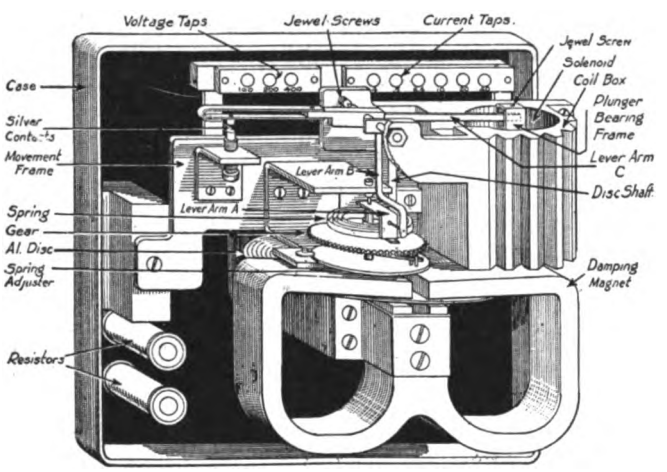

Fig. 1—Sketch Diagram Showing Principal Parts of the New Distance Relay

Figs. 1 and 2 show the principle of the relay. Essentially it consists of two elements, a current element and a voltage element. The former is similar to that used in the standard induction overload relay. An aluminum disk is driven by an electro-magnet against the damping action of the permanent magnet at a speed dependent in part upon the position of the permanent magnet and approximately proportional to the current. A countershaft carries the lever arm *A*, a spring and a spring adjuster, and is geared to the shaft of the induction disk.

The lever on *A* is movable on the shaft and carries the outer end of the spring, the inner end of which is fastened to the disk shaft. A rocker arm pivoted in jeweled bearings carries the contact on one end and the core of the voltage element on the other end. This voltage element consists of a solenoid sealed into a cast-iron case, having a number of ribs cast integral with it, the purpose of which is to keep the temperature of the coil within safe limits.

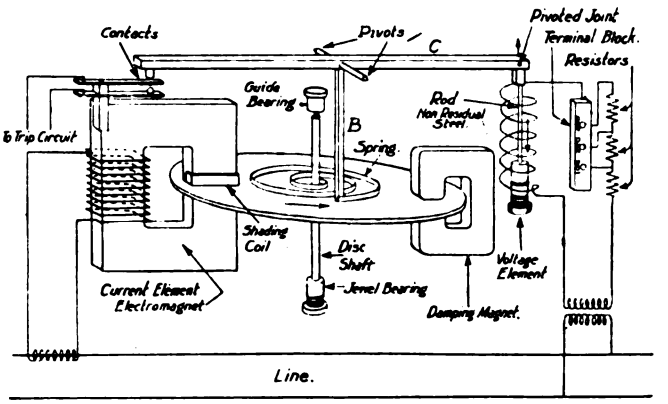

Fig. 2—Schematic Diagram of the Distance Relay

As the induction disk rotates the spring on the countershaft is tightened and causes a force to be exerted on the lower end of arm *B* in the direction of the arrow. This force tends to close the contact by rocking the pivoted beam against the pull of the solenoid plunger suspended on the end of arm *C*. Now for a given position of the damping magnet, the speed of the disk is, within limits, proportional to the current, therefore the time required to travel a given distance is inversely proportional to the time. The distance through which the disk must travel to close the contact is determined by the pull of the voltage coil, which is made directly proportional to the voltage. The time required to close the contact is, then, inversely proportional to the current, directly proportional to the voltage, and, therefore, directly proportional to the distance from the short circuit.

Where the distance relay is to be applied to a ring system or to a line having two or more sources of power, it is necessary to add an additional element to enable the relay to take account of the direction of power flow as well as the location of the trouble. This can be done by equipping the relays with a directional element (see Fig. 3) the contacts of which are in series with the contacts of the distance element and connected so that they close only when the power is flowing away from the busbars. The directional element is similar to the familiar reverse-power relay.

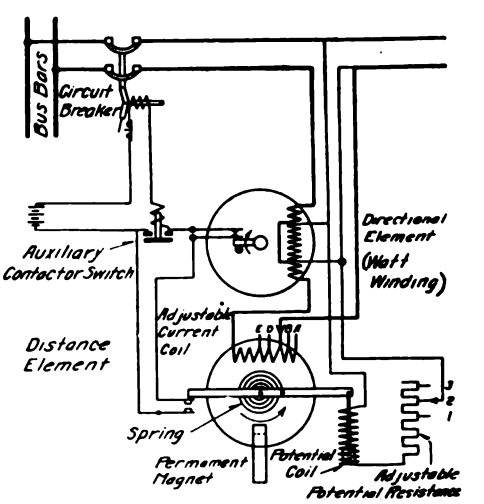

Fig. 3—Internal Connections of the Directional Distance Relay—Distance Element Below, Directional Element Above

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Association News & Discussions

Transportation as Discussed by Southwestern Association

THE street and interurban railway section of the Southwestern Public Service Association held its first session at the Fort Worth convention on May 16. Alves Dixon, El Paso, Tex., presided.

Dr. Alden Coffey, Fort Worth, read the first paper, which was entitled "Human Maintenance in Industry." An abstract of this will appear in a later issue. Supplementing the paper Dr. Coffey stressed the importance of periodical physical examinations of employees to disclose lowered vitality. He suggested that every large company should provide for the employee who is nervous and irritable, and sometimes melancholy, because of worry over financial or domestic affairs. Each might establish some sort of a "listening post" where employees could explain their troubles. Many of the troubles will prove to be imaginary. At any rate, brooding over them has a tendency to increase labor turnover and decrease production. More attention should be paid to preventive rather than curative medicine.

At the same time, said the speaker, there are certain physical conditions which should determine the fitness of an employee to continue in his present service. Upon the development of any one of the following conditions, either he should be discharged or transferred to some other department where his particular ailment will not unfit him for the position assigned him, or jeopardize his fellow worker: Partial blindness, partial deafness, organic heart defect, hernia, varicose veins, venereal diseases, senility, diseased tonsils, decayed teeth and pyorrhea.

Dr. Coffey urged that every company have made a yearly health survey, stressing the importance of blood pressure tests together with exhaustive urinalysis. Measures to prevent disease increase output, decrease training costs, decrease labor turn-over, stimulate the good will of employees, reduce compensation costs, reduce loss of time due to sickness, protect the public from infectious diseases, remove causes of dissatisfaction, reduce death to a minimum, prevent accidents, protect employees from infection and give the employee an opportunity to discover a disease early enough to combat its deadly work.

In reply to a question as to whether the methods suggested by Dr. Coffey are being followed by any company in Texas he replied that no company, as far as he knew, had adopted strict rules in this connection, but several companies are following the suggested plans to some extent.

In reply to a query: "Can these examinations be made compulsory, or should they be entirely voluntary?" George H. Clifford, Fort Worth, said that such examinations have been compulsory in his organization (Northern Texas Traction Company) since the beginning. No man can enter the employ of this company unless he passes an acceptable physical examination or, following the recommendation of the examining physician, agrees to correct unacceptable conditions which have been brought out in the examination.

Mr. Clifford also explained a "dollar-per-month plan" for caring for sick and injured employees. This is a cooperative proposition among the employees, each contributing $1 per month to a sickness and accident fund. The contributions are matched dollar for dollar by the company. The fund thus accumulated is ample for its purpose.

H. S. Mann, Chicago, recommended that the purposes of a physical-examination plan be explained to all employees, to eliminate misunderstanding. Dr. Coffey agreed that the whole proposition is a matter of education and must be thoroughly understood by each employee in order to be effective. It must be diplomatically handled by company officials in order that employees be not offended.

Following Dr. Coffey's paper, N. S. Hunsden, director of the State Board of Industrial Education, spoke on "Educational Opportunities for Industrial Workers." He recommended the establishment of vocational-training classes in every electric railway organization.

In the past, said Mr. Hunsden, there has been no plan for training people vocationally other than the haphazard hit-and-miss practice generally found in big prosperous industries. There had been no consistent training, other than that given the foremen of the different departments, until recent years, or since the World War. He explained that, as a result of the Smith-Hughes law passed in 1917, funds of the national and state boards are dispensed through the state board to the local school. The benefits are not confined to the people in the industries.

The leaders of vocational training classes, he said, should be selected with care from the ranks of employees and should not come from among officials of the company or heads of departments. Their services should be voluntary.

Mr. Hunsden complimented the Northern Texas Traction Company for sending a representative to take certain training under the State Board of Vocational Training. This leader has since been conducting vocational training classes among the employees of the Northern Texas Traction Company. At a meeting and banquet held in the Texas Hotel on May 15, 1923, certificates of graduation were given the car inspectors of the company who had completed work outlined by the instructor along lines suggested by the state board. The state, he said, has sufficient funds to continue the work during the coming year and he understood that the Legislature plans to supply funds so that vocational training may be carried on indefinitely.

Luke Bradley, Houston, Tex., expressed approval of Mr. Hunsden's work, stating that there is much of personal satisfaction in helping one's fellow men, to which end vocational training not only demands, but deserves serious consideration.

Next on the program was J. T. Porter, Fort Worth, who read a paper on the "Reduction of Maintenance Expense Through Reclamation Work." An abstract is given below.

Reclamation Work Reduces Maintenance Expense*

BY J. T. PORTER
Master Mechanic Northern Texas Traction Company, Fort Worth, Tex.

RECLAMATION work begins with the human element. A clean, healthy body and an active mind enable a man to profit by the educational and training programs that are within his reach today as never before. What a man must realize is his duty to himself, to prepare himself for better work tomorrow. The principles of the electric railway business must be kept before our employees and they must be encouraged to develop their knowledge of cost values, accident hazards, etc.

Efficiency is one of the greatest elements in human progress, but men, like materials, may be allowed to go to waste if not reclaimed.

In the broad sense of the word all maintenance is reclamation. Our maintenance costs are reduced and production is speeded up by the application of all practical labor and time-saving devices. Machines that save time and

*Abstract of paper read before street and interurban railway section of Southwestern Public Service Association, at the nineteenth annual meeting, Fort Worth, Tex., May 15 to 17, 1923.

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labor require fewer, though better-trained operators, and the reduction in necessary physical exertion further encourages a higher class of production and a better morale in all sections of the shop.

The possibilities of reclamation work are greatest in the mechanical department. Here the variety of materials is greater, and the number of articles needed is larger than in other departments, but there are opp rtunities in all departments. In Fort Worth hardly a day passes but that we find some small way of improving the reclamation methods with little increase in overhead expense.

Our reclamation department is housed in a 40-ft.x36-ft. section of the truck shop and is provided with 350 shelves of various sizes, bins for scrap copper and waste, spare controller racks, glass racks, 560 small bolt bins, armature rack for taking care of "O. K." armatures, and a bench with a vise and air connections for use in reclaiming material. This department is in charge of an all-round competent man who has two other men under him.

It is the rule of the shop that nothing is junked or laid aside unless it has been through this room. All material removed from cars, no matter how useless it may appear to be, is carried there for inspection and all requisitions on the general storeroom are issued there. The men are required to turn in an old part before an order for a new one will be issued.

The following statement of maintenance costs for the first three months of 1923, as compared with the same period for 1922, shows the results which we have had in reducing our maintenance expense, a large part of which we are sure was due to our reclamation and educational programs.

During the first quarter of 1922 the company spent for maintenance of car bodies, trucks, and air and electrical equipment of all types of cars a total of $47,576.69. During the same period of 1923 the amount was $41,592.14, a decrease of $5,984.35 or 13 per cent.

During the first quarter of 1922 forty-four cars were put through the carpenter and paint shops for heavy repairs and painting at a total cost of $10,818.28. In 1923 fifty-six cars were put through at a cost of $12,052.73. That is 37½ per cent more cars were turned out with only a 10 per cent increase in cost.

Deducting from the totals for the first three months of each year the costs of repairs to cars put through the carpenter and paint shops, there remains a total saving in running repairs of $7.219, or 20 per cent.

During these two periods the number of employees in the mechanical department remained about the same, namely 153 in 1922 and 150 in 1923. In the first three months in 1922 it was necessary to make 606 changes on all our cars, while in 1923 it was necessary to make only 513 car changes, or a decrease of 93 car changes or 15 per cent over 1922.

Merchandising Transportation*

By Richard Meriwether
Vice-President and General Manager Dallas Railway, Dallas, Tex.

THE term "merchandising transportation" has come into popular usage among members of the street railway fraternity only within the last year or two. It would, therefore, appear that traction managements have recently discovered a new element in their business, and that it is taking a first rank position among the problems of the industry.

Merchandising transportation is the development of the transportation service furnished by street railways along lines which will attract patrons other than those who from necessity must use the street cars. To incite a desire upon the part of the public to use the service at other times than when from necessity they must go to their business and home again by means of the street railway requires true salesmanship. The traction business has become a highly competitive one; and, as in other competitive businesses, the art of salesmanship must be called into play in order to produce the maximum results.

Let us examine this problem of merchandising from the traction manager's standpoint, in order to determine some of the sales factors that enter into it. While the mere fact that there are street cars is a notice to the public that a service exists, the frequency of the service largely determines the number that will ride. The development of the light-weight, one-man safety car, affording a means of giving more frequent service at less expense, has furnished a most excellent means of selling rides.

The speed at which the car travels is another important factor; and every effort should be made to afford the public not only a frequent service but a rapid one. The safety car has enabled street railways to improve their schedule speeds, by reason of the quicker starting and stopping qualities of the car, and the elimination of loss of time in giving signals from the conductor to the motorman.

The appearance of the equipment is another element which figures in the sale of the service. An attractively painted, clean, smooth-running car will certainly invite patronage. Not only should the car be attractive in appearance, but the motorman and conductor, likewise, should be in keeping with their surroundings.

The handling of the car by the motorman and the handling of the passengers by the conductor play a most important part in satisfying the patrons so as to develop future business. The motorman who brings his car to a smooth, easy stop; who accelerates his car gradually, and whose every action assures the passenger that he is in the hands of a safe, careful operator, helps materially in completing a satisfactory sales transaction. Likewise, the conductor who greets his passengers with a smile, who answers questions pleasantly and in a businesslike manner, and who is willing at all times to assist in every way possible in making his passengers comfortable, promotes an inclination on the part of the patron frequently and continually to buy the service.

Type of equipment is also a potent factor in the merchandising of transportation service. Cars that are easy to enter and to leave; with steps reasonably low; with wide aisles which permit one to move in the car, even though it contains standing passengers, without undue crowding; and with a seating arrangement affording comfort to the rider, will add no little to the patronage of the traction company.

As an indication that traction companies recognize this fact, the side-seat car, which is conceded to be an uncomfortable one to ride in and is not popular with the public, is gradually being superseded. Further, many of the newer types of cars are now built with small wheels, which permit the use of a low step.

In the merchandising phase of the traction business, every official and employee of the company plays his part as a sales medium; and, likewise, every physical element of the property has its bearing as a sales factor. And, finally, a management that has won the good will of the public will receive more patronage than one whose public is antagonistic.

*Abstract of paper read before street and interurban railway section of Southwestern Public Service Association, at the nineteenth annual meeting, Fort Worth, Tex., May 15 to 17, 1923.

Convention of Associated Advertising Clubs of the World

THE annual convention of the Associated Advertising Clubs of the World will be held in Atlantic City, June 3-7, and there will be an accompanying large exhibit, including foreign and domestic general advertising, industrial advertising and public utilities advertising. The hotel reservations indicate the largest attendance in the history of the association, and the number of foreign delegates to be in attendance is unprecedented. Among the addresses will be one by Floyd W. Parsons on "What Advertising Has Done and Can Do for Public Utilities," one by Bernard J. Mullaney, Chicago, on "Public Utilities in Connection with Community Advertising" and a committee report on standardization of industrial advertising literature, presented by J. C. McQuiston. The Associated Public Utilities Advertising Association will meet at the St. Charles Hotel, Tuesday morning, Tuesday afternoon and Wednesday morning. The speakers include: Grover C. Maxwell, former secretary Ohio Public Service Commission; W. H. Boyce, general manager Beaver Valley Traction Company; P. H. Gadsden, vice-president United Gas Improvement Company; James O'Shaughnessy, executive secretary American Association of Advertising Agencies; W. S. Vivian,

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Middle West Utilities Company; J. C. McQuiston, manager publicity department Westinghouse Electric & Manufacturing Company; Francis H. Sisson, vice-president Guaranty Trust Company of New York; W. H. Hodge, manager advertising department Byllesby Engineering & Management Corporation, and W. B. Strandborg, Portland Railway, Light & Power Company and vice-president Thirteenth District, Associated Advertising Clubs.

As a supplement to the convention, on Friday, June 8, the McGraw-Hill Company will provide a special exhibit of industrial advertising at its building, Tenth Avenue and Thirty-sixth Street, and is arranging for an inspection tour of the offices and a luncheon for the benefit of delegates to the convention. Included in the exhibit will be displays of industrial advertisements, industrial market data and other material of special interest to industrial advertising men. After the inspection trip a selected number of industrial motion pictures will be exhibited.

C.E.R.A. Car-Braking Tests

A SERIES of car-braking tests have been completed under the auspices of a committee of the Central Electric Railway Association. They were inaugurated following a paper read at the January meeting of the C.E.R.A. by H. C. De Camp, which was abstracted in this paper for Jan. 27, 1923, on page 172. These tests were made May 15, 16, 17 and 18, over the tracks of the Terre Haute, Indianapolis & Eastern Traction Company, between the towns of Lebanon and Crawfordsville, Ind.

The tests were made to determine the most efficient way to stop a car, and the distance required for making the stop. The cars tested included a heavy interurban car, a double-truck city car, and a Birney safety car. The necessary apparatus was installed on each car to get a complete record of the variable elements in making stops under different conditions. Straight air brakes, automatic air brakes, and dynamic braking were employed. It was found that from speeds below 10 m.p.h. the car could be stopped in a shorter distance with dynamic braking than by the use of air, while at higher speeds the air brakes stopped the car in a shorter distance.

The members of the committee on tests of the C.E.R.A. who were present, were S. W. Greenland, H. C. DeCamp, G. K. Jeffries, and Prof. D. D. Ewing of Purdue University, who was in charge of the tests. The executive committee of the American Electric Railway Engineering Association was represented by Charles H. Clark of Cleveland. The Ohio Public Utilities Commission was represented by T. H. Barke, inspector of safety appliances, and H. M. Evans. The Indiana Public Service Commission was represented by D. E. Mathews, chief inspector. Others in the party were: R. W. Emerson and Terence Scullen, Cleveland Railway; Harry Coleman, Indiana Service Corporation; C. E. Masterson, Northern Indiana Power Company; S. D. Hutchins, B. H. Hartsock, C. W. Mailphant, H. Wood, L. Wilcox and P. B. McGinnis, Westinghouse Air Brake Company; Charles Ives and E. S. Gunn, General Electric Company; L. E. Earlywine, secretary Central Electric Railway Association; W. L. Galay, W. E. Blowers and Merle Aldrich, Purdue University.

New Englanders Discuss Education

ON MAY 10, 1923, a joint meeting was held in Providence, R. I., of the United Electric Railways company section of the American Electric Railway Association and the New England Street Railway Club. The program consisted of entertainment, felicitations from a number of prominent visitors, a running fire of wit and humor from the toastmaster, Alonzo Williams, and an address on education by Prof. W. H. Timbie of the faculty of the Massachusetts Institute of Technology.

Prof. Timbie explained that in his attempt to interest the Boston Elevated Railway in co-operative schemes of education he constantly met the question, "What will this do for the men in the employ of the railway?" It was finally agreed that the educational problem is larger than any scheme of co-operation.

The speaker explained further that the problem is one of training every man in the industry to make the most he can of his own ability and to secure the highest position that he is capable of filling. Furthermore, there is the bringing of new blood into the industry, in order that the industry may not get into ruts. The American idea of vocational education is not only to train a worker to give him the greatest possible skill in his present work, but also to train him to progress.

An example cited by Professor Timbie was the course in practical electricity recently completed by 140 employees of the Boston Elevated Railway. At a dinner given by the company at the Harvard Club in Boston, the president of the board of trustees returned to these employees the tuition fee of $5 each, which they had paid, with these remarks: "We are not giving you a present, we are not giving you any bonus, we are making an investment. I consider the five dollars which we have invested in each of you the best five-dollar investment the company ever made."

In connection with the co-operative efforts which are being made by the Boston Elevated Railway and the M.I.T., one opportunity is afforded the railway employees in the form of evening courses. Men may take a course in engineering four evenings a week. They can, if they so desire, enter the day course with credit for work done in the evening course. It is hoped that scholarships can be arranged to enable the evening-course men to take the day course as soon as they are prepared for it.

Under a new plan, the Elevated Railway is taking on each year two M.I.T. juniors who have maintained a high standing at the Institute, and giving them an opportunity alternately to work on the railway property and in the Institute. A student works with the railway for three months and then exchanges places with another student who has been engaged on his studies. After three years of this alternating procedure, the student is granted a master's degree. The work is continuous for the three years with the exception of scattered short vacations of a total duration of four or five weeks per year.

While with the railway the student starts in as a motorman or conductor, and goes through the several departments. He learns the practical side of electric railway work, along with the theory, and his theory is translated into the terms of electric railway work. He lives in the atmosphere of the electric railway while he is studying.

While this plan has been in operation only about a year, the results are already very satisfactory. A plan similar in principle has been in operation in co-operation with the General Electric Company for four years, involving about forty men each year.

Professor Timbie explained that the co-operative work between the Boston Elevated and the M.I.T. is the outgrowth of the work of the committee on education of the American Electric Railway Association, of which Edward Dana, general manager of the railway, is chairman. Mr. Dana is not asking other railways to do what he is not willing to do himself. He is trying to follow out the recommendations in the report of the committee presented last year at Chicago.

American Association News

Plans for Increasing the Membership

AT A MEETING of the American Association committee on company and associate membership, held in New York City on May 24, plans were laid for an active campaign during the summer. The "prospect list" has been divided among the committee members and individual study will be given the case of each "prospect." A circular, outlining the advantages of membership by pointing out what the association is doing, will be prepared as an aid in the campaign.

The committee members in attendance were: W. H. Sawyer, East St. Louis, Ill., chairman; H. H. Norris, New York City, and E. P. Waller, Schenectady, N. Y. J. W. Welsh, executive secretary, was also present.

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Equipment Maintenance Notes

Portable Pneumatic Jack Makes Handy Device

WHERE truck overhauling work is done only at infrequent intervals, and the expense of elaborate machinery for raising car bodies is not warranted, the portable pneumatic jack is a handy device. Apparatus of this sort, built by the Buffalo & Lake Erie Traction Company, Erie, N. Y., has proved very

Pneumatic Jacks Easily Moved Anywhere in the Carhouse Are Used for Lifting Car Bodies

useful in one of the carhouses, where there is occasional need to remove a truck.

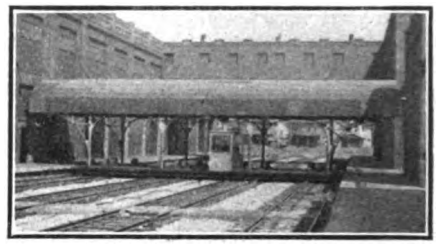
Each jack consists of a cylinder 18 in. in diameter and 14 in. in height. It is connected by a flexible hose to the compressed air system at any one of many conveniently located outlets, and the flow of air into the cylinder is controlled by an engineer's valve attached thereto. One jack is put on each side of the track and a section of rail placed on the piston heads of the two cylinders.

Two men are required for this operation, one at each jack. They can by careful observation and proper manipulation of the air valves keep the cross rail very nearly horizontal. After the car body has been raised far enough for the trucks to be pushed from under, the jacks are replaced by horses. From ten to fifteen minutes is required to remove a truck. The operation is reversed in lowering the bodies down upon the trucks after the work has been completed. Heights are then checked by measuring from the underside of sill to the top of the rail.

The portable feature of this apparatus consists of a separate two-wheeled truck, as shown in the accompanying illustration. It works on the same plan as a barrel truck, inasmuch as the edge is inserted beneath the cylinder base, and when the handle is lowered, the cylinder is tipped over and rests in a cradle. The heavy jacks are easily moved from place to place by this means.

Covered Transfer Table

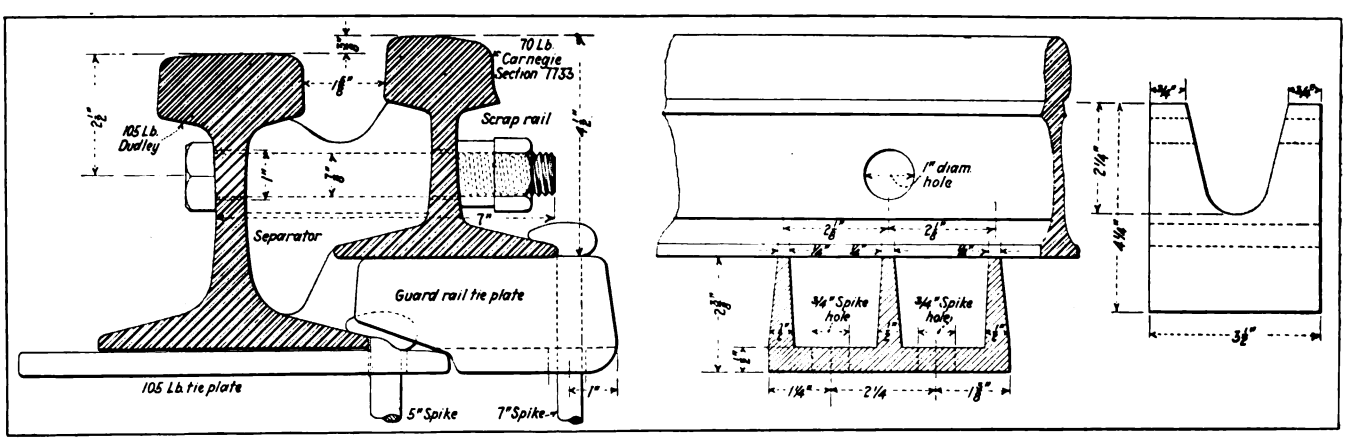
WHERE open transfer tables are used, stormy weather conditions are likely to interfere with the work, and in the case of moving cars which have been recently painted and are not thoroughly dry there is danger of spotting. This difficulty has been solved in the Harvard shops of the Cleveland Railway by providing a covering for the transfer table. This was added partly to protect the cars and partly as a protection to workmen who are required for shifting the cars during stormy weather conditions.



Covered Transfer Table in Harvard Shops of Cleveland Railway

Guard Rail with Inside Spiking of Main Rail

AN ACCOMPANYING illustration shows a type of construction used extensively by the Lehigh Valley Transit Company, Allentown, Pa., for T guard rail which permits of inside spiking of the main rail. For the guard, scrap rail is used, but of course only such lengths as have a fairly thick ball and one side in fair condition. With this type of construction it is unnecessary to cut off the inside of the base of the rail in order to give clearance for the installation of the guard. In the construction illustrated, 105-lb. Dudley T-rail is used for the main rail and 70-lb. Carnegie section 7033 for the guard rail. A special guard-rail tie plate is used underneath the guard, a separator of special section being required.



Guard-Rail Construction Used on All Curves Above 4 Deg. in Open and Paved Track of the Lehigh Valley Transit Company
At left, cross-section of construction. In center, cross-section of guard-rail tie plate. At right, end view of separator

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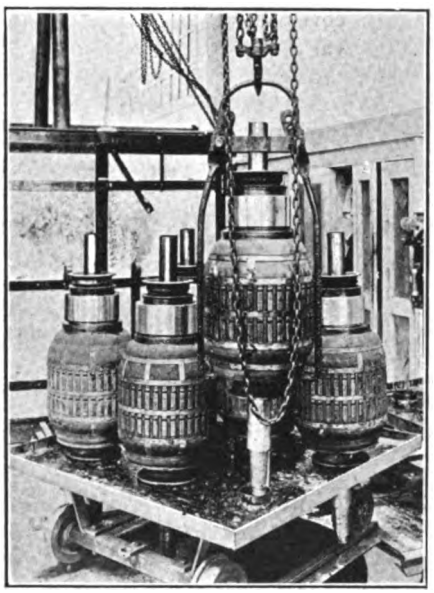
Transfer Car Handles Armatures for Baking

BY JOHN S. DEAN
Renewal Parts Engineering, Westinghouse Electric & Manufacturing Company

IN CONNECTION with the process of dipping armatures in an insulating varnish and then baking them so as to increase the life of the windings the problem of the most economical method of transferring armatures to and from the oven must be solved for each individual installation. In connection with some ovens a monorail transfer system is used where the armatures are hung on carriers that run on an overhead



Convenient Car for Handling Armatures While Baking

rail construction. On others, special stands mounted on wheels are used to carry individual armatures. In some cases these armatures are transferred from the stands to racks built in the oven, while on others they run the stand containing the armature into the oven and leave the entire outfit inside the oven during the baking process.

One very common method used is to construct a narrow-gage track running from the dipping tank into the oven, on which are run specially designed cars made to hold a number of armatures in a vertical position commutator end up. A type of truck used by one operator for this work is shown in the accompanying illustration.

The body and floor of the car are constructed in the form of a tray equipped to hold the armatures in a vertical position while draining. This tray collects the excess varnish which runs from the armatures, and thus the floor is kept clean and free from varnish drippings. The wheels of the car are fitted with ball bearings, which make it possible for one man to push the car in and out.

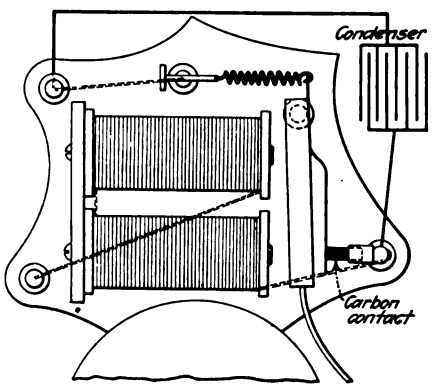
The floor of the car is provided with holes conveniently spaced to hold the maximum number of armatures in an upright position, commutator end up, thus economizing oven space during the baking process. The holes in the car floor are also fitted with short pieces of pipe extending above the bottom of the tray to prevent any excess varnish from draining down on the clean armature shafts.

This design of car has been found to work out very economically in service, as it facilitates the loading, draining, handling and baking of the armatures.

Eliminating Sparking at Crossing-Bell Contact

THE Portland Railway, Light & Power Company, Portland, Ore., has several crossing bells of ordinary make-and-break type which continually gave trouble due to the burning of the contact. These bells are shunted around 80 ohms resistance.

Experiments were made with spring contacts in order to provide a working contact at the break, but the result was not satisfactory. Finally, a carbon contact was arranged as shown in the accompanying illustration, the carbon being mounted in a brass holder. Results were excellent, but still further to eliminate the arc a telephone condenser, of 1 microfarad capacity, was



Carbon Crossing-Bell Contact Which Has Proved Effective in Eliminating Blistering

shunted around the contact. Now, there is no blister formed at the contact as formerly, and the wear of the carbon is so slight as to require replacement only at long intervals. Contacts of this type have now been in service for more than two years, and no failures have resulted which could be attributed to them.

Greasing Trolley Wire Reduces Wear

FOR several years the Lehigh Valley Transit Company, Allentown, Pa., has been obtaining good results from greasing its trolley wire. Miller trolley shoes are used on a number of the lines, and at one time it was apparent that these were causing considerable wear of the trolley wire, as the roofs of cars showed an accumulation of particles of copper. Greasing the wire was undertaken to remedy this condition

The Grease Reservoir and Piping Are Installed Inside Car

and careful observations indicate that it has done so.

An old double-pole car is used for the greasing. One pole is used for operating the car, while the other is equipped for the greasing operation. Accompanying illustrations show the reservoir, piping and greasing shoe. The grease used is Houghton's L Nos. 3 and 4, manufactured in Philadelphia, Pa. It is placed in a reservoir inside the car and is fed from this by air pressure through piping and hose to the trolley shoe, which greases the wire as it slides along.

The reservoir is 12 in. x 32 in. and has a plugged opening at the top for filling. The air is piped from the air reservoir to a center connection of this grease reservoir. A cut-out cock installed adjacent to the reservoir permits regulation of the air pressure and a gage indicates the pressure employed. The grease is

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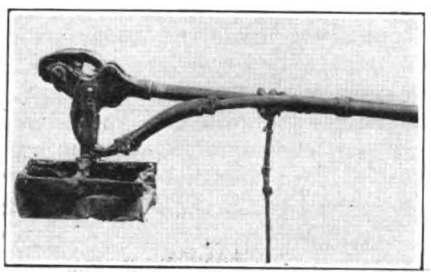
forced out of the bottom of the reservoir, through a ¾-in. pipe connection, thence is led to the roof through a ⅜-in. pipe. A cut-out cock is used in this line also for cutting off the supply.

In order to provide for movement of the trolley base, the connection from the roof to the trolley pole is made with flexible hose. A ⅜-in. iron pipe is led along the trolley pole, and



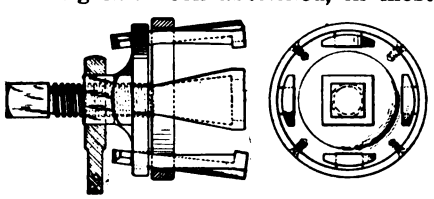
Greasing Shoe and Basket

again at the shoe a hose connection is used. The greasing shoe has a hole drilled through the center for the connection, and the grease is forced through this and oozes out into the shoe. It is thus spread along the groove in the shoe and so greases the trolley wire as the car operates.

In order to catch any particles of grease that might fall from the shoe a sheet-iron basket of about 12 in. x 12 in. is hung under the shoe. At an air pressure from 60 to 80 lb. 9 gal. of grease is distributed on 16 miles of trolley wire. The present practice is to grease the wire at intervals of from three to eight weeks.

Handy Type Pinion Puller

MANY methods and devices are used in the various shops of electric railways for removing pinions from armature shafts. The old method of driving a wedge between the back of the pinion and the motor housing has been abolished, in most



Convenient Type of Pinion Puller

cases, in favor of some type of pinion puller. The wedge method frequently resulted in damage to the armature bearing collar and motor housing. A convenient type of pinion puller successfully used in the Harvard shops of the Cleveland Railway is shown in the accompanying illustration.

This pinion puller consists of a heavy metal plate with slots in which are inserted four T-shaped dogs. A removable band or ring holds the dogs loosely in place. To remove a pinion the dogs are spread outward so as to pass over the outside of the pinion and are then hooked over the inside face. The ring is then slipped down over them to hold them tightly in place. There is a heavy screw which works in the end plate and presses against the end of the armature shaft. By turning this jackscrew with a long-handled wrench, pressure is exerted on the pinion teeth from the rear, and this pressure pulls the pinion off. The outside end of the metal plate has a squared portion, so that a wrench can be placed on it to hold it in position while the pinion-pulling operation is taking place. By the use of different-sized rings the same pinion puller can be used to remove pinions of varying sizes. This particular type of pinion puller is the invention of Christian Reinker and has been patented by him.

Rail Made Positive Pole for Welding in Havana

THE annual report for 1922 of the Havana Electric Railway, Light & Power Company discloses at least one advantage for the double-trolley system used in that city. The statement is made that in track welding from the trolley circuit in Havana the track is made the positive electrode, so that the company gets one advantage of a motor-generator welder without the complications. Since the greater part of the heat in an arc is at the positive electrode there is an advantage in having the rail the positive pole. A puddle of metal will thus be maintained at the welding point, so that the molten metal which is being applied will form a better union with the rail. Where connections are reversed and the rail is connected to the negative side, there is a tendency for the molten metal to fall on a comparatively cold surface, so that an imperfect weld may result. During 1922 the company ordered two more arc welders and now has four. They are being used extensively.

New Equipment Available

New Low-Energy Relays

THE Westinghouse Electric & Manufacturing Company has added to its line of relays low-energy instruments, to be known as the low-energy Type CO and low-energy Type CR relays. Each is made in 4 to 12-amp. and ½ to 2½-amp. ranges.

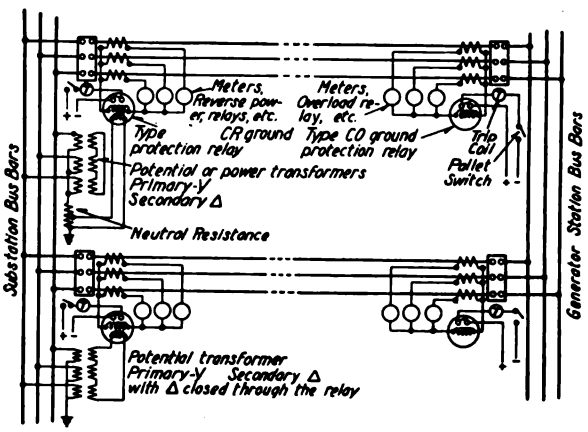


Diagram Showing the Method of Using CO and CR Ground Protection Relays

In the higher range the CO relay is designed for use where low-ratio bushing-type current transformers are the only convenient means for supplying energy to the relay. It should be used for line sectionalizing and the overload protection of power transformers where the low energy type is necessary.

The lower ampere range is intended for the differential protection of generators, large motors, etc., where a sensitive relay is desirable and where the current transformers on both sides of the main winding can be exact duplicates, but it is too sensitive for the differential protection of power transformers.

The low-energy CR relay in the 4 to 12-amp. range is intended for line sectionalizing to protect against short circuits in exactly the same way as the standard CR, except that the low-energy type is necessary where the transformers are of the bushing or any other type that can carry only a small secondary burden. The ½ to 2½-amp. relay is used as a ground relay for automatic sectionalizing of transmission lines. Only one ground relay is required for each circuit, and short circuits are taken care of by line relays.

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The News of the Industry

Amended Contract Ready

Electors of Saginaw on June 25 Will Vote on Fifteen-Year Grant with Ten-Cent Cash Fare

After a series of conferences between the City Council of Saginaw and Otto Schupp, grantee under the last two street car-bus franchises, a modified contract has been prepared and accepted by the bondowners' protective committees on the defunct Saginaw-Bay City Railway.

Because of the elimination of some of the objectionable features of the last two contracts those who have striven during the last two years to obtain a satisfactory solution of the transportation problem in Saginaw believe that the measure will be approved by the electors on June 25, particularly as it has the support of a friendly city administration.

Since Aug. 10, 1921, the city has depended upon buses of all types to transport the people. Attempts have been made to secure the return of street cars with motor bus extensions, but they have all failed, once through an error of an election inspector and the other time by about 100 votes short of the majority of three-fifths necessary for approval. A franchise for city-wide motor bus operation attracted only a few more votes than the negative vote cast against the railway proposition. These contracts were submitted during the administration of a hostile Council. Since the election on April 2, a new Mayor and two Councilmen chosen on a street car platform have taken the lead in preparing a new contract.

Many believe that the previous grants were defeated on account of the provision fixing the grant at twenty-five years, stipulating the rate of fare for only two years and authorizing the State Public Utilities Commission to settle disputes and adjust the rate of fare on a value fixed after the two-year period, on application of either party.

The franchise now before the electors was drawn with these provisions eliminated. The term of the grant is fifteen years, and fares are to remain unchanged during this entire time. The cash fare is to be 10 cents, with four tickets for 25 cents. Six school tickets will be sold for 25 cents. There will be universal transfers.

Any disputes between the operating company and the City Council will be settled by arbitration, the three members of the board to be citizens of Saginaw. One is to be appointed by the company, one by the City Council, and the other by the Federal Judge of the district of which Saginaw is a part. Should either party fail to appoint an arbitrator, the other, upon proper written notice, can appoint the third and the decision of the board is final.

Before the franchise can be assigned, the company must deposit $400,000 for the purpose of rehabilitating the property and certain renewals must be made upon thirty days notice from the Council. The company is relieved of all paving and repaving, but must keep the paving between and 12 in. outside of its tracks in proper repair. Should the company fail to do this work, the city will proceed, charging the cost to the company. To assure payment, the grantee must maintain a revolving fund of $1,000 for the purpose.

The board of directors is to consist of nine members, and not less than six to be citizens of Saginaw. The directors must be approved by the Mayor and Circuit Court judges.

The present rolling stock of the company will be used, but must first pass inspection by the Council, and before motor buses are purchased the specification must be approved by the Council.

The frequency of service and type of equipment, routes to be traversed, seating capacity, etc., are to be regulated by the City Council.

The city has the right to purchase the property at any time. If the company and the City Council cannot agree upon the price, it is to be fixed by arbitration.

Ninety days are allowed for the organization of the company after acceptance by the city, as it was believed it would take that long to get the property out of the bankruptcy court.

Wages Increased Three Cents an Hour in Alton

The receivers of the Alton, Granite & St. Louis Traction Company and the employees have arrived at a settlement, whereby wages are to be increased 3 cents an hour, effective May 1, 1923.

On the city lines in Alton, where practically all the cars are of the one-man type, the new wage, in cents per hour, is as follows:

For the first three months	45
Next nine months	48
One year and thereafter	52

Four cents additional for men when operating one-man cars.

On the interurban lines, the new scale, in cents per hour, is as follows:

For the first three months	50
Next nine months	53
One year and thereafter	56

The East St. Louis & Suburban Railway and the East St. Louis Railway are arbitrating wages, but have agreed on all working conditions.

Adopts Resolutions

Spartanburg Chamber of Commerce Makes Requests of City Council—Railway Seeks Abandonment

The railway problem affecting residents of Spartanburg, S. C., for more than a year appears to be on its way toward a settlement. At a recent conference held at the Chamber of Commerce at which were present officials of the Spartanburg Chamber of Commerce, members of the State Railroad Commission and a number of citizens, two resolutions were passed by the board of directors. The first one, suggested by Charles O. Hearon, a director of the Chamber of Commerce, was in the nature of a request to the City Council of Spartanburg to explain to the people its aim and policies with respect to the South Carolina Gas & Electric Company. The second resolution, offered by John B. Cleveland, was a request to the City Council to protect the railway from the competition of jitneys over the streets on which electric cars are operated.

H. H. Arnold, member of the Railroad Commission, gave the commission's views on the situation. He outlined events from Jan. 10, when the company gave notice that it would cease to operate, and through the time that the commission took over the property. He asked for the hearty co-operation of the citizens of the city, saying that if the local railway was dismantled, junked or sold the entire city would suffer. He announced that the 5-cent fare started some weeks ago at the suggestion of the commission had more than doubled the number of passengers carried, but that, as had been expected, there had not been a corresponding increase in revenue.

B. T. Earle, president of the Bank of Commerce and a director in the South Carolina Gas & Electric Company, spoke in behalf of the railway, saying that the people of Spartanburg rode too much in automobiles.

The meeting was the result of a hearing before the commission on April 27 held at the request of the South Carolina Gas & Electric Company with a view to providing the people of Spartanburg with information as to the progress the railway was making under the direction of the South Carolina Railroad Commission. At the hearing the railway sought permission, in the absence of constructive suggestions, to abandon its urban and suburban electric lines.

Attorney Earle, representing the company, reviewed its recent history. He referred to the destruction of the

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dam at Gaston Shoals on Broad River some years ago as a reverse to the company, followed by the trying war-time period. He told then about the appointment of the receiver, the subsequent winding up of the affairs of the old company and the organization of a successor. The new company, he claimed, was paying $35,000 annually in extra and unnecessary interest, because the city refused to make certain concessions. Further, he brought out the fact that less than 2 per cent of the population of the city of Spartanburg patronized the electric railway cars. So the company felt that the only way was to abandon the local railway system unless the commission was able to work out some scheme whereby the company could operate on a paying basis. He said that the company was willing to try the bus as an experiment, but that the Council would not permit the test.

President Tripp said expenses could not be lowered appreciably if the present service was maintained.

New York State Men Accept New Scale

New York State Railway employees in Syracuse, Utica and Rochester voted on June 1 to accept a new wage scale offered by the railway calling for 51, 53 and 55 cents an hour, an increase of 5 cents over the present scale. The employees sought 65 cents as top scale.

Wants Jitneys Barred from Detroit Streets

A move has been made to bar jitneys from the streets of Detroit upon the recommendation of Ross Schram, assistant general manager of the Department of Street Railways. The city's legal department is prepared to proceed with the injunction proceedings and May 31 was set by the judge as the date for hearing arguments in the case. Detroit jitneys have been operating since last fall without licenses. When former Mayor James Couzens sought to bar them from the streets, a temporary injunction was granted.

Jitney Men May Protest New Birmingham Ordinance

The Jitney Owners & Drivers' Association of Birmingham, Ala., may contest the legality of the agreement recently made between the Birmingham Railway, Light & Power Company and the city regulating the operation of the jitneys after July 1.

The agreement, as explained previously in the ELECTRIC RAILWAY JOURNAL, does not interfere with the operation of suburban jitneys, but states that no jitneys will be allowed to operate in the down town section on streets where there are railway lines, or within four squares of a railway line.

The railway, if this ordinance is put into effect on July 1, will reduce cash fares from 8 cents to 7 cents and sell tickets at 6 cents, with an additional charge of 2 cents for transfers, the same as at present.

Chicago Rapid Transit Report Nearly Due

Some of the Particulars of Major Kelker's Forthcoming Plan Are Made Public—Recommends Co-ordinated System

An extract from the proposed physical transportation plan for this city was submitted on May 21 by Major R. F. Kelker, Jr., consulting engineer for the local transportation committee of the City Council. The full report will probably be ready about June 15.

The plan, involving an estimated expenditure of $375,833,000, embraces a unified system of surface and elevated lines and subways. In recommending this plan Major Kelker states that it was based on the following general premises:

1. Long-haul traffic should be carried on rapid transit lines.
2. Short-haul traffic should be carried on surface lines so operated as to serve the feeders to the rapid transit lines.
3. Transfers should be permitted and encouraged between surface and rapid transit lines in order to make rapid transit service accessible to all.
4. Existing transportation systems should be unified and operated as a single system, thereby eliminating competition.
5. The transportation system of the city should be planned for the metropolitan area in advance of traffic demand.
6. Existing structures, as far as possible, should be used so as to form a part of a complete rapid transit system, and
7. The transportation system should connect the various outlying commercial centers of the city in such a manner as to provide rapid transit without passing through the congested central business district.

An interesting feature of the recommendations is the proposal for the unification of all lines in one system, thus giving passengers a universal transfer from one class of service to another. With a unified system, it is expected that 80 per cent of the traffic will be carried on the rapid transit lines and 20 per cent on the surface lines. At the present time the reverse is true. It is the intention that the surface lines should be the feeders to the rapid transit lines, and thus eliminate the necessity of traveling long distances in street cars. In this manner a large number of through route cars, which pass through the loop, would be discontinued and thus relieve traffic congestion in the central business district.

The construction program has been divided into two periods, as follows: A first period construction, which includes such parts of the plan as are urgently required and can be definitely located at this time, and a second period of construction, which includes the remaining parts of the plan. A considerable extent of elevated track is proposed, as shown in the accompanying table.

It is understood that in its broad features the Kelker plan does not differ greatly from the All-Chicago Council plan of last year or the Ridgway-Parsons-Arnold report of 1917.

TRACK MILEAGE OF THE UNIFIED TRANSPORTATION SYSTEM—MILES OF SINGLE TRACK

	Existing Systems	First Period of Construction	Second Period of Construction	Construction Period Totals	Unified System Total
Rapid transit subways	None	17.6	37.3	54.9	54.9
Elevated railroads	162.0	137.0	67.2	204.2	366.2
Total rapid transit lines	162.0	154.6	104.5	259.1	421.1
Street car subways	None	None	2.5	2.5	2.5
Street railways	1,060.0	153.0	95.5	248.5	1,308.5
Total mileage	1,222.0	307.6	202.5	510.1	1,732.1

Inquiry Into Schenectady Strike Scheduled—Eight Cars Operating

The much postponed inquiry into the causes of the Schenectady trolley strike, under the auspices of the State Industrial Commission, was scheduled to start on May 31.

The Schenectady Railway is operating eight heavily screened cars without police guards. So far no disorders have been reported and the cars which have been operated have had few passengers. It is anticipated the next move of the company will be to obtain a court order restraining jitneys from operating in the city of Schenectady. This order will be opposed by the city administration on the ground that complete service has not been restored by the company inasmuch as it has 128 cars in its carhouses.

No attempt has yet been made to operate interurban service. The labor people are organizing a "We Will Walk" club in anticipation of a court ruling which will discontinue jitney service.

With the state police called upon to enforce the provisions of the anti-Klu-Klux-Klan law recently signed by the Governor, it is not anticipated that this body will be sent into Schenectady. Nor is it expected that there will be any cause for its presence.

It now looks like a long drawn out struggle with thousands of dollars lost to Schenectady merchants, much inconvenience to the public and heavy financial expense to the railway company.

Seven Traction Bills Signed by New York Governor

Among recent legislation affecting the transit situation in New York Governor Smith signed seven bills. They are as follows:

Johnson bill amending section 93 railroad law, relative to maintenance and repairs of roadways and approaches of bridges over railroads by villages of less than 1,200 population.

Van Wagenen bill amending section 78 railroad law, relative to length of coal jimmies, by extending time within which all cars operated must conform to section, to July 1, 1924, a period of one year. This chapter, 519 of the laws of 1923, affects a number of urban electric as well as steam roads.

Farrell bill directing Coney Island & Brooklyn Railroad, Brooklyn City Railroad and Nassau Electric Railroad companies to restore service on Park Slope line, Brooklyn, and authorizing the Transit Commission to waive issuance of transfers.

Clayton bill authorizing the Transit Commission to extend for one year operation

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of the Church Avenue line of the Nassau Electric Railroad, Brooklyn, without exchanging transfers.

Reich bill authorizing the Transit Commission to extend for one year operation of the Park Avenue line, Brooklyn, without exchanging transfers.

Knight bill amending the public service commission law, by increasing the number of officers of corporation required to file reports with commission, who may verify such reports and giving the commission discretionary power to extend the time within which corporations required to file reports may do so.

Sheridan bill amending chapter 788 of the laws of 1917, relative to the removal of the Manhattan Railway structure at Forty-second Street, New York City, by providing for extinguishment of all rights to structure, or to maintain same and assessing cost.

International Railway Officer Refuses to Act as Witness

Herbert G. Tulley, president of the International Railway, Buffalo, refused to be a witness at the investigation into the causes of the strike of platform men on the local and interurban lines started last July. It was intended to hold the hearing before Bernard L. Schientag of the New York State Industrial Commission. President Tulley refused to answer questions and said the strike was a dead issue and the company was operating cars with trained and efficient employees on normal schedule.

Upon advice of counsel, President Tulley refused to produce the books and records of the traction company and contended from the start of the investigation that the commission had no jurisdiction or power to act in the matter. Among the witnesses at the inquiry were James H. Vahey of Boston, attorney for the Amalgamated Association; William F. Fitzgerald of the organization staff of the Amalgamated and Clarence F. Conroy, business agent of the Buffalo local. Coleman J. Joyce, general counsel for the Mitten interests of Philadelphia and Buffalo; James R. Sweeney of Penney, Killeen & Nye, counsel for the International, and President Tulley also attended the hearing but refused to participate. Mr. Joyce contended:

That the International has a complete organization of permanent employees working under a written agreement between the company and the present employees made Dec. 20, 1922, which provides for the manner and conduct of employment mutually satisfactory.

That the commission has no jurisdiction to make an inquiry into the cause of a strike of former employees which occurred July 1, 1922, because the controversy terminated by the employment of men now under contract and therefore no strike, lockout or industrial controversy exists or is susceptible of settlement.

Further objections were made by counsel for the railway to producing books and papers on these grounds:

That the commission has no authority to inquire generally into expenditures of the International for strike purposes or to inquire into the expendtures on account of the strike.

That the commission has no authority to inquire into action taken by the protective committee of the International bondholders referred to as reorganization.

That the commission has no authority to inquire into the revenue of the International or financial arrangements made by the company since July 1, 1922, or into the affairs of employees of the Philadelphia Rapid Transit Company, or into the books and papers of the International bondholders' committee or Philadelphia employees with respect to any matter mentioned in the subpoena upon the company's officers.

That no matter mentioned in the subpoena is relevant to the causes of the strike of former employees.

At the adjournment of the hearing, Commissioner Shientag said he would make a ruling later whether or not President Tulley would be compelled to testify at a continuance of the investigation.

No Agreement in Chicago

Company Is Firm in Its Stand that It Cannot Increase Wage—Mayor Seeking Arbitration

Negotiations between the Chicago Surface Lines and the men ended after a futile conference on May 28. Those attending the conference were Henry A. Blair, president of the Chicago Surface Lines; Guy A. Richardson, vice-president in charge of operation; John M. Roach, vice-president Chicago Railways; William Quinlan, president of the union; William Taber, secretary-treasurer, and J. J. Kehoe, recording secretary of Local No. 241. The 10-cent hourly wage increase demanded by the union was flatly refused and the meeting ended with no announcement of future conferences.

Following the breaking off of negotiations the Mayor conferred with both sides. He is seeking to have the wage controversy settled by arbitration. On May 31 he met Henry A. Blair, president of the Chicago Surface Lines, and Samuel Insull, chairman of the board of directors of the Chicago Elevated Railroads, at separate meetings.

Up to the morning of June 1 no break had come in the deadlock over wages, despite the efforts of the Mayor. Indications then pointed to the calling of a strike vote early in the week. Members of the union will meet on the night of June 4 and if such action is taken by the surface car trainmen a special meeting of the elevated railroad employees will be called immediately for a similar purpose.

The wage agreement entered into last year expired at midnight on May 31. It has been agreed that the old wage scale will be continued pending the outcome of the present controversy.

After the meeting last Monday Mr. Blair said:

We informed the officials of the unions that the Chicago Surface Lines cannot pay the 10 cents an hour increase demanded by the motormen and conductors. Officials of the union replied they are in duty bound to stand pat on the demands of the men. Settlement of the wage controversy is just as far away now as it was when negotiations started a few weeks ago. We have come to a brick wall so far as a settlement is concerned.

Mr. Blair was asked whether another conference would be held. He replied that he saw no logical reason why one should be held. As he expressed the matter:

Both sides have reached a point where an agreement seems improbable. The hearing on the fare finding of the State Commerce Commission has no bearing on the situation. The wage dispute is strictly a matter of business between employees and the employers.

Mr. Quinlan intimated that he is about to send for William D. Mahon, international president of the Amalgamated Association.

News Notes

Wages Advanced Five Cents.—An increase in wages amounting to 5 cents an hour has been granted blue uniform men and track workers of the Northern Massachusetts Street Railway, Athol, Mass. This is practically a 10 per cent advance and restores the scale in force before the cut of April, 1922, was put in effect.

Ready for Arbitration.—The fifth arbitrator for the wage issue affecting the employees of the Scranton Railway has been selected in the person of the Rt. Rev. M. J. Hoban, Bishop of the Scranton Diocese. The proceedings were scheduled to start on May 31. The subject to be arbitrated is simply wages, which affect the motormen and conductors, all of the shop crafts and the men in the track department.

Completes Pleasure Park.—The Chicago, Ottawa & Peoria Railway, Ottawa, Ill., has just completed the construction of a new pleasure park on Covel Creek, 4 miles south of Ottawa, on the Streator division. It was intended to open the park to the public on Decoration Day. This new park will provide a bathing beach that will accommodate 1,000 people at one time, boating facilities, a dancing pavilion, several riding devices and other buildings.

Contract Renewed.—The New Orleans Public Service, Inc., has renewed its contract for one year, beginning June 1, with its 4,500 workers, including conductors and motormen. The 500 other workmen, comprising the electricians, have a contract which may be reopened, by either party, on thirty days' notice. Contracts have been signed with the carpenters, blacksmiths and machinists in the employ of the company on the same hourly rate which is now in force.

Reorganization Deferred.—A postponement from June 1 to Sept. 1 in the proposed reorganization of the Pittsburgh Railways has been granted by the commission. The plan for the reorganization of the property, which has been under receivership since 1918, was started two years ago. In seeking the postponement those in charge acting in co-operation with the city of Pittsburgh told the commission that the preliminary proceedings are taking more time than was expected.

Reward for Loyalty.—All employees of the Johnstown Traction Company have been granted an increase in pay effective June 1. Those in the service three months or less than one year will be given a 2½-cent advance and those in the service one year will receive a 5-cent raise. This increase will bring the pay of three-month employees or those in the service less than one year up to 52½ cents and all employees of one year or more 55 cents. During the war-time period the hourly rate of pay was 60 cents.

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Foreign News

A Turn for the Better at Leeds

The accounts of the Leeds (England) City Tramways for the year ended March 31 last show that the total revenue was £961,507, compared with £959,703 in the previous year. The working expenses were £599,983, against £702,250. After paying capital and other fixed charges and allowing for permanent way renewals there is a surplus of £91,491, as compared with a deficit of £43,266 in the previous year.

The Metropolitan Railway has now a bill passing through Parliament without opposition to authorize the raising of £2,000,000 additional capital. It is proposed to spend £790,000 on new rolling stock, £285,000 on the extension of the company's generating station, £168,000 on the electrification of the line from Harrow to Rickmansworth and £228,000 on widening the line.

The London Underground Railways and associated concerns are working on a scheme for facilitating the journeys of regular passengers living in the outer ring of the metropolis. The proposal is to issue combined season tickets available by underground railway tramcar and omnibus. The first trial started at Golder's Green on May 1. From this northern terminus of the Charing Cross & Hempstead Railway tramcars and buses run to and from places farther north and the through season ticket will enable the passengers to travel part of the way by railway and the rest of the way either by bus or tramcar and vice versa. The season ticket rates will work out cheaper than the combined ordinary fares and the passenger will not be restricted in the number of journeys he makes.

In Situ Rail-Hardening Process

Highly satisfactory tests have been carried out by the London County Council on a stretch of its tramways on the Victoria Embankment with Sandberg's *in situ* process of hardening the tread of rails. The object was to find how far the harder surface would remain free from corrugation, so a flat curve was chosen where the evil was very apparent. For a certain distance the rails were treated and the rest remained untreated. The test began in December, 1920, and was continued till February, 1923. During the period the corrugations on the untreated rails had to be ground out three times, while the treated track did not corrugate at all. The number of cars passing over it during the twenty-six months was 2,092,000. A further test of a more extensive nature is about to be begun. It may be recalled that the treatment consists in alternately heating and cooling the rail head until it is much hardened. A special machine is used to do this and the rails do not need to be disturbed.

It was expected that before the end of May practically all the tramways in Edinburgh will have been electrified. R. S. Pilcher, general manager, calculates that the cost of running the electric cars is about 5d. per car-mile less than the cost of working the old cable cars. When the whole system is electrified, it is estimated that there will be a saving in working expenses of £125,000 per annum.

Return Ticket Automatic Machines

What for the want of a better term is still described as the "booking" of passengers has been much facilitated at stations on the London Underground Railways by the use of "put your money in the slot" ticket issuing machines. So much has this been so that the companies are now beginning to experiment with return ticket slot machines at terminal stations. If the machines work all right the success of the arrangement is secure, as the trouble of taking a ticket for the return journey is removed.

English Southern Railway Electrification

It was announced toward the end of March that the work of converting to electric traction part of the suburban lines of the Southeastern section of the Southern Railway would be begun almost immediately. Particulars of the scheme have already appeared in these pages. The company hopes to be able to work forty trains an hour through London Bridge Station during the busy periods of the day. The first stage of the work will include the lines from Charing Cross, Cannon Street, and London Bridge to Dartford, all lines as far as Orpington and the Bromley branch and Mid Kent lines, the routes from Victoria and Holborn Viaduct to Bickley Junction, and the Crystal Palace line. It is proposed at first to have sixty eight-car trains. Probably a number of the cars will be reconstructed from existing rolling stock.

British Tramway Statistics

The Ministry of Transport has issued its annual return giving statistics of all tramway and light railway undertakings in Great Britain for the year ended Dec. 31, 1921, for companies, and March 31, 1922, for local authorities. The tables show that the total route mileage open for traffic at the end of the year was 2,579 miles, of which 1,756 miles were worked by local authorities and 823 miles by companies. The total gross receipts for 1921-22 were £32,523,339 as compared with £32,692,209 in 1920-21, and the total working expenditure £26,835,292, compared with £28,339,706, leaving net receipts amounting to £5,688,047 or £1,335,544 more than the corresponding figure for the preceding year. The number of passengers carried during the year was 4,256,268,692, a decrease of 413,647,712, or 8.86 per cent as compared with 1920-21. Car-miles run amounted to 332,079,865, a decrease of 13,073,720 or 3.79 per cent. Of the total car-miles run 98.24 per cent were electric car-miles.

London Tramway Excursions

It was announced at a recent meeting of the London County Council that on application to the tramway offices arrangements could be made for the conveyance of parties of children to the holiday resorts on the tramway routes. The charge for the hire of special cars is 7s. 6d. per car single or 10s. return for each 1d. of the ordinary fare for the journey. Last year 700 parties of children were carried on the cars of the municipal railway system.

Fascisti Favor Private Operation

Under the new Fascisti Government in Italy considerable progress is being made toward a change from public to private operation of public utilities. It is said that within a few months a good part of the steam railroads of that country will be turned over for operation to private companies, and it is quite possible that the government may sell them outright. The parcel post system is already in the hands of a private contracting company, the telephone system is about to follow, and it is rumored that the same course will be followed with the telegraph. Not many of the electric railway lines in Italy have been operated by the municipalities, but in a few instances this has been the case, notably in Milan. While no announcement has been made that the Milan municipal street railway is to be changed to private operation, there is a rumor that it may be turned back to the company which was formerly operating it, namely, the Milan Edison Company.

Italy Electrifies More Lines

There have been a number of extensions of electrification in Italy during the past year. One of the most important is the Genoa-Turin line, equipped on the three-phase system. Now, electric operation is in force all the way between Modane (at the Montcenis tunnel) and Genoa. Other divisions of the state railroads are being electrified. The line between Rome and Ostia (the harbor of Rome) will soon be put in operation with 2,600 volts direct current. The locomotives will be of the same general type as those on the Torino-Cirié-Lanzo-Ceres line. Another high-voltage direct-current line to be started this summer is that between Domodossola and Locarno in the lake district of northern Italy. This proposed line will use 1,750 volts direct current.

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Financial and Corporate

Separation Sought

Bondholders' Committee Seeks Separation of Suburban System from the United Railways of St. Louis

The separation of the so-called Suburban system from the United Railways, St. Louis, and the independent operation of the former road is not only possible but probable, according to Sam B. Jeffries, one of the attorneys for the committee of bondholders of the Suburban system, who have asked the Missouri Public Service Commission for a valuation of the Suburban properties as an independent unit in the whole of the United Railways system. The committee acting for the bondholders includes Herman C. Stifel, John H. Longmire, A. C. P. Meyer and John L. Johnston. Besides Mr. Jeffries they are represented by Cleveland A. Newton and Marion C. Early, attorneys.

The Suburban lines include the Hodiamont Line and Fourth Street to the old Suburban Garden, the Kirkwood-Ferguson line and the Florissant line, the Sarah Street and the Union lines and the line to Meramec Highlands from Sarah Street West.

BONDHOLDERS WANT APPRAISAL

The holders of the $6,500,000 bonds of the old Suburban company desire to have the property on which they hold a mortgage appraised in order to know what they can expect in the reorganization, said Jeffries. It has been intimated, he said, that the Suburban bondholders may have to take a cut in the par value of their securities in the reorganization which, in view of their present idea of the value of the properties, the bondholders do not feel would be equitable.

There are two issues of Suburban bonds. The underlying securities are of the St. Louis & Suburban Railway consolidated first mortgages amounting to $4,500,000 issued under a general mortgage. This issue was due April 1, last, and is now in default. There are six months of grace, however, before the foreclosure provision of the mortgage becomes operative.

Mr. Jeffries said that if the Suburban general 5s are not paid at the expiration of the six months period, the bondholders will have the opportunity of foreclosing and forcing a sale. In such event the property might be bought in by an independent company, or by the bondholders themselves.

One of the Suburban bondholders declared that the United Railways seemed to treat the Suburban properties as an "adopted child," and the Suburban bondholders were ready to take over their property and run it themselves. It is expected that the reorganization plans will develop a contest between the Suburban bondholders and the holders of the $9,790,000 Transit Company 5s as to which issue shall receive more favorable treatment.

Treasury Revokes Corporation Tax Income Ruling

The U. S. Treasury on May 21 revoked its decision of two weeks ago declaring exempt from income taxation corporation dividends distributed out of profits of earnings accrued prior to March 1, 1913.

It was said unofficially in Washington that the original decision amending the revenue regulations had resulted from a ruling on one particular case, and that a review of that case had convinced revenue officials that no general application of the determination should have been made.

The ruling now revoked was made on May 11 and was referred to in the ELECTRIC RAILWAY JOURNAL for May 19, page 862. It took the form of an amendment to the income tax regulations. It applied to the distribution to its stockholders by a holding corporation of profits accumulated by subsidiaries prior to March 1, 1913. Under the ruling profits so distributed were held to be non-taxable, though the provision was made that profits accumulated since Feb. 28, 1913, must be distributed.

$1,104,991 Net for Capital Traction

Results for 1922 Satisfactory to Board, Gratifying to Stockholders and Creditable to Employees

The net income of the Capital Traction Company, Washington, D. C., for the year ended Dec. 31, 1922, was $1,104,991. The number of passengers carried in 1922 was 3½ per cent less than in 1921, due to increased competition from bus lines and to the more extensive use of private automobiles. Automobile registration in the District of Columbia was more than 25 per cent greater than in 1921. The loss in revenue was greater than the loss in traffic because the rate of fare was, throughout the year, less than in the preceding year.

The following comparisons between the years 1921 and 1922 give a general summary of operations:

Operating revenue decreased	$507,156— 9.2 per cent
Operating expenses with taxes decreased	190,995— 5.0 per cent
Net income decreased	306,711—21.7 per cent
Car mileage decreased	204,754— 2.1 per cent
Revenue passengers decreased	2,587,402— 3.5 per cent
Total passengers decreased	2,526,491— 2.7 per cent
Operating ratio increased from	58.4 to 63.4 per cent

On March 1, 1922, by order of the Public Utilities Commission, the rate of token fare was reduced from five tokens for 35 cents to six for 40 cents, the cash fare remaining at 8 cents.

The Public Utilities Commission, after a hearing held Oct. 16, denied an application of the Federation of Citizens' Associations for a reduction in the rate of fare in effect on the lines of the Capital Traction Company, taking the same position held by it heretofore that the rate of fare should be the same on all street car lines operated in the District of Columbia.

Net additions to capital during the year were $265,669, and consisted chiefly

SUMMARY OF OPERATIONS OF CAPITAL TRACTION COMPANY, FOR YEAR ENDED DEC. 31, 1922

		1922	1921
Passenger revenue		$4,966,341	$5,472,924
Special car revenue		20	110
Total revenue from transportation		4,966,361	5,473,034
Revenue from operation other than transportation		27,682	28,165
Railway operating revenue		4,994,043	5,501,199
Operating expenses (62.97% of gross revenue)		3,167,211	3,220,740
Net operating revenue		1,826,832	2,280,459
Taxes assignable to railway operation		436,093	573,519
Operating income		1,390,739	1,706,940
Non-operating income		34,906	18,412
Gross income		1,425,645	1,725,352
DEDUCTIONS FROM GROSS INCOME			
Interest on funded debt	$280,300		
Interest on unfunded debt	22,433		
Miscellaneous rents	1,309		
Rent for leased roads	12,604		
Miscellaneous debits	4,008		
Total deductions		320,654	313,648
Net income		1,104,991	1,411,704
PROFIT AND LOSS STATEMENT			
Credits:			
Balance beginning of year	$1,089,585		
Net income for year	1,104,991		
		2,194,577	
Debits:			
Dividends	840,000		
Miscellaneous	10		
		840,010	
Credit balance at close of year		$1,354,567	$1,089,586

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CAR-MILE AND REVENUE AND TRANSFER STATISTICS OF CAPITAL TRACTION COMPANY

CAR-MILES

	1922	1921	1920	1919
City lines	8,582,366	8,818,335	8,894,931	8,558,385
Chevy Chase line	815,819	785,367	764,993	755,149
Washington and Maryland line	153,177	152,414	149,347	147,544
Total all lines	9,551,362	9,756,116	9,809,271	9,461,078

REVENUE AND TRANSFER PASSENGERS

	1922	1921
Number of passengers carried at 8 cents	15,303,295	13,719,351
Number of passengers carried at 7½ cents	.....	38,820,788
Number of passengers carried at 7 cents	9,263,546	19,609,398
Number of passengers carried at 6⅔ cents	45,025,583	...
Number of passengers carried at 5 cents	972,779	984,369
Number of passengers carried at 3 cents	321,724	340,423
Total revenue passengers	70,886,927	73,474,329
Other passengers:		
1-cent inter-company transfer passengers	2,636,136	2,438,628
2-cent bus transfer passengers	1,009	.....
Free bus transfer passengers	202	.....
Capital Traction Company free transfer passengers	18,182,305	18,256,680
Other free passengers:		
Employees	883,835	951,395
Police and firemen	* 82,496	78,369
Total passengers	92,672,910	95,199,401

* Exclusive of policemen and firemen riding free while in uniform.

of betterments to track, additions to the conduit and cable system, the substitution of modern type stokers in four of the boilers at the Georgetown Power Station, and final payment on substation No. 4 building and equipment. This figure is net after deducting $111,137, the value of equipment abandoned at the Georgetown and Chevy Chase power stations.

The net increase in depreciation reserve for the year was $238,437, bringing the total reserve at the end of the year to $1,419,658, of which $690,000 is invested in government securities, $86,430 is held on deposit bearing interest, and $643,227 has been advanced for capital expenditures.

Tax accruals in 1922 amounted to $436,093, a decrease of $137,426 from the preceding year due to smaller revenues and the elimination of the excess profits tax.

It is interesting to note that the company now has in the service 126 employees (10.6 per cent of the total) who have been with the company twenty years or more.

It is explained that competition from the buses has had a tendency to increase, numerous applications being filed by the Washington Rapid Transit Company and others for the operation of bus lines, some of them paralleling the railway tracks. The commission has expressed its policy not to grant such parallel service. The Capital Traction Company joined with the Washington Railway & Electric Company in an application for permission to operate a bus line through Cleveland Park connecting with Capital Traction lines at Connecticut Avenue and Woodley Road and with the Washington Railway & Electric Company lines on Wisconsin Avenue and at Connecticut Avenue and Columbia Road. This application was granted and operation began in December. Transfers selling for 2 cents each are issued to the lines of both companies, and the loss or profit from operation shared equally.

Insurance policies on the principal properties of the company expiring June 22, 1922, were renewed for a period of three years at a slightly reduced rate. Fire insurance is now carried on the company's various properties in the sum of $4,822,900.

Ford Makes Short-Term Loan to Detroit

The City Council of Detroit, Mich., on May 22 authorized the comptroller to negotiate a short term loan to enable the street railway department to commence at once its work on extensions.

The Municipal Railway has outlined its building program for the summer, including some important extensions. In order that the department may not be delayed the money will be raised for this work at once.

The Street Railway Commission requested a loan of $2,500,000, but the Council decided not to borrow more than $1,000,000 until the increase in the city's assessed valuation is ascertained next month.

It has since been announced that Henry Ford has agreed to advance a short-term loan of $500,000 to the city at 4 per cent and that he is prepared to offer further to finance the city to the extent of as much as $10,000,000 at decidedly favorable interest rates.

The Legislature has increased the bonding limit to enable the expenditure for subways, but this matter is subject to further consideration before loans based upon increased valuations can be negotiated.

Receives Permission to Issue Bonds

The Public Service Commission of Alabama has granted authority to the Mobile Light & Railroad Company to issue 6 per cent mortgage bonds to the amount of $245,000 to refund bonds which have become due. The new bonds will mature on May 1, 1950. An operating statement presented to the commission showed a net income of $1,697 for April, after caring for all obligations and allowing for the sinking fund account. The total revenue of the company for April was $67,471 and the surplus after all operating expenses had been deducted was $3,781. A total of $2,083 was credited to the sinking fund account.

North American Company Increases Its Wisconsin Holdings

Control of the Wisconsin Traction, Light, Heat & Power Company has passed into the hands of the North American Company, through the purchase by the latter of the stock in the Wisconsin company held by John I. Beggs, Charles F. Pfister and Fred Vogel, Jr., Milwaukee.

The deal, according to Mr. Beggs, means only that the North American Company is extending its holdings of public utility properties in Wisconsin. Mr. Beggs said:

> The North American Company has been a stockholder in the Wisconsin Traction, Light, Heat & Power Company. It has been the second largest owner, and with the acquisition of the interests held in Milwaukee gains a controlling interest. It means merely the extension of the North American Company holdings in Wisconsin.

The company operates railway lines in Appleton, Neenah and Menasha, with 21.24 miles of track, and also operates motor bus lines. Its properties are valued at about $7,000,000 and annual revenues are about $1,500,000. The management of the property will remain unchanged.

Auction Sales in New York.—At the public auction rooms in New York there were no sales of electric railway securities this week.

Reorganization of Suburban Lines Being Arranged.—Le Roy T. Harkness of the New York Transit Commission, has announced that plans are being formulated for the reorganization and readjustment of the Long Island Traction Company and the Long Island Electric Railroad, both owned jointly by the Interborough Rapid Transit Company and the Long Island Railroad, and operating in Queens and Nassau Counties.

Will Subscribe to New Stock.—Stockholders of record of April 24 of the Washington Water Power Company, Spokane, Wash., have the right to subscribe to new 10 per cent stock at par. Payment for new stock will be due by June 15. The company has reported for the first quarter of 1923 net earnings of $499,378, equal to 2.72 per cent on the $18,330,200 capital stock outstanding. In the first quarter of 1922 net earnings amounted to $429,153, equal to 2.41 per cent on the $17,779,800 capital stock outstanding.

Bonds Offered.—R. L. Day & Company, Estabrook & Company, Harris, Forbes & Company and Merrill, Oldham & Company are offering at 98 and interest yielding about 6.25 per cent $3,000,000 of the Boston Elevated Railway 6 per cent ten-year gold bonds. The bonds are due on June 1, 1933 without option of prior payment. Of the proceeds of this issue of bonds, $700,000 will be used to reimburse the company for money used to pay at maturity on Jan. 1, 1923, a like amount of West End Street Railway debenture 4½ per cent bonds. The balance will be used to provide for extensions to the company's power station in South Boston, for new shops in Everett and for the George Street storehouses in Somerville.

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Traffic and Transportation

Extra Pay for Politeness in Muskegon

The Muskegon Traction & Lighting Company, Muskegon, Mich., is going to make it pay to be polite. It has introduced a bonus plan for conductors and motormen based on the success of the platform men in being courteous and polite to customers. Under the plan the year is divided into two periods, the first bonus of $30 being payable on July 1 and the second on Jan. 1. The plan is retroactive to Jan. 1, 1923.

Every employee starts with a credit of 1,000 points, and all who have 800 points to their credit at the end of the six months period are to receive the full bonus. The company has prepared a special rule book. Deductions are made for the violation of certain rules. In addition extra points will be awarded for any outstanding acts of courtesy, loyalty or safety. Plans will be made for paying an additional sum over the regular bonus to employees who maintain the full 1,000 points at the end of the period.

The bulletin states that it is the purpose of the company not only to provide for the safety and comfort of the public, but also to see that the public receives courteous treatment. Further, that the employees are expected to treat the public politely and show the public consideration. As for the employees themselves, they must maintain a neat personal appearance while on duty.

George Steinwedel, president and general manager, said he believed that 90 per cent of the employees would earn the full bonus. Remarking that the purpose was twofold, Mr. Steinwedel said:

> We wanted some way to reward those employees who give us a little more than the full service. Under the old system we had no way to reward them. The bonus plan will provide a means. In the second place we wanted to impress on the public and the men that our aim is to give service.

The plan was well received by most of the employees. The company had been working out details since Jan. 1, and it was considered a part of the plan of the company started two years ago to win the popular approval of the public in operation of the street cars and the management of the company.

Buses Will Replace Railway in Brattleboro

W. A. Buttrick, vice-president of the Twin States Gas & Electric Company, has announced that motor buses will replace trolley cars in Brattleboro, Vt., soon and that tracks will be torn up. He says the company cannot be expected to operate the railway at a loss and claims that it may substitute bus service under the recent law putting bus lines under supervision of the Public Service Commission. A 10-cent fare for buses is proposed.

Safety Enters Amid a Great Din

Through the efforts of Barron Collier, Special Deputy Police Commissioner of Greater New York in charge of safety, Friday, May 25, was observed as safety day in the metropolis. Safety hour, beginning at 3 p.m., when schools are dismissed, and ending at 4 p.m., also was observed for the first time, and will continue to be observed every day throughout the remainder of the present school year.

At 3 o'clock on May 25 New York heard safety hour ushered in with a din

Aunty J. Walker as Shown in the Placards

such as it seldom has experienced. For one minute factory, ferry and steamboat whistles blew, church bells rang, taxicab, truck and other motor vehicle horns honked and other loud noises were made from Yonkers to the Battery. This din will be repeated every day now at 2:59 o'clock in the afternoon until June 29.

The outstanding feature of the day was the introduction of "Aunty J. Walker," a woman figure whose special mission in life is to break folks of the habit of jay-walking, or crossing streets at places other than the regular crossings. Aunty J. Walker was introduced to New York through the medium of posters, car cards and an animated figure who appeared at prominent points throughout the city with Mr. Collier while the Commissioner was addressing the crowds.

Aunty J. Walker proved such a striking feature and impressed the jay-walking lesson so strongly on the New York public that the Advertising Section of the American Electric Railway Association has arranged with Mr. Collier to use the figure in a series of window signs and posters for the benefit of the entire electric railway industry. The signs are now being made and samples of them soon will be forwarded to companies as a part of the regular service of the Advertising Section.

Council Will Pass Over Mayor's Veto in Seattle

The Seattle City Council will pass over the veto of Mayor E. J. Brown the ordinance providing for increasing fares on the Seattle Municipal Railway lines from 5 cents to 10 cents cash, or three tokens for 25 cents. The veto causes a delay in placing the ordinance in effect, as thirty days is required to pass after the bill has been vetoed before it is placed in effect, which means that the increased fare will not become effective before July 5. The delay in passing the carfare ordinance complicates further the railway's financial situation, in that it makes necessary a return to the warrant basis for supplies, and a possible issuance of warrants for the June 10 pay day of trainmen.

Mayor Brown in his veto message expressed the opinion that the time has arrived to solve the question for all time of the rewriting of the "impossible" $15,000,000 purchase contract, and that terms, conditions and methods for its solution should be agreed upon before any increase of charges for street car fare is made.

No plan has been decided upon by the special committee appointed to formulate a proposal for the rewriting of the contract. Councilman E. L. Blaine suggests that the proposal to pay $1,000,000 yearly for a period of nineteen years and six months from the date of purchase, based upon an interest rate of 4 per cent, should be telegraphed to the bondholders, but this action has not been agreed upon. In the meantime, Mayor Brown would shift the entire responsibility to the City Council members, expressing a willingness to cooperate in any possible way with them.

Another plan proposed by the city utilities committee for possible increase of revenue is the installation of the $1 weekly pass plan, providing for the issuance of transfer to the lines of the Seattle & Rainier Valley Railway on the same basis as to municipal lines. Walter M. Brown, general manager of the Rainier lines, states that his company would be willing to accept the proposition should the city agree to remit the payment of the annual franchise tax of $11,000 and would agree to pay the company on the same basis now paid the municipal lines for carrying police and firemen, amounting to $4,000 yearly.

Bus and Trollibus Rights Granted

Two ordinances were passed recently by the City Council of Philadelphia granting subsidiaries of the Philadelphia Rapid Transit Company franchises for operating a bus line on Roosevelt Boulevard and a trackless trolley line on Oregon Avenue. When the ordinances were finally placed before the Mayor he vetoed them, but the Council over-rode the veto. The Mayor objected to a provision for a 10-cent fare. Repre-

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sentatives of the Philadelphia Rapid Transit Company said that the buses, for which the Roosevelt Boulevard grant provides, would be running before the end of the year. In Oregon Avenue, where the trackless type of trolley car will be used, preparations for its installation probably will proceed at once.

Beeler Organization Will Study Charleston Situation

The Charleston Consolidated Railway & Lighting Company has employed the Beeler organization of New York City to make a study and report on the street railway conditions in the city of Charleston, S. C., with a view to determining, if possible, some solution of the present serious financial difficulties with which the company is confronted.

This company says that its railway revenues for the first four months of 1923 were practically $40,000 less than for the first four months of the previous year, while the cost of operation has not fallen in anything like this proportion, with the result that the company is experiencing substantial losses every month. The revenue for the first four months of 1923 has failed by $13,749 to meet actual operating expenses, exclusive of depreciation and interest on the value of the street railway properties, it is stated.

Just what changes will be made are at present problematical, and it is likely that no changes will be made until the Beeler organization has completed its investigation and made its report. The company already uses the one-man car and is attempting to apply other operating economies. The use of the automobile, the reduction of the force of men at the Charleston Navy Yard, the loss to Charleston of the destroyer fleet during the winter and other similar influences have brought about a shrinking of traffic with a consequent reduction of revenues, amounting to more than the savings effected by the economies.

One-Man Cars Allowed in Johnstown

One-man cars, prohibited in the city of Johnstown, Pa., by ordinance, can now be operated. The City Council at a recent special meeting passed a repealer of the old ordinance that provided that every car should be manned by a motorman and conductor. Efforts to pass the repealer have been under way for the past year. The repealer was put through by a vote of three to two, Mayor Joseph Cauffiel, who previously opposed one-man cars, voting in favor. The ordinance repealed was signed on March 19, 1921, and allowed only "trailers" with one man in charge.

One-man cars will be added to the Johnstown Traction Company equipment gradually, according to Lee T. Shannon, general manager. In presenting an appeal for the ordinance repealer Mr. Shannon stressed the safety measures as applied to one-man cars and stated that the reduced revenues of the company made the curtailment of men necessary.

Carrying out the agreement with the City Council the company announced a tariff of rates effective May 24, the new tariff pertaining to school children only. The tariff makes decreases in existing rates and provides a special rate of fare of 5 cents per passenger for all children actually going to and coming from school on all days when the schools are in session. The rate of fare is applicable, however, only between the hours of 8 a.m. and 5 p.m. Tickets are to be sold children in packages of 20 for $1 upon proper identification. The rate of fare is reduced from 7 to 5 cents for school pupils on all the city lines. On the Windber line, the new tariff reduced the fare from 10 cents to 5 cents on each zone.

Single and Double Deck Buses for Louisville Railway

The Louisville Railway will start a bus service during June. Announcement to this effect was made recently by J. P. Barnes, president of the company. Twenty-four buses will be put in service immediately and the plans of the company call for additions to this original fleet as rapidly as public demand justifies such action. Of the twenty-four cars twelve will be single-deck vehicles, costing approximately $7,500 each, being built in Cleveland, and twelve double-deck, costing about $9,000 each, which will be supplied by the Yellow Coach Company, Chicago. The former will seat twenty-five persons, while the double-deck buses will seat sixty-eight.

The single-deck buses will be upholstered in leather, finished in mahogany, with pneumatic tires, and will be painted royal blue. They will have Bender bodies mounted on White chassis. They will be operated on a ten-minute schedule. There will be one operator on the single-deck cars, and two on the double deck. The fare will be 10 cents.

At the start of the service the twenty-four buses will be divided between two lines. One will run from the center of Louisville out into the southern district, where jitney traffic in the past has been the most active. The other will run through the southeastern section of Louisville. Neither line will traverse streets over which cars of the Louisville Railway are operated.

The Kentucky Transportation Company has been organized to operate the buses. All of its capital stock of $200,000 is held by the Louisville Railway.

Transfers Cost Two Cents.—On payment of the usual 6-cent fare on any car of the Arkansas Central Power Company in Little Rock, Ark., an extra 2-cent fare carries with it a transfer to any line in North Little Rock. This rule applies also to passengers boarding cars in North Little Rock for the city of Little Rock.

Extends Pass Plan.—The Tacoma Railway & Power Company has been given permission by the State Department of Public Works to extend for three months the $1 weekly pass on its lines in the city of Tacoma. The period will end Aug. 26, 1923.

Proposal Made to Operate Radial Lines.—A proposal has been made by Sir Henry Thornton to operate certain radial lines in the Niagara Peninsula in conjunction with the National Railways. The Canadian *Financial Post* points out that this proposal really means that where electric lines can be operated to advantage the National Railways will meet the situation.

Investigates Right of Buses.—General Manager R. A. Leussler of the Omaha & Council Bluffs Street Railway has stated that the company counsel is investigating the question whether buses have a legal right to operate on the city streets. The Boulevard Transit Company recently took out a permit to operate two buses on the streets of Omaha, charging a 10-cent fare.

Big Excursion Business Being Done.—The electric railways in the Central Electric Railway Association territory are conducting an extensive excursion business, particularly in the states of Indiana and Ohio. Tariffs covering these movements are issued by the association, the fare for the round trip on the certificate plan being in all cases one-and-one-half times the one-way fare.

Loop Plan in Late August.—The United Electric Railways, Providence, R. I., will not be able to put its looping plan into effect until late in August or early September because of the special work that will be required to make the necessary track connections. This eight-loop plan cutting all crosstown railway lines was referred to in the ELECTRIC RAILWAY JOURNAL, issue of May 12. The plan, it is believed, will relieve much of the congestion in the city center.

Will Test One-Man Cars.—The Chicago, Ottawa & Peoria Railway, Joliet, Ill., is considering the possibility of trying out the one-man interurban cars on its property. The company will test the cars on the division of 18 miles between Streator and Ottawa, and if successful, similar service will be put into effect on the entire property of 107 miles. Arrangements are also being made to operate the city service of four cars in La Salle and Peru with one-man cars.

Rerouting to Improve Service.—In the interest of better service to its patrons the Dallas Railway on April 15 put into operation its first crosstown service, the old Main line passed out of existence and two new stretches of track were opened up. The new crosstown line and the rerouting of the Mount Auburn-Park View lines were the major changes. Other changes consisted of rearranging the linking up of various lines. The changes took place without any serious difficulties.

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Personal Items

J. C. Smith Heads Quebec Company

Shawinigan Company Executive Elected to Succeed E. A. Robert as Head of Quebec Railway, Light, Heat & Power Company

Julian C. Smith, who has been elected president of the Quebec Railway, Light, Heat & Power Company, has been a prominent figure in Canadian hydro-electric developments during the past few years.

Mr. Smith was born in Elmira, N. Y., in 1878 and was graduated from Cornell University in 1900. He began his business career as draftsman with Wallace C. Johnson, consulting engineer at Niagara Falls, N. Y. Later he went to

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J. C. Smith

Shawinigan Falls, Quebec, as assistant engineer to Mr. Johnson. In 1903 he allied himself with the Shawinigan Water & Power Company of Montreal as superintendent, and three years later was advanced to general superintendent. Subsequently, he became general superintendent and chief engineer and in 1913 he was made vice-president. At present, in addition to his position of vice-president and general manager of the Shawinigan company, he is executive of all of the subsidiary companies.

Mr. Smith has taken an active interest in engineering societies—American, Canadian and British—and has made many important contributions to technical literature.

Besides occupying the chief executive's office of the Quebec company, Mr. Smith is vice-president and general manager of the Shawinigan Water & Power Company, president of the Public Service Corporation, Quebec, president of the Canada Carbide Company, vice-president of the Dominion Engineering Works, Ltd., and director of the Dominion Bridge Company and president of the Canadian Electro-Products Company and North Shore Power Company, Three Rivers.

George A. Iler Joins Pennsylvania-Ohio Electric Organization

George A. Iler has been appointed electrical engineer of the Pennsylvania-Ohio Electric Company, New Castle, Pa., and has assumed the duties of his new position, coming to the company from Atlanta, Ga., where for the last year he was radio engineer for the Atlanta *Journal*, constructing and operating its big broadcasting plant.

Mr. Iler succeeds C. A. Harrington in the Pennsylvania-Ohio organization. After serving in the Sixteenth Regiment of Pennsylvania Infantry in the Spanish-American war Mr. Iler joined the U. S. Navy as first-class electrician and was promoted to chief electrician. Following his naval service he devoted his energies to electrical work in various parts of the country in charge of construction and operation of power generating plants, transmission systems and general electrical engineering work, completing his education with a post-graduate course at the Georgia Institute of Technology.

Among other important work in which Mr. Iler has been engaged was the building and operating of the power transmission lines in the New River coal district, West Virginia, and the early application of electrical power to mining projects there. He was also chief operator in connection with the construction of the 100,000 hp. hydro-electric power plant for the Georgia Railway & Power Company at Tallulah Falls.

E. J. Nash has been acting general manager of the Butte Electric Railway since the death on March 19 of J. R. Wharton, who was general manager.

Rodney J. Selby of Des Moines has been appointed assistant director of the Iowa Committee on Public Utility Information. Mr. Selby goes to this committee from the Des Moines *Capital*, with which he has been associated for a number of years. He is a graduate of Drake University and has had many years' experience in the newspaper business.

Elbert G. Allen, formerly chief engineer of the Philadelphia Rapid Transit Company, is now in the Boston office of Stone & Webster, Inc., as consulting engineer. It is not the first time that Mr. Allen has been associated with Stone & Webster. In 1901 he entered their employ, remaining there continuously for twenty years. Early in 1922 Mr. Allen was appointed chief engineer of the Philadelphia Rapid Transit Company.

C. H. Dahl Advanced

Merits of Work of Research Engineer Recognized by His Appointment to Assistant to Vice-President at Winnipeg

C. H. Dahl, statistician for the Winnipeg Electric Railway for the last three and one-half years, has been advanced to be one of the assistants to the vice-president, A. W. McLimont.

The promotion of Mr. Dahl is recognition of his services as statistician, in which capacity he has made a number of investigations into various problems of the company arising in the operation of its electric, gas and railway properties. He has figured prominently in the adjustment of rates and fares, wage negotiations and general operating efficiencies.

Prior to his connection with the Winnipeg Electric Railway Mr. Dahl was a case investigator for the Wisconsin Railroad Commission, and as such his work consisted in analyzing and reviewing testimony and evidence submitted in rate cases in appeals for changes in rates as well as drafting decisions in connection with such applications. The experience gained there has no doubt been very helpful to him in the performance of his work in Winnipeg.

C. H. Dahl

Mr. Dahl prepared himself for public utility work while a student at the University of Wisconsin. He is a graduate of the college of letters and science of that university, and while there he took the course provided by that institution in railway transportation, public utilities, statistics, money and banking and kindred subjects in political economy.

George I. Plummer, superintendent of traffic of the Dallas Railway, was elected chairman of the electric railway section for the 1924 meeting of the Southwest Public Service Association at the recent convention held in Fort Worth. W. R. Burns, assistant secretary-treasurer of the Dallas Railway, was re-elected secretary of the section for the ensuing year. Both Mr. Plummer and Mr. Burns have long been active in the affairs of the association.

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Safety Manager in Providence

Harrah K. Bennett has been appointed safety manager of the United Electric Railways, Providence, R. I. He has already assumed his new duties.

Previous to joining the railway at Providence he had a long period of experience in electric railway business. He entered railway work with the Fitchburg & Leominster Street Railway in December, 1898, as carhouse foreman. He advanced gradually and was appointed claim agent for the company in 1905 and held this position until September, 1917, when he resigned to go with the Bay State Street Railway, Boston, afterward the Eastern Massachusetts Street Railway.

H. K. Bennett

Mr. Bennett was successively superintendent of employment of the Bay State Street Railway, Boston District claim agent and general claim agent. When the latter office was abolished in 1920, he was appointed manager of the Melrose-Woburn division, remaining there until this division was consolidated with the Chelsea division.

He then went into the claim department of the Liberty Mutual Insurance Company at Boston, where he was chief examiner of claims in the branch office, supervision department. He continued with this company until his appointment to the United Electric Railways.

Mr. Bennett has been interested in safety work for many years, and while in Fitchburg gave several talks in the public schools and before other organizations along the line of prevention of accidents. While with the Eastern Massachusetts Street Railway he continued his interest in this phase of railway work and was responsible for that part of the standardized form of breaking in "blue uniform" men by the company which dealt with the instruction of new men from the safety standpoint. In 1911 he was president of the American Electric Railway Claims Association.

John J. O'Connor, superintendent of transportation for the Muskegon Traction & Lighting Company for the last three years, has resigned. The resignation was reluctantly accepted by George Steinwedel, president of the company. The retiring official was forced to give up his work because of ill health. Mr. O'Connor, formerly a conductor, was promoted by Mr. Steinwedel from the ranks at the time of the reorganization. He is given credit for aiding greatly in the re-establishing of the Muskegon company. Roy Strevo, a dispatcher and a former conductor of the company at Muskegon, is acting as superintendent.

Joe Gill Heads Southwestern Public Service Association

Joe H. Gill, assistant general manager of the Dallas Power & Light Company, Dallas, Tex., was elected president of the Southwestern Public Service Association at the annual meeting at Fort Worth on May 17. Mr. Gill was born on Sept. 25, 1886, at Kerrville, Tex. He received his elementary education in the public schools of Paris, Tex., and was graduated from the University of Texas at Austin in June, 1910, with the degree of electrical engineer.

Immediately after receiving his degree Mr. Gill entered the employ of the General Electric Company at Schenectady. He remained with that company until December, 1912, when he entered the employ of the Texas Power & Light Company of Dallas as resident engineer. He was engaged with the company at Dallas until October, 1917.

From October, 1917, to April, 1918, Mr. Gill was with Stone & Webster as electrical engineer on the design of the American Ordnance Base Depot in France and in April, 1918, he enlisted with the United States Army as a private in Battery B, Third Trench Mortar Battalion, Fort Crockett, Tex. On July 4, 1918, he entered the officers' training camp at Fort Monroe, Va., and was commissioned Second Lieutenant of the Coast Artillery on Sept. 25, 1918. He served as instructor in the Coast Artillery Training Center until Dec. 7, 1918, at which time he was discharged from the army.

Mr. Gill returned at once to Dallas and on Feb. 1, 1919, re-entered the employ of the Dallas Power & Light Company as power salesman. He was successively promoted from power salesman to chief engineer and from chief engineer to assistant to the general manager and then to assistant general manager.

J. H. Gill

Obituary

Elisha H. Talbot, retired publisher and founder of the *Railway Age* and other periodicals, died recently at his home in New York. He was eighty-three years old. Mr. Talbot was born in Ohio. When he was nineteen he established a weekly newspaper in Winterset, Ia. Besides the *Railway Age* he founded the *Interurban Railway Journal* at Indianapolis, Ind., during the period when interurban railway construction was at its height.

William A. Geoghegan, forty-four years old, a member of the Cincinnati Rapid Transit Commission, died at his home in that city on May 20, as the result of heart disease. Mr. Geoghegan had been a member of the Rapid Transit Commission since 1919, when he was appointed by the late Mayor John Galvin. He was reappointed by Mayor George P. Carrel in 1921. From 1913 to his appointment on the Rapid Transit Commission, Mr. Geoghegan was one of the presiding judges in the Hamilton County Common Pleas Court.

John E. Sickels, long an attorney of the Interborough Rapid Transit Company, New York, N. Y., died on April 14. Mr. Sickels became connected with the law department of the traction company many years before the lease of the Manhattan Railway to the Interborough was effected. After being admitted to the bar, in Florida, he became a member of the firm of Henderson & Sickels in Tallahassee. Later he was admitted to the bar in the State of New York, and about December, 1897, he entered the law department of the Manhattan Railway.

Capt. Alexander B. Guigon, sixty-five years of age, for more than thirty years prominently identified with the traction business in Virginia, died recently in his home at Richmond. Captain Guigon was one of the original incorporators of the Richmond Traction Company, now an integral part of the Virginia Railway & Power Company in Richmond, and at the time of his death was general counsel for the company. Captain Guigon was prominent in the merger of the Richmond Traction with the Virginia Railway & Power Company. His pallbearers included E. Randolph Williams, vice-president of the Company; George H. Ingles, A. H. Herrmann and G. B. Williams, all officials of the railway.

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Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

English Electric Has Many Important Railway Contracts

At the annual general meeting of the English Electric Company held in London on April 25, Sir Charles Ellis, the chairman, said that the past year was one of the worst the engineering trade had ever experienced, so that he thought it was a satisfactory result to show a balance on profit and loss account of £318,264 as compared with £363,659 for the previous year.

The orders received during the year were in value one and three-quarter times those received in the previous year, and in the first three months of this year the improvement had been more than maintained. There had been a most encouraging revival in the application of their standard manufactures to steel works, coal mines, and other industries. Improvements in designs and the development of new lines of machinery had been actively continued, and had assisted the company in obtaining contracts, particularly in electric railway and water power work. Glancing at contracts of special interest he was glad to say that entire satisfaction had been given by the electric locomotives now in regular operation in the Pyrenees service of the Midi Railway of France.

After a prolonged inquiry the Japanese Government Railways had decided to adopt the high-tension direct-current system, and had placed with the English Electric Company an order for thirty-four electric locomotives, the largest order of the kind ever executed entirely by British manufacturers. More recently the contract had been secured from the Great Indian Peninsula Railway for electrical equipments for the suburban lines in and near Bombay.

Foreign Trade Is Returning to Pre-War Condition

The volume of export trade in many commodities used in large quantities by electric railways decreased to a marked extent in 1922. This is shown by the recently published report of the U. S. Chamber of Commerce. Coal, coke, etc., at the head of the list, with 31,161,384,000 lb., was nevertheless 21.4 per cent below the pre-war average and 44.6 per cent below the figures for 1921. Steel rails with 625,166,000 lb. were 29.5 per cent below pre-war, and 13.3 per cent below 1921. Copper, on the other hand, with 652,667,000 lb. was 11.8 below pre-war figures but showed an increased export of 9.5 per cent over the preceding year. The export of hydraulic cement was heavily curtailed as the total quantity 424,070,000 lb. was 59.3 per cent less than the pre-war quantity and 4.5 per cent below 1921. In spite of the fact that coal occupies first place by weight in the list of exports, it does not play so prominent a part when value is considered, being seventh at $95,630,000, or 2.5 per cent of the total. Copper is ninth at $89,030,000. The decline in value of the coal exported coincided almost exactly with the reduction in quantity noted in the preceding paragraph, but the export of copper increased 19 per cent in value.

Electrical apparatus was an important part of the export trade. Telephone, telegraph and signal devices had a value of $3,398,000 last year. Electric motors, controllers, etc., exported were valued at $7,444,000. Switches, meters and other transmission and distribution apparatus had a $6,911,000 valuation, and transforming and converting devices were valued at $6,273,000.

The relative rank of foreign customers showed little change in 1922 from the year before. Great Britain, Canada, and Germany head the list in the order named. France is now fourth, having displaced Japan. South America continues to make a poor showing, with only 5.9 per cent of the total exports being consigned there.

Increased imports of such commodities as coal and hydraulic cement coincide with the decreased export, with the influence of the coal strike plainly discernable in the first case. The total imports for the year show an increase of 24 per cent over 1921 as compared with a decrease of 14.6 per cent in exports. The present trend appears from this to be toward a smaller export balance as in pre-war days.

Detroit May Purchase Generating Equipment

Although the Detroit City Council, which recently voted to award contracts for four 20,000-kw. turbo-generators, has rescinded this action, it is said to be likely that the city will eventually buy two, or possibly three, turbines to generate the 35,000 kw. or 40,000 kw. additional energy that it needs for lighting and pumping purposes and in the operation of the municipal railway. At present the city is generating about 19,000 kw. for these purposes and purchasing the rest from the Detroit Edison Company. It is the plan of the city administration eventually to generate all the power needed for municipal uses, but not to compete with the central-station company in the supply of private customers.

Employment and Wages Gain in April

A preliminary report of the Bureau of Labor Statistics of the U. S. Department of Labor covering over 5,000 representative industrial establishments shows in April an increase over March of 0.5 per cent in the number of employees, an increase of 1.4 per cent in the total amount paid in wages, and an

ELECTRIC RAILWAY MATERIAL PRICES—MAY 31, 1923

Metals—New York

Copper, electrolytic, cents per lb.	14.75
Lead, cents per lb.	7.25
Nickel, cents per lb.	28.50
Zinc, cents per lb.	6.70
Tin Straits, cents per lb.	42.25
Aluminum, 98 to 99 per cent, cents per lb.	27.25
Babbitt metal, warehouse, cents per lb.:	
Fair grade	65.00
Commercial	40.00

Bituminous Coal

Smokeless mine run, f.o.b. vessel, Hampton Roads	$6.25
Somerset mine run, Boston	3.175
Pittsburgh mine run, Pittsburgh	2.00
Franklin, Ill., screenings, Chicago	1.95
Central, Ill., screenings, Chicago	1.575
Kansas screenings, Kansas City	2.625

Track Materials—Pittsburgh

Standard Bessemer steel rails, gross ton	$43.00
Standard open hearth rails, gross ton	43.00
Railroad spikes, drive, Pittsburgh base, cents per lb.	3.15
Tie plates (flat type), cents per lb.	2.675
Angle bars, cents per lb.	2.75
Rail bolts and nuts, Pittsburgh base, cents, lb.	4.375
Steel bars, cents per lb.	2.40
Ties, white oak, Chicago, 6 in.x8 in.x8½ ft.	$1.50

Hardware—Pittsburgh

Wire nails, base per keg	3.00
Sheet iron (28 gage), cents per lb.	3.85
Sheet iron, galvanized (28 gage), cents per lb.	5.25
Galvanized barbed wire, cents per lb.	3.80
Galvanized wire, ordinary, cents per lb.	3.35

Waste—New York

Waste, wool, cents per lb.	12–16
Waste, cotton (100 lb. bale), cents per lb.:	
White	11–13.50
Colored	8–13

Paints, Putty and Glass—New York

Linseed oil (5 bbl. lots), per gal.	$1.16
White lead (100 lb. keg), cents per lb.	13 125
Turpentine (bbl. lots), per gal.	$1.07
Car window glass, (single strength), first three brackets, A quality, discount*	84.0%
Car window glass, (single strength), first three brackets, B quality, discount*	86.0%
Car window glass, (double strength) all sizes, A quality, discount*	85.0%
Putty, 100 lb. tins, cents per lb.	4.75

*These prices are f.o.b. works, boxing charges extra.

Wire—New York

Copper wire base, cents per lb.	18.375
Rubber-covered wire, No. 14, per 1,000 ft.	$7.75
Weatherproof wire base, cents per lb.	19.00

Paving Materials

Paving stone, granite, 4x8x4, f.o.b. Chicago, dressed, per sq.yd.	$3.50
Common, per sq.yd.	3.10
Wood block paving 3½, 16 treatment, N. Y., per sq.yd.	3.19
Paving brick 3½x8½x4, N. Y., per 1,000 in carload lots	54.00
Crushed stone, ¾-in., carload lots, N. Y., per cu.yd.	1.75
Cement, Chicago consumers net prices, without bags	2.20
Gravel, ¾-in., cu.yd., N. Y.	2.25
Sand, cu.yd., N. Y.	1.25

Old Metals—New York

Heavy copper, cents per lb.	12.50
Light copper, cents per lb.	10.625
Heavy brass, cents per lb.	6.50
Zinc, old scrap, cents per lb.	4.375
Yellow brass, cents per lb. (heavy)	6.50
Lead, heavy, cents per lb.	6.00
Steel car axles, Chicago, net ton	$21.75
Old car wheels, Chicago, gross ton	22.75
Rails (short), Chicago, gross ton	22.25
Rails, (relaying), Chicago, gross ton	33.50
Machine turnings, Chicago, net ton	17.75

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increase of 0.9 per cent in the average weekly earnings. Identical establishments report 2,139,053 persons employed in April compared with 2,128,816 in March, and weekly payrolls of $55,353,000 compared with $54,573,958.

Rolling Stock

Beech Grove Traction Company, Beech Grove, Ind., has placed an order with the Cincinnati Car Company for two one-man Birney safety cars. The order was placed in April, and delivery is expected in July. The seating capacity of the car is thirty-two persons.

Columbia Railway, Gas & Electric Company, Columbia, S. C. placed an order with the J. G. Brill Company of Philadelphia for six one-man cars of the standard Birney safety type. Additional equipment of this type is contemplated, but no orders have been placed.

Memphis Street Railway, as was reported in the ELECTRIC RAILWAY JOURNAL, issue of May 12, has placed an order for forty new cars. They are described as follows:

Date order was placed	May 18, 1923
Date of delivery	December, 1923
Builder of car body	St. Louis Car Company
Type of car	Low-level, light-weight passenger
Seating capacity	48
Total weight	33,400 lb.
Bolster centers, length	22 ft. 0 in.
Length over all	45 ft. 2 in.
Truck wheelbase	5 ft. 10 in.
Width over all	8 ft. 4½ in.
Body	Steel
Interior trim	Birch
Headlining	Agasote
Roof, arch or monitor	Arch
Air brakes	General Electric C. P. 27
Control	K-35
Couplers	Hoovey
Curtain fixtures	Curtain Supply Company
Designation signs	Hunter
Door-operating mechanism	Memphis Street Railway standard
Fare boxes	Johnson
Fenders or wheelguards	Memphis Street Railway standard
Gears and pinions	General Electric
Hand brakes	St. Louis Car Company
Heater equipment	Consolidated
Headlights	Golden Glow
Journal boxes	M. C. B.
Lightning arresters	General Electric
Motors, type and number	40-G. E.-265
Motors, outside or inside hung	Inside
Paint, varnish or enamel	St. Louis paint and surfacer
Registers	International No. 5
Sanders	St. Louis Car Company
Sash fixtures	Dayton Manufacturing Company
Seats	Hale & Kilburn
Seating material	Wood
Step treads	Feralun
Trolley catchers or retrievers	Ideal
Trolley base	U. S. No. 13
Trolley wheels or shoes	4 in. wheels
Trucks	Brill 76 E.
Ventilators	Nichols-Lintern
Wheels (type and size)	Cast iron, 26 in.

Indianapolis & Cincinnati Traction Company, Indianapolis, Ind., in connection with its change from single-phase operation to d.c. operation has purchased the following equipment: Twelve new all steel passenger cars from the Cincinnati Car Company; forty-eight Westinghouse type 548-C-7 field control 105 hp. motors at 600 volts for the passenger cars; sixteen Westinghouse 557-A-7 field control 145 hp. motors for freight service; Westinghouse standard HLF pneumatically operated control to permit train operation. The gear ratio on the passenger cars will be 21/68 and Nuttall helical gears will be used. The gear ratio for the freight cars will be 16/61 and helical gears will also be used here.

Track and Roadway

Brantford Municipal Railway, Brantford, Ont., expects to build 1,000 ft. of new track on Oxford Street.

Chicago, Ottawa & Peoria Railway, Joliet, Ill., is replacing some 60-lb. rails in La Salle and Peru with 100-lb. A. R. A. rails.

Bristol & Plainville Electric Company, Bristol, Conn., expects to replace at once 1 mile of track for new paving. Supplies are all on hand.

United Electric Railways, Providence, R. I., has ordered the necessary material for its track work in connection with the loop plan to be put into effect in the early fall. Deliveries on the orders are expected in about two months.

Los Angeles Railway has applied for franchises to permit construction of track on Vermont, Evergreen, Melrose and Central Avenues, Rampart Boulevard, South Main, West Eighth and West Forty-eighth Streets.

Rochester & Syracuse Railroad will spend $75,000 this year making improvements to the right-of-way, T. C. Cherry, vice-president and general manager, has announced. A large part of the line will be reconstructed with 25,000 new ties and new ballast. The work is already under way near Lyons.

Johnstown, Pa.—A petition to grant the Johnstown Traction Company a franchise to operate cars on Ohio Street, from Moxham, Johnstown, to the borough of Lorain, has been filed with the Johnstown City Council. The petition is signed by residents of Lorain Borough, who want an extension. The franchise is being held for consideration by the Johnstown Council.

Power Houses, Shops and Buildings

Boston Elevated Railway has awarded to Simpson Brothers Corporation the contract for constructing the superstructure of four buildings constituting the first unit of the new shops at Everett, Mass.

Electric Depot Company, Cleveland, is completing a new warehouse which will be the largest building of its kind that the company owns. The freight traffic on the interurban roads surrounding Cleveland has been increasing greatly, particularly on the Northern Ohio line, and this line will be among those served by the warehouse. Its area will be approximately 160 ft. x 44 ft., and it is served by three tracks on one side and a driveway on the other.

Boston, Mass.—Plans for the enlargement of the sheltered area at the Everett terminal of the Boston Elevated Railway were submitted recently to the Public Utilities Commission. The plans call for the relocation of the waiting room in the station so that it will be placed on the easterly side of the terminal, between the outbound surface tracks and Broadway. The relocation will make possible an extension of the sheltered area 75 ft. long and 25 ft. wide. A prepayment entrance, at the corner of Broadway and Bowdoin Street, will also be installed.

Indianapolis & Cincinnati Traction Company, Indianapolis, Ind., in connection with its change over to d.c. operation has placed orders with the Westinghouse Electric & Manufacturing Company for equipment for ten automatic substations. These will consist of five 300 kw. and three 500 kw. full automatic substations, and one 500 kw. semi-automatic substation. The 300 kw. automatics will be installed at Martin on the Cincinnati division and at New Bethel, Fairland, Prescott and Adams on the Shelbyville division. The 500 kw. automatics will be installed at Hoffman, Reedville and Gwynneville on the Cincinnati division. The one semi-automatic station will be located at Rushville, which is the location of the present power plant. Each of the automatic stations will be equipped with one 600 volt d.c. six phase 60 cycle compound wound rotary converter, one three-phase 33,000 volt transformer and automatic switching equipment. There will also be high tension switching equipment for sectionalizing, which will probably be of the out-door type. The tenth automatic equipment will be of 500 kw. capacity for installation on one of the present cars for use as a portable substation.

Trade Notes

General Electric Company will move its Omaha offices from the Electric Building to the City National Bank Building.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., announces that C. H. Long, formerly manager of the contract section of the railway department, has been appointed a section manager of the light traction division of the railway department and is responsible for international negotiations and also for stocks and production schedules of the light traction division. R. W. Soady has been appointed manager of the contract section to succeed Mr. Long.

T. M. Grindley Company is the new name of the organization handling the sale of the products of the Conveyors Corporation of America, Chicago, in the Province of British Columbia. The address of the Grindley Company is 1158 Homer Street, Vancouver. The Grindley Company was the western office of Gormans Limited, Edmonton, and operated under that name up to May 1, but after that date Mr. Grindley took over the business, organized his own company and enlarged his selling staff.

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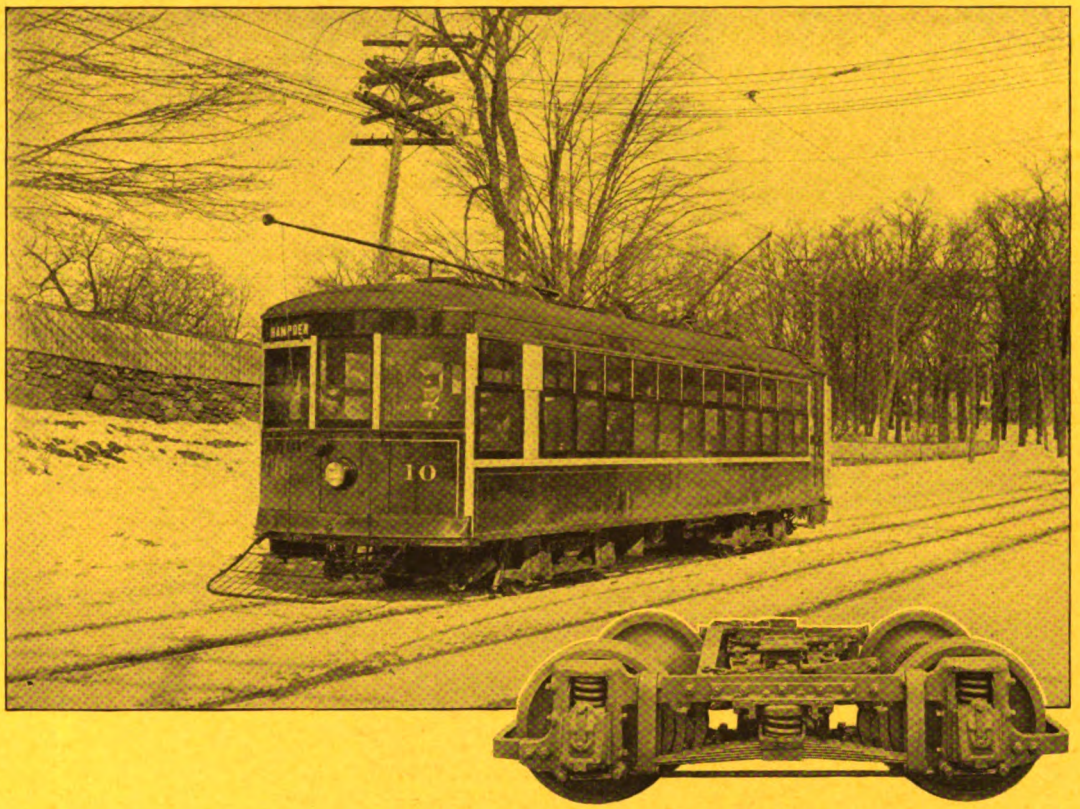

Double-Truck Safety Car

Mounted on Brill Low-Level Trucks No. 77-E

In this double-truck type Safety Car are combined the advantages of light weight and a carrying capacity equal to the requirements of practically any service. It weighs approximately 28,000 lb. complete, and has a seating capacity of 54.

Also, Brill 77-E trucks equipped with 26-in. diameter wheels not only carry the car body very low but operate in a steady and most comfortable manner.

Complete information will be furnished upon request.

THE J. G. BRILL COMPANY
PHILADELPHIA, PA.

AMERICAN CAR CO. ST. LOUIS MO. — G. C. KUHLMAN CAR CO. CLEVELAND OHIO — WASON MANF'G CO. SPRINGFIELD MASS.

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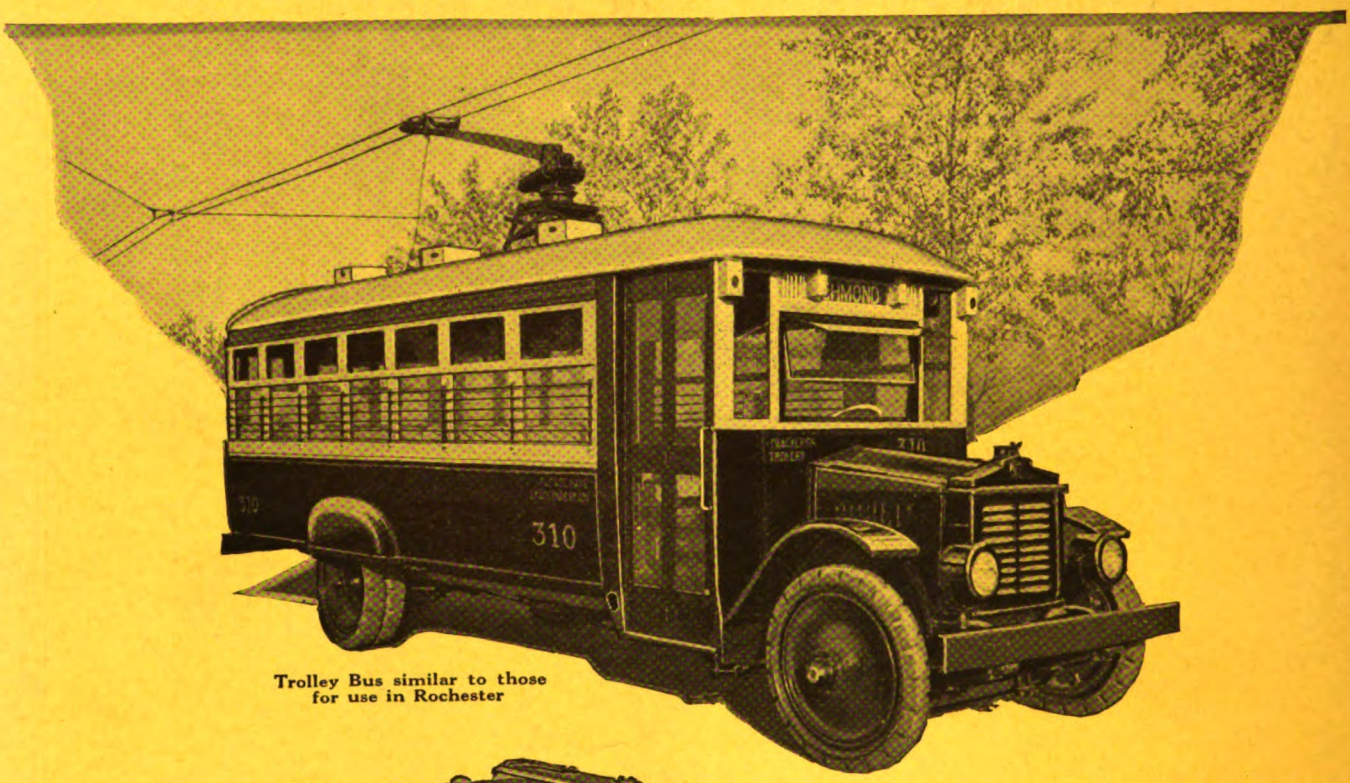
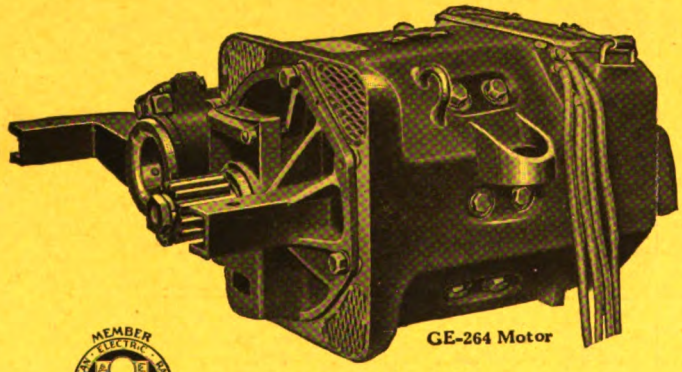
5 Trolley Buses ordered for Rochester



Trolley Bus similar to those for use in Rochester

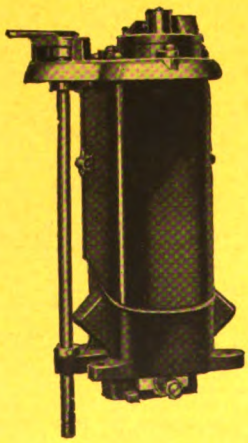


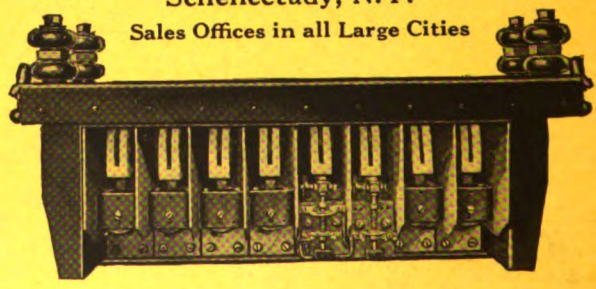
GE-264 Motor

ANOTHER road to supplement its service with trackless trolleys is the New York State Railways, which recently purchased 5 trolley buses for operation in Rochester.

These new buses will be "GE equipped" with motive equipment consisting of the GE-264 light-weight Motor and type "M" foot-operated Control.

General Electric Company
Schenectady, N.Y.
Sales Offices in all Large Cities





Master Controller and Contactor Box (cover removed)

Motive equipment which has proved its suitability for light-weight cars on electric railways all over the country is the logical power for driving the trolley bus. Considering the experience of the General Electric Company in this line, trolley buses "GE equipped" means equipped to give successful service.

GENERAL ELECTRIC

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25-208

McGraw-Hill Company, Inc. June 9, 1923 Twenty Cents Per Copy

ELECTRIC RAILWAY JOURNAL

Correct Lubrication for Turbines

TURBINES are extremely sensitive to incorrect lubrication. Oils that will not separate readily from water or other impurities promote the formation of sludge—the bane of every turbine operator. And, you know, without our reminding you of it, the cost of even temporary shut-downs.

The correct lubrication of turbines has been one of the outstanding successes of the Vacuum Oil Company. Gargoyle D.T.E. Oils are manufactured from the highest grade of crudes and are specially treated to meet the exacting requirements of turbine lubrication. Gargoyle D.T.E. Oils, if properly used, will not form sludge.

Stocks of Gargoyle D.T.E. Oils are carried in all the principal cities of the world.

GARGOYLE

Lubricating Oils

A grade for each type of service

VACUUM OIL COMPANY

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The Virginian Railway

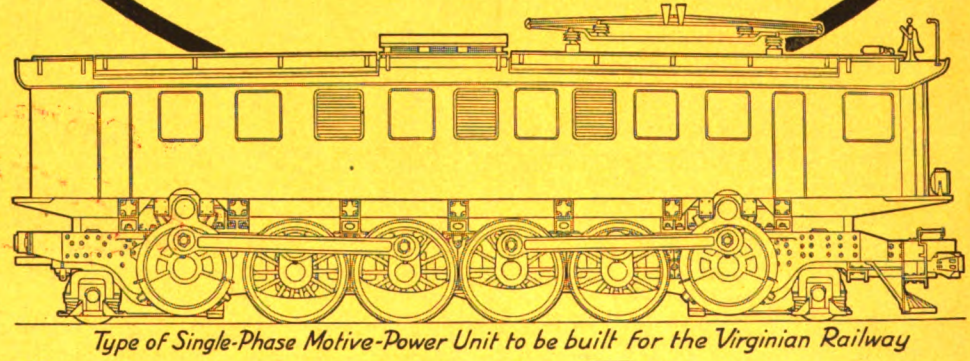
Progress

The Virginian Railway Company, already noted for its progressive tendencies towards the use of the largest cars and locomotives, and the handling of the heaviest possible tonnages, has advanced still further in this direction by the electrification of 213 track miles of its lines with the—

Single-Phase Alternating-Current System

The equipment, which has been ordered in its entirety from the Westinghouse Electric Co., will enable the Virginian Railway to concentrate 20,000 hp. to move their heavy trains up the mountain grades at 14 miles per hour.

Westinghouse Electric & Manufacturing Company
East Pittsburgh, Pa.



Type of Single-Phase Motive-Power Unit to be built for the Virginian Railway

Westinghouse

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New York, Saturday, June 9, 1923

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

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HENRY W. BLAKE and HARRY L. BROWN, *Editors*

Volume 61
Number 23

The Double-Deck Vehicle Has Its Limitations

A COMPARISON of the street space occupied by street cars and buses, as determined for British and American designs, is given in the report of Daniel L. Turner, consulting engineer to the New York Transit Commission, abstracted in this week's issue. Mr. Turner states: "With us, the policy of carrying standing passengers to the limit has resulted in a type of vehicle most extravagant in the use of street space." He argues that it is time to change this policy and compel the production of a type of car that will utilize the roadway space more economically, such as the New York Railways double-deck car.

There is no question that a given area divided between two floors takes less ground space than with a single floor. While space must be reserved for stairways, more usable area can, in general, be obtained by double-decking, so that more seats, or more standing room, or both, can be provided in a double-deck design. Those who are familiar with the New York double-deck car, however, may take issue as to this being a desirable type for general use with frequent stops in congested streets.

The real limitation in two-story designs is in getting people in or out. Considerable difficulty is encountered in nearly all the designs, as only a limited amount of space can be allotted to doors and stairways. There is a limit to what the car patron will stand for in boarding and alighting time—the standing time of the car at stops. Each passenger wants to get off without delay at his stop, and those desiring to get on do not want to wait until the others are off. A more or less definite time per passenger is required, dependent on the design of doors, stairways and steps.

The speed of vehicle movement is limited very distinctly by the time consumed in this way in loading and unloading. Our British cousins, more leisurely in their habits, do not object to the use of a little extra time, while the same thing would bring vociferous protests in this country.

Then, too, it is possible in Great Britain to limit the number of passengers on a vehicle to its seating capacity. By this means there is no crowding about the doors, with the attendant confusion and congestion. Some few American systems have tried the "car full' method, but it never has been popular, and where adopted it has been impossible to prevent passengers from disregarding it almost at will. In the few cases in this country where double-deck buses have been used for so-called de luxe transportation, with the carrying capacity limited strictly to the seats, no difficulty has been encountered.

The passenger capacity figured by Mr. Turner for a double-deck open-top vehicle is based on the seats being available at all times. Experience in this country shows that passengers will not ride on an open upper deck in bad weather, so that as an all-year proposition this figure for seating capacity does not give a fair comparison with inclosed single-deck designs.

Neither the square feet of ground space per seat nor the length occupied in the traffic stream gives a fair comparison of congestion on the street produced by various types of vehicles. With a double-deck design the running time undoubtedly is increased on account of delays due to the time used by passengers climbing the stairs, and by the greater number of persons who must use the limited door space. And the standing of cars tends to increase the traffic congestion.

If the element of time were introduced into Mr. Turner's factor, the comparison would not be so much against the single-deck design in the matter of congestion.

Surface Car Subways Not an Economic Advantage

AN IMPORTANT question of economic feasibility is raised by the discussion in Detroit, Chicago and other cities of building subways for the use of the street cars in the congested business districts. If this is done, it will be for the sake primarily of relieving surface traffic congestion and to speed up service somewhat, and not because it makes a saving in the cost of transportation.

For normal surface roads the investment varies between $2 and $5 for each dollar of annual revenue, while for rapid transit lines it may be as high as $10. A few subway lines show an even higher investment.

With $3.50 invested per dollar of annual gross business and a 7 per cent rate of return, 24½ cents out of each dollar of gross must be paid out for the use of the capital. With $10 invested per dollar of gross and a 5 per cent return—a rate possible only on a pre-war investment or when the enterprise is financed by some governmental agency, at least for the roadway and structures—some 50 cents out of each dollar must go to capital charges.

A rapid transit line should have two advantages over the surface road to make possible the payment of the increased charges, namely, greater density of business and lower costs of operation per passenger hauled. These things, generally speaking, are inseparable. The lower unit costs possible with dense traffic come about through train operation, with few stops and small labor charges.

When a rapid transit structure, whether elevated or subway, is used for the operation of surface cars, especially when the cars are run as single units, it is not possible to crowd enough of them in, or to carry enough passengers in each of them, to keep the cost of operation sufficiently low to allow a fair return on the high investment; for as the density of business goes down the investment per dollar of business goes up. In prac-

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tice, even with economies of all sorts, it has not been found possible to lower the operating ratio, including taxes, under present conditions to much less than 75 per cent for normal surface lines and 50 per cent for rapid transit lines, and this is with a fare generally higher than the traditional nickel of pre-war days. Thus each class of road is just about able to earn the permitted rate of return on its investment.

If surface cars are put into a subway and operated in the usual manner, the high operating ratio remains, as there are few economies that can be realized by virtue of this kind of operation. The result is that to operating costs of some 75 cents per dollar of gross business must be added a return on capital of nearly 50 cents. No means has yet been found to pay $1.25 out of receipts of $1, at least for any length of time. Mayor Hylan has essayed to do it, but the car rider does not realize—or care—that the taxpayer is contributing about 1 cent for each nickel paid the railway as carfare, in order to carry the interest charges on the subways.

Special conditions may arise where it is considered desirable for the good of the community to take surface cars off the streets. This was pointed out in this column last week. But it should also be remembered that it is an expensive proposition, since the diversion of the surface cars from the thoroughfares for short distances does not enable them to earn any more. True, they can get through the congested district with greater ease, and so reduce operating costs slightly, but this is perhaps offset by a loss in revenue due to the less advantageous location for short-haul riders. Passengers of this class cannot be induced to go out of their way, to or from a station, even for a few hundred feet, and the necessity to climb stairs acts as a deterrent to riding when the walking is good.

In Boston, which was referred to in last week's editorial, the street cars were taken off the surface and put in expensive subways. This was a main contributing cause leading to the increase of the fare from 5 cents to 10 cents, as it was shown in 1917 that the cost of hauling a surface car passenger was less than 5 cents, of a rapid transit passenger was 7½ cents and of a passenger on a subway-surface car 8⅓ cents. It does not follow that the same ratio will hold in the other cities contemplating subways, but there will be an increase in the cost of handling passengers. That it must be borne by some one is evident and those who urge surface car subways should realize that the railway company cannot be expected to carry the burden without some special concession in the way of increased revenue or reduced expenses.

Safety on Walkway Surfaces Is a Big Problem

THE formulation of a safety code for walkway surfaces, mentioned elsewhere in this issue, is a subject in which electric railways should have a keen interest. Great effort has been made to reduce the huge sums paid in accident claims, but the serious nature of the slipping hazard has often been overlooked. A slight danger to thousands of people is worse than a far greater danger to only one or two people. Statistics show that there is no other single hazard so serious as that of falls, and that most falls are caused by slipping. Falls are not confined to industry. On the contrary, the hazard to the general public is even more serious. In New York City, for example, it is exceeded only by that attributable to automobiles.

On an electric railway property there are many chances for people to fall. Platforms, stairs, ramps, car steps, door sills, and car floors may be safe or hazardous, depending on whether or not anti-slipping precautions have been carefully taken. It is not enough to slap down any so-called "safe walkway surface" and let it go at that. An improper stair tread, for example, may be more hazardous than no tread at all. The plan now under way to establish a national code of specifications for safe walkway surfaces, therefore, should be a big help in determining the sort of protection most suitable in any given situation.

Utility Publicity Prominent in Two Programs This Week

THIS has been a notable week for utility publicity, which at last is becoming recognized as one of the most important phases of the business of public service corporations. It is hard to realize that a few years ago some street railway managers looked upon the advertising of their facilities and even of their methods and policies as unnecessary. "What have we to advertise?" they would say. "People will have to ride on our cars whether we advertise or not, and advertising is a waste of money in these circumstances." This week the Associated Public Utilities Advertising Association held a two-day session at Atlantic City, as part of the convention of the Associated Advertising Clubs of the World, and a considerable portion of the meeting of the National Electric Light Association this week was set aside to the subject of public relations.

Undoubtedly the extension of state public utility information bureaus has had a great deal to do with the better understanding now had by utility companies of the need and proper method of public utility publicity. The first of these bureaus was started only about four years ago, but they have effectively taught the lesson that the utilities have a responsibility in the matter of publicity which they should not shirk. The burden falls on them because there is no one else sufficiently interested to do it. Some of this work can most economically be carried on through a state organization in which all of the utilities have a share, and much duplication of work which would otherwise occur is avoided, and some part can be done by the national association.

Of course the scope of a proper policy of publicity is much broader than the activities usually associated with the work of the information bureaus or that expressed by the word "advertising," unless the latter term is understood in its most comprehensive sense. Thus, the committees reporting at the first public relations session of the N. E. L. A. included those on co-operation with educational institutions, employee relations with the public, information bureau organizations, manufacturers' advertising, public speaking, relations with financial institutions and women's public information. Still, the testimony at both conventions clearly brought out the fact that any successful publicity policy must include considerable direct advertising as one of the most effective means of carrying the desired message to the public, and that this advertising should be continuous, not used only when some crisis arises in the company's affairs. In this connection it is interesting to note that W. C. Strandborg of the Portland Railway, Light & Power Company and president of the Public Utilities Advertising Association has estimated that on a minimum basis of 2 per cent of their annual gross business the four major utilities, electric railways, gas companies, light and power companies and telephone companies, should be spending about $60,000,000 a year for advertising instead of $7,500,000 as at present.

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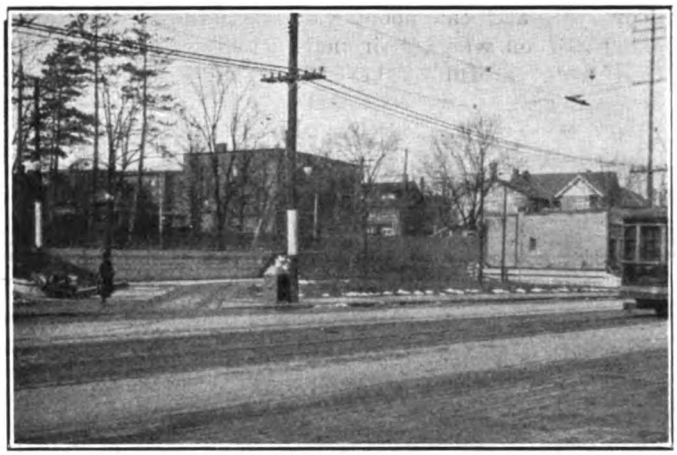

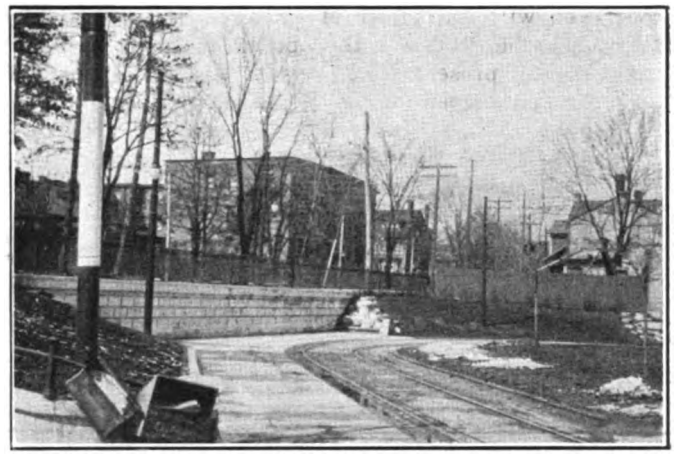

Turnback Loop Recently Installed on Purchased Property, Yonge Street Line. The Right-Hand View Shows in Greater Detail the Loading Platform on the Loop

Speeding Up Traffic in Toronto

By Judicious Spacing of Stops, the Schedule Speed Has Been Increased 4.5 per Cent in Normal Service and 10.3 per Cent in Rush-Hour Service—Other Traffic Studies Made

THE Toronto Transportation Commission has an official known as engineer of traffic study, one of whose principal duties is to study the possible needs of changes in routing because of changes in passenger movement. This official, N. D. Wilson, has a force of six men constantly in the field making periodical audits of traffic, besides an office force working up the results obtained by these checkers. His department is entirely distinct from the traffic department, whose traffic checking as a basis for car service consists largely in tabulating the loads at the peak-load points, which are mainly downtown.

The checkers of the traffic engineer, on the other hand, work mostly outside the downtown area, to determine how service might be improved and car-mileage saved by changes in routing or by turnbacks. The department also has to do with stop locations and probable extensions, and other questions arising from the street plan, or from the lack of grade separation, etc. Among its records it maintains up to date a spot population map of the city and suburbs, as well as monthly traffic charts of each line showing the growth of each relative to the growth of traffic on the whole system. Investigations as to the merits of complaints regarding the inadequacy of service from individuals or districts is handled by the traffic study department. It also advises in regard to special trackwork to be installed, in so far as the design would be affected by rerouting.

The street system of Toronto is rectangular and almost all of the streets are 66 ft. wide. This feature has at least the merit that special trackwork is standardized to an unusual degree. One great difficulty is that the cross streets do not directly cross the main thoroughfare but frequently jog 30 to 100 ft. or more, so that the cross-street traffic has to travel that distance on the main thoroughfare. It is partly for this reason that as traffic, both vehicular and street railway, has increased, endeavor has been made to develop U-shaped routes for the districts in the northeast and northwest parts of the city rather than routes which would send the passengers over the two principal north and south lines, which are overtaxed now. In this rerouting also the management has made an effort to develop certain main routes where two-car trains could be operated for most of the day.

COMPARATIVE STATEMENT OF ROUTE LENGTHS, STOPS PER MILE, AND SCHEDULE SPEEDS, TORONTO

Route	Length in Miles		Stops per Mile		Schedule Miles per Hour Normal Hours		Speeds, Hour Rush Hours	
	Sept. 1, 1921	Jan. 11, 1923	Sept. 1, 1921	Jan. 11, 1923	Sept. 1, 1921	Jan. 11, 1923	Sept. 1, 1921	Jan. 11, 1923
Ashbridges	2.36	2.36	5.10	5.10	9.44	9.44	9.44	9.44
Avenue Road	6.90	12.41	10.30	7.90	8.62	9.80	7.96	9.08
Bathurst	8.84	9.64N		8.00N				
		12.36R	8.80	7.30R	9.46	9.98	8.84	9.76
Bloor	8.98	9.03N		6.21N				
		12.75R	8.13	6.12R	9.98	10.05	8.70	9.57
Bloor West	2.46	3.30	8.13	7.87	9.24	9.00	9.24	8.25
Broadview	5.72	12.45	9.10	6.41	9.02	10.37	8.16	9.57
Carlton	11.77	10.82	9.25	7.12	9.82	9.57	9.28	9.57
Church	6.15	6.15	9.75	8.95	8.38	8.80	8.03	8.03
Church Tripper		13.10		6.80				9.83
College	10.45	10.42	9.17	7.30	9.50	9.20	8.96	8.94
Coxwell		2.40		5.82		8.00		8.00
Danforth	6.80	See Broad.	7.50	See Broad.	9.72	See Broad.	9.72	See Broad.
Dovercourt	4.97	4.97	7.25	6.45	9.32	9.95	9.04	9.32
Dundas	10.62	10.01	8.85	7.26	9.38	10.36	8.85	9.70
Dupont	7.32	6.79	10.22	7.80	8.78	9.70	8.13	8.86
Gerrard	3.64	5.13	8.52	6.63	9.93	10.26	9.93	9.63
Harbord	10.39	10.54	7.80	7.20	10.05	10.54	9.45	9.90
Humberside (double-deck gas bus)		3.68		7.06		9.20		8.50
King	17.83	20.21	8.03	6.85	10.70	10.75	9.75	10.20
Kingston Road		3.86		6.74		9.65		8.92
Lansdowne	1.17	1.17	8.55	8.55	5.85	5.85	5.85	5.85
Mount Pleasant (trolley bus)		2.45		7.35		9.20		9.20
Pape		1.71		8.20		8.55		8.55
Queen	15.80	16.73N		7.45N				
		20.90R	8.87	7.28R	9.30	10.45	8.47	9.95
Queen Tripper		11.65		7.38				9.70
Rosedale (single-deck gas bus)		1.90		6.40		8.03		8.03
St. Clair	6.36	0.71	8.50	8.60	10.60	5.33	10.60	5.33
Sherbourne	5.88	5.88	8.68	7.65	8.83	9.05	8.61	9.05
Spadina	5.88	5.88	8.68	7.65	8.83	9.05	8.61	9.05
Winchester	3.96	3.60	9.85	7.50	8.50	9.00	7.92	8.30
Yonge	6.36		10.70		8.68		7.35	
Yonge-Scott Deloraine		12.60		7.15		10.21		8.80
Yonge-Station-Lawton		7.40		8.38		8.23		7.93
Average of all lines			8.70	7.25	9.38	9.81	8.81	9.72
				—16.7%		+4.5%		+10.3%

Note:—The average for all lines was secured by weighting the various items according to the length of route provided in normal hours, except in the case of rush hour schedule speeds, when the rush hour mileage was used.
N—stands for normal; R—for rush.

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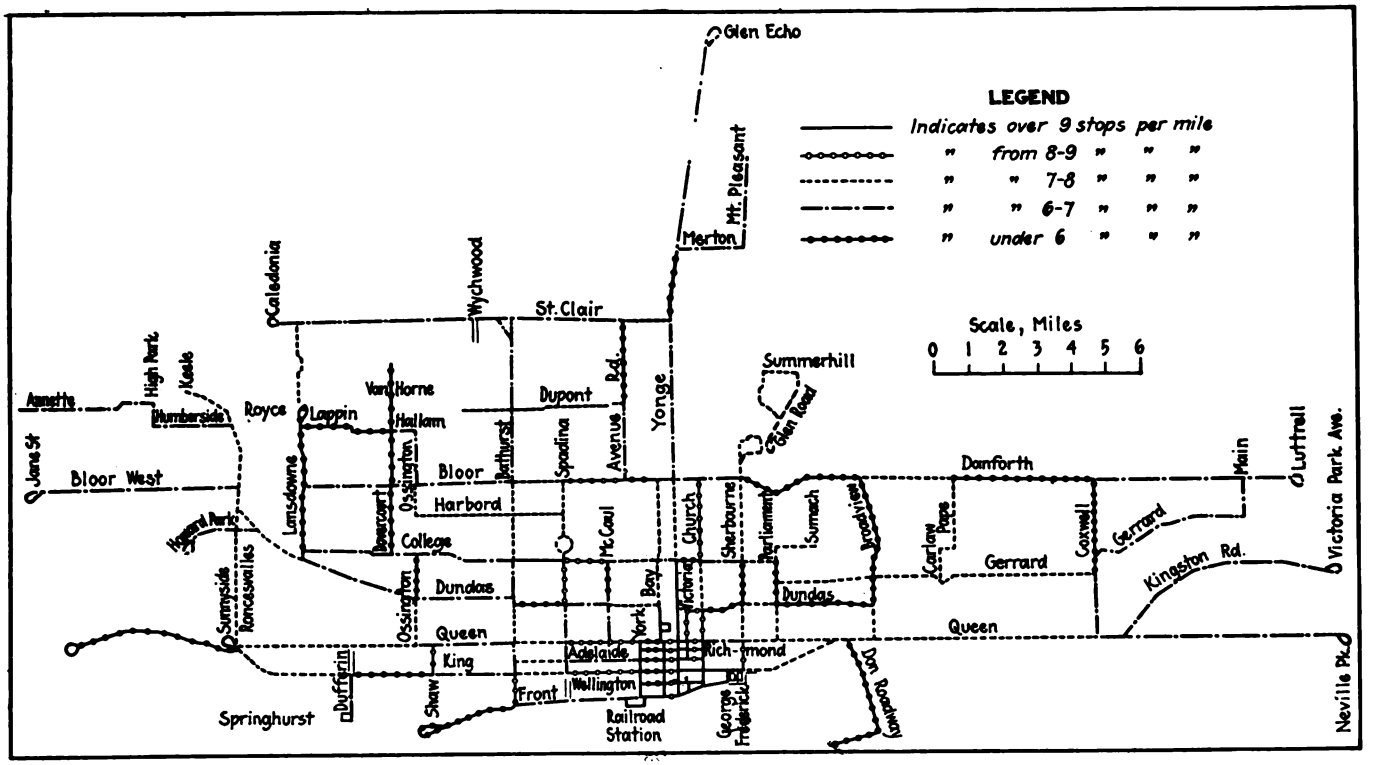
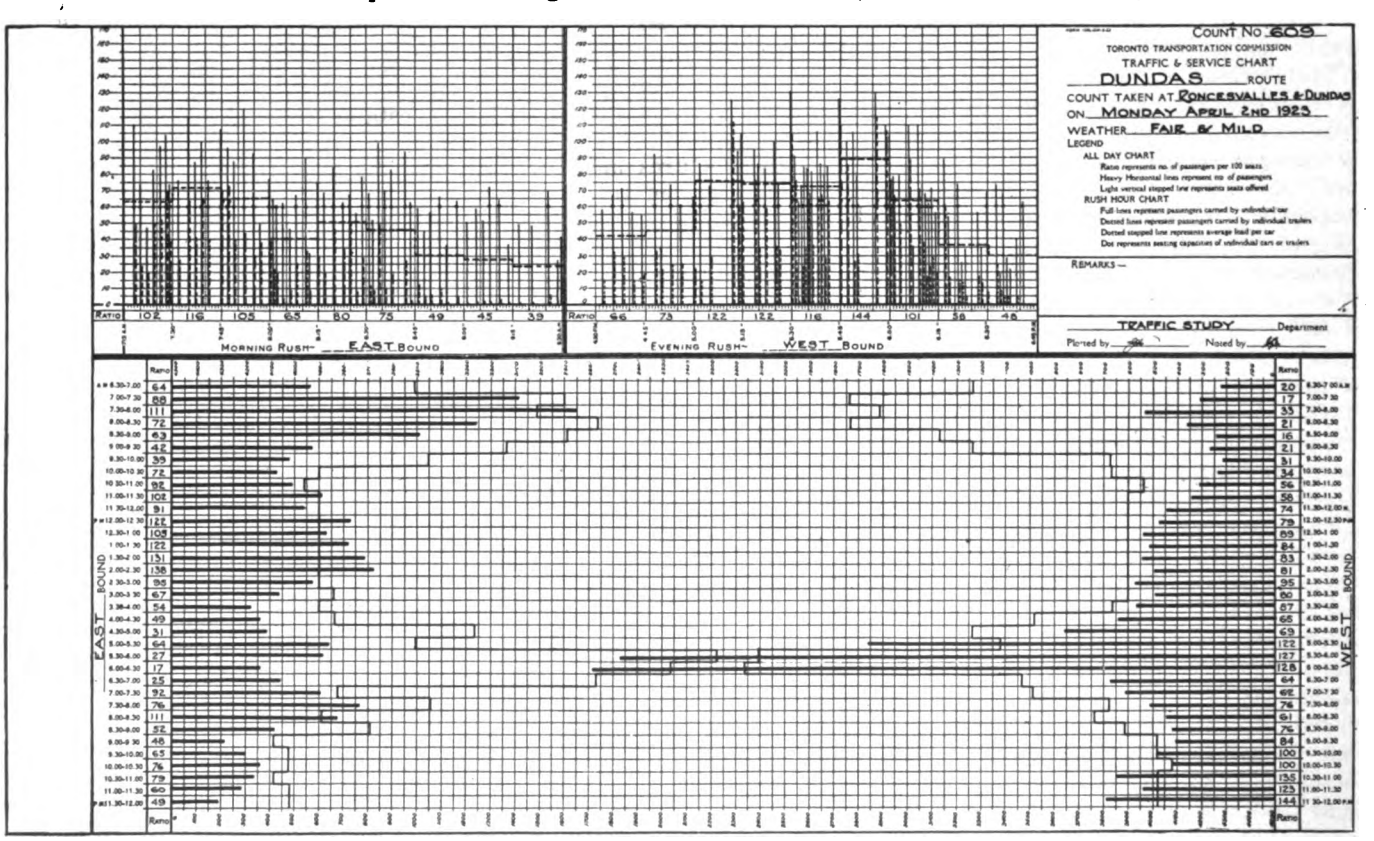


Map Showing the Layout of the Toronto Street Railway System, as of Jan. 1, 1923, with Number of Stops per Mile on Each Section

The comparative statement of route-lengths, stops per mile, etc., accompanying this article shows that the management has been quite successful in increasing schedule speed without increasing maximum speed. The chart shows the number of stops per mile in different parts of the city. In general, the aim has been to place stops in the outskirts not more than 1,000 ft. or less than 600 ft. apart, making an average of about seven to the mile. Downtown the stops are closer together.

For the system as a whole, between Sept. 1, 1921, and Jan. 11, 1923, the designated stops per mile have been decreased 16.7 per cent, while the schedule speed has so far been increased 4.5 per cent in normal hours and 10.3 per cent in rush hours.

In this same connection, since the lines of the Toronto Railway were taken over on Sept. 1, 1921, ten additional terminal and turnback loops have been installed, making twelve all told, and several more are projected.



Form Used by Traffic Study Department for Charting Traffic Service Data

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The form on which the records of individual lines made by the inspectors are kept by the traffic study department is shown in the large chart on page 952. In the all-day chart, which is the lower record, "Ratio" represents the number of passengers per 100 seats, the heavy horizontal lines represent the number of passengers and the light stepped lines represent the number of seats offered.

The two upper charts show conditions in the rush hours. Here the full lines represent the passengers carried by individual cars, the dotted lines represent the passengers carried by individual trailers, the dotted stepped line represents the average load for the fifteen-minute period per motor car, and the circles represent the seating capacity of individual motor cars or trailers.

In the course of its rehabilitation of the property the commission has installed three bus routes, as shown on the map and also in the table. The bus equipment altogether consists of eight double-deck gas buses, three single-deck gas buses and four trolley buses. These buses have not yet been in operation long enough or under such conditions as to give definite figures of cost of operation, but some conclusions can be drawn. One of these is that the trolley bus shows slightly less operating cost than the one-man single-deck gas bus, and this difference, in the opinion of the management, will grow greater, as the maintenance cost of the gas bus will increase at a greater ratio than that of the trolley bus. Another conclusion drawn from the results of operation is that the two-man double-deck bus costs more to operate than a two-man trolley car.

Denver Tramway Valued at $31,330,568

Going Concern Value, Included at $4,000,000, Analyzed to Cover the Historical Development Costs, Which Have Many Phases in Denver

AFTER over two years in the hands of a receiver, during which time the Denver Tramway Company and the city of Denver have been unable to agree on a proper permanent fare, the matter is now coming up for settlement in the Federal Court.

The city of Denver is seeking to re-establish a 6-cent fare, and the company, through E. Stenger, receiver, is seeking a permanent injunction to restrain the city from enforcing its 6-cent fare ordinance of 1919, which he claims would be confiscatory. The company has operated under an 8-cent fare with 7½-cent ticket fare since March, 1921, under order of the Federal Court.

At the hearing before Special Master Henry A. Dubbs, appointed by the United States Court, A. L. Drum, consulting engineer, Chicago, submitted valuations of the property prepared on the following bases:

Present-Day Cost: Minimum amount of capital required actually to reproduce the physical property existing as of Dec. 31, 1922, derived by applying to the Dec. 31, 1922, inventory units, the prices of labor, material, apparatus and equipment which prevailed as of Dec. 31, 1922.

Three-Year Average Cost: Minimum amount of capital required actually to reproduce the physical property existing as of Dec. 31, 1922, derived by applying to the Dec. 31, 1922, inventory units, the average prices of labor, material, apparatus and equipment which prevailed during the three-year period, 1920 to 1922, inclusive.

The valuations submitted by Mr. Drum on these bases summarize as follows:

SUMMARY OF COST OF REPRODUCING AND DEVELOPING THE PROPERTY AS OF DEC. 31, 1922

Item	Present-Day Cost, Prices Current Dec. 31, 1922	Three-Year Average Cost, Average Prices 1920-1922
Total physical property	$27,330,568	$29,071,181
Going concern value	4,000,000	4,000,000
Total	$31,330,568	$33,071,181

The property covered by the valuation comprises the entire street railway system located within the corporate limits of Denver, with lines to Englewood, Aurora and Fairmount Cemetery, outside of the city limits but within the one-fare zone; and three rotary-converter substations with high-tension transmission lines leading to them located outside the city limits, from which direct-current power is sold to the interurban lines. The system consists principally of 201.7 miles of single track; lands; power distribution system, consisting of overhead trolley and feeder lines; high-tension transmission lines; cars and equipment; carhouses, general office building, shops and miscellaneous buildings; nine rotary-converter substations having an aggregate capacity of 7,000 kw., including the three substations outside the city limits; one power station with equipment having a generating capacity of 16,200 kw., and one 3,000-kw. rotary converter unit; shop equipment; tools; furniture; etc.

The presentation of the claim for "going concern value" was made by Mr. Drum generally on the basis that the Denver Tramway Company has passed through the following stages of development: (1) Construction period; (2) developmental period of construction; (3) period of unifying and creating the existing system; (4) the period of development into a successful going concern.

Mr. Drum testified that in reaching the figure of $4,000,000 for going value he had investigated the financial history of the company and ascertained the developmental cost of establishing the system as an efficient operating going concern, including the expenditures made for developmental equipment and construction, the cost of unifying the system, etc.

The report states that the developmental costs represent capital ascertained to have been prudently invested in the business, and necessarily expended in the early developmental and experimental years in overcoming initial difficulties incident to creating and developing the property of the company to its present state of efficiency. These capital expenditures were made for property during the several periods of evolution of the physical means of transportation, which property has since been superseded or abandoned, due to the development in the art of transportation. They represent capital invested in the property which has not been returned to the investor from earnings and therefore continues to be an inherent and proper part of the value of property now existing as a going concern.

Historical Development of the Tramway

The horse-car period in Denver began in 1871-1872 and continued until 1889, when all horse car lines and equipment were replaced by cable lines, with the exception of the Argo line, which was replaced by an electric line in 1900. The horse car system consisted of about 21 miles of narrow-gage track, three buildings and 110 horse cars.

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CLASSIFIED SUMMARY OF THE COST TO REPRODUCE NEW THE PHYSICAL PROPERTY OF THE DENVER TRAMWAY COMPANY, AS OF DEC. 31, 1922

Division	Present-Day Cost, Prices Current Dec. 31, 1922	Three-Year Average Cost, Average Prices 1920-1922
Land and right-of-way	$1,333,456	$1,333,456
Track	5,347,255	5,745,873
Bridges, viaducts, trestles and culverts	856,231	856,662
Paving	1,412,005	1,438,403
Electrical distribution system	1,109,285	1,177,598
Rolling stock	4,445,233	4,873,867
Power station equipment	1,598,098	1,767,777
Substation equipment	303,156	342,026
Shop and miscellaneous equipment, tools, and supplies	391,514	453,373
Buildings	2,950,023	3,135,419
Furniture and fixtures	174,716	213,572
General stores	507,599	507,599
Cost of franchises	284,100	284,100
Engineering and superintendence	1,035,634	1,106,486
Administration, organization and legal expense	953,010	953,010
Taxes during construction	325,220	317,425
Interest during construction	2,763,184	2,940,799
Working capital	239,394	239,394
Cost of financing	1,301,455	1,384,342
Total physical property	$27,330,568	$29,071,181

HISTORICAL DEVELOPMENT COSTS FOR DENVER TRAMWAY COMPANY

Horse car lines	$224,825
Conduit electric lines	185,012
Cable lines	1,861,119
Initial electric development	1,431,546
Track superseded on account civic improvements	1,048,247
Total	$4,750,749
Cost to unify system	174,076
Cost of placing the physical property in successful operation	2,733,057
Total development costs	$7,657,882

Three steam motor lines were operated for a very short period and were electrified about 1890-1891.

A conduit electric system of the Short patent was constructed and operated on Fifteenth Street from Tremont to West Twenty-ninth Avenue from 1885 to 1887, but, on account of the electrical system not having been sufficiently developed at that early date, the operation was found unsatisfactory and it became necessary to abandon the conduit electric system and replace it with a cable system.

The construction of the cable lines, comprising 49.0 miles of cable track, started in 1888, and on account of the development of electric traction, the abandonment of cable lines was necessitated, 1895 to 1900, after but a short period of operation, notwithstanding the fact that over $4,000,000 of capital had been invested in their construction.

The initial development of electric traction commenced in 1890, and the early experimental stages continued until about 1903. During this period the company made five separate electric power station developments, the equipment of which was superseded within twelve years due to the rapid development in the electric art. All of the single-truck electric cars were replaced by modern double-truck cars, and 62.5 miles of track was removed and required replacement before the expiration of its useful life on account of new paving ordered by the city, or on account of the use of heavier and larger cars.

Cost to Unify and Place in Operation

The cost to unify the system, as set forth by the consultant, represents an estimate of the cost incident to creating and consolidating the thirty-one original companies into what now comprises the Denver Tramway Company, city lines only.

In addition to the cost of the component parts of the bare physical property, the cost of placing the physical property in successful operation, that is, the cost of converting the inert railway plant into a successful operating system, is an element of cost in creating a street railway system. In determining the amount of this item of cost, the fact is considered that the Denver Tramway Company is in active and successful operation and has passed through the period between the beginning of operation and the time when the business earns not only operating expenses and taxes, but also a return on the investment.

The business of the company has been built up, the service and equipment have been planned and perfected successfully to serve the business, an experienced and successful operating staff has been organized, trained and perfected in its duties, and extensions have been made into unpopulated territory requiring many years of operation before the increase in population, due to the construction of such extensions, has created traffic sufficient to pay the operating expenses and interest on the capital invested in such extensions.

This cost of placing the physical property in successful operation is estimated to be not less than 10 per cent of the cost of the component parts of the physical property.

Accrued Depreciation

The accrued depreciation of the property claimed by the engineer represents the amount of actual existing physical depreciation due to wear and use, as ascertained and determined by an inspection of the property in the field. The result of the inspection of the property indicates that the present service condition of the property is practically as good as new, and with a few exceptions such as some deferred maintenance on track, the actual existing depreciation as found does not materially affect the service condition of the property. The amount of accrued depreciation was shown as follows:

On basis of present-day cost, prices current as of Dec. 31, 1922, $2,516,563.

On basis of three-year average cost, average prices during the three-year period, 1920-1922, $2,711,533.

Metropolitan Railway Locomotive Reconstruction

Important English Railway Remodels Score of Locomotives to Permit More Efficient Handling of London Suburban Traffic

A LARGE electric locomotive reconstruction job has recently been undertaken for the Metropolitan Railway, England. It comprises the rebuilding of twenty machines, resulting in virtually new equipment.

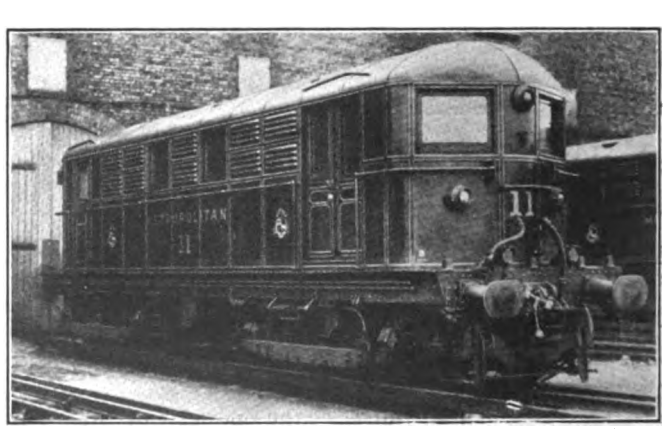

Photo by International News Reel

Remodeled Electric Locomotive for Metropolitan Railway, England
One-hour rating is 1,200 hp. at 600 volts and 30 m.p.h.

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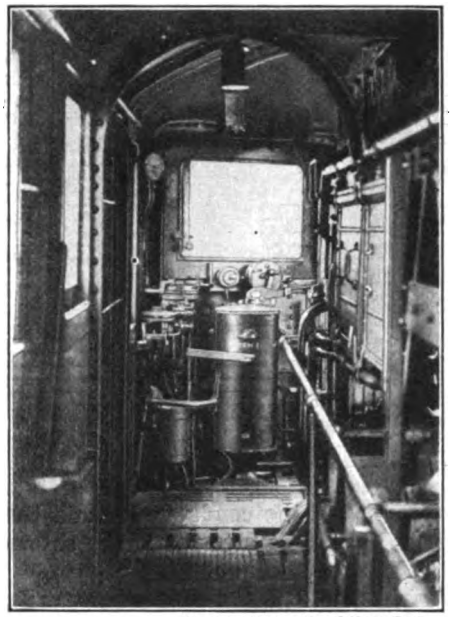

Photo by International News Reel

Engineer's Operating Position in Cab, Showing Also Some of the Control Apparatus in the Center of the Cab

The work is being done by Vickers, Ltd., the electrical apparatus being supplied by the Metropolitan-Vickers Electrical Company, Ltd. The locomotives are of simple construction, consisting of two trucks, carrying a steel cab mounted on a substantial steel underframe. This underframe takes the buffing stresses. The trucks carry each two motors, of 300 hp. capacity at 600 volts and at the one-hour rating. The one-hour rating of the locomotive as a whole is, therefore, 1,200 hp. The locomotive is provided with both vacuum and pressure brakes, the former being used in regular service and the latter for shifting purposes.

The control is of the Metropolitan-Vickers all-electric type, with automatic acceleration. All auxiliary apparatus is mounted in the center of the cab, leaving a passageway all around.

This road uses two contact rails, one for the positive and one for the negative current. The former is at the side of the track, the latter in the center. The locomotive, therefore, had to be supplied with two sets of collecting shoes. One set is connected to a positive busbar in a control cabinet at one end of the locomotive, while the other goes to a negative busbar at the other end of the locomotive.

The control is of the multiple-unit type, so that two or more locomotives can be operated from one master controller. Bus lines are also provided for connection with a power bus on the coaches, some of which are provided with auxiliary collecting shoes to insure continuity of contact with the conducting rails.

Particular interest attaches to the braking system, which is novel compared with American practice. To supply air for the pressure brakes, a compressor with a capacity of 38 cu.ft. displacement per minute, driven by an 8-hp. motor, is provided. For the vacuum brakes there are two exhausters, one to offset the effect of leaks in the vacuum train pipes and the other to provide sufficient capacity for releasing the brakes quickly. The brakes are interlocked with the motor control in such a way that current cannot be supplied to the motors unless the brakes are released. Similarly, the interlocks prevent operation of the motors unless one of the brake systems is ready for use.

The weight of the locomotive in working order is about 63 tons (2,000 lb.); its length over the buffers is 39½ ft., its length over the body is 35 ft., and its width over the body is 8 ft.

The Metropolitan Railway, the operator of these locomotives, is one of the underground railways in London.

Conductors Make Traffic Counts in Milwaukee

The Plan Has Been Found Entirely Practical Where Great Accuracy Is Not Required—Traffic Count Continues for Three Days

AT ONE TIME schedules on many roads were drafted largely by guesswork, and when once established they continued in force for a long time except for the usual seasonal and week-day variations. Now the principle is generally accepted that continuous study and revision of schedules is one of the most important duties of the transportation department, if efficiency and economy of operation are desired. This means that traffic checks frequently must be made on different lines, and the more often they are made, within reasonable limits, the better.

The general practice is to use special men for this

TRAFFIC RECORD

Conductor will look at watch and record ACTUAL TIME of leaving checking point and GREATEST LOAD on car at that point. See below for list of checking points, and seating capacity of cars.

INBOUND means toward center of town on lines running down town; southbound on 27th St. and 35th St.; and eastbound on North Ave. and Center St.

OUTBOUND means away from center of town on lines running down town; northbound on 27th St. and 35th St.; and westbound on North Ave. and Center St.

	CHECK POINT Biddle & Jackson		CHECK POINT 12th & Wells			CHECK POINT 12th & Wells		CHECK POINT Biddle & Jackson	
Car Number	Inbound		Outbound		Car Number	Inbound		Outbound	
	Time	No. of Pass.	Time	No. of Pass.		Time	No. of Pass.	Time	No. of Pass.
550	6 22	70	6 29	20		7 48	75	7 25	15

LINE	CHECKING POINT	LINE	CHECKING POINT
Wells St.	12th and Wells	Howell Ave.	Clinton and Maple
Downer Ave.	Biddle and Jackson	1st Ave.	Reed and Mitchell
12th St.	12th and Cherry	3rd St.	3rd and Sherman
State St.	13th and State	8th Ave.	Greenbush and Greenfield
Clybourn St.	17th and Clybourn	Burnham	Greenbush and Greenfield
Oakland Ave.	Cass and Brady	8th St.	7th and Germania
Delaware Ave.	Kinnickinnic & Maple	Muskego	11th and Weiker
Holton St.	Holton and Harmon	North Ave.	Teutonia and North
Mitchell St.	Reed and Mitchell	Center St.	4th and Center
National	1st and National	35th St.	35th and Cherry
Fond du Lac	13th and Fond du Lac	27th	27th and Prairie
Walnut	13th and Walnut	North via 8th	8th and Garfield
Vliet St.	13th and Vliet	12th Viaduct	16th and Clybourn

SEATING CAPACITY OF CARS

	SINGLE UNITS					TRAINS						
TYPE OF CAR	251 500	501 600	601 660	800 899	900 One Man	8 Truck	200–400		600–200		700–700	
							Motor	Trailer	Motor	Trailer	Motor	Trailer
STOVE IN	42	52	50	51	55	103	44	44	50	49	54	58
STOVE OUT	44	52	52	53	57	107	46	46	52	50	56	60

The Traffic Count Form Is Printed on the Back of the Conductor's Trip Sheet

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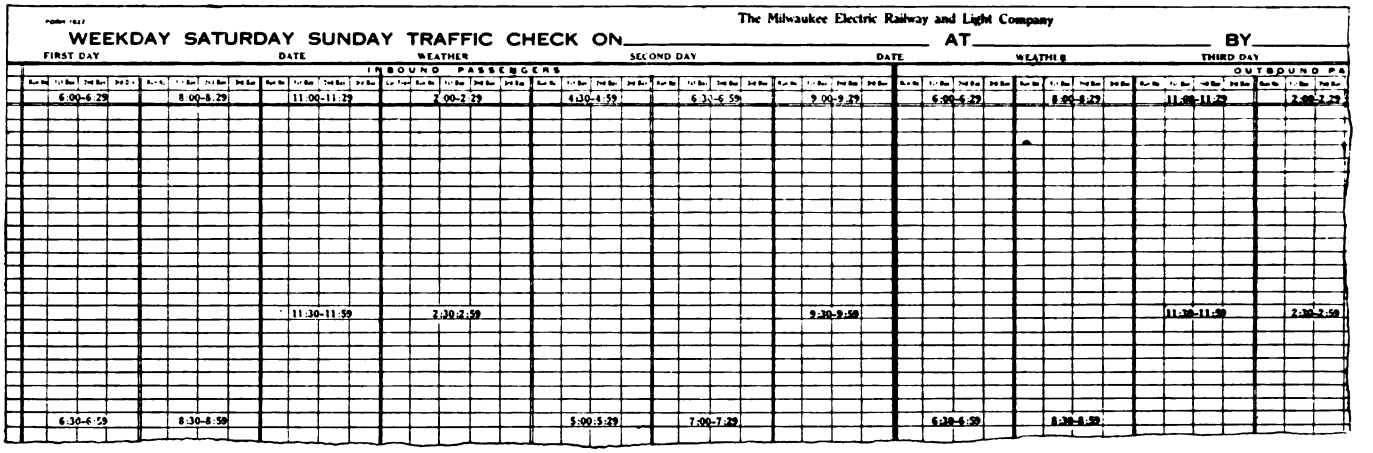
The Milwaukee Electric Railway and Light Company

WEEKDAY SATURDAY SUNDAY TRAFFIC CHECK ON _____ AT _____ BY _____

FIRST DAY DATE WEATHER SECOND DAY DATE WEATHER THIRD DAY

INBOUND PASSENGERS OUTBOUND PA

6:00-6:29 8:00-8:29 11:00-11:29 2:00-2:29 4:30-4:59 6:30-6:59 9:00-9:29 6:00-6:29 8:00-8:29 11:30-11:59 2:00-2:29

11:30-11:59 2:30-2:59 9:30-9:59 11:30-11:59 2:30-2:59

6:30-6:59 8:30-8:59 5:00-5:29 7:00-7:29 6:30-6:59 8:30-8:59

The Figures from the Trip Sheet Are First Transferred to This Blank

purpose and to station them at points of maximum traffic and also at possible turn-back points to read the loadings of the cars. Obviously, unless a large force of men is employed for this purpose, observations of individual lines can be made only rarely. A better plan, in the opinion of the Milwaukee Electric Railway & Light Company, is to have the conductors make these traffic records when a count is desired. Outside checkers are used also to some extent in special cases, but a great deal of information can be obtained by the conductor's count, if the method followed is such that it is convenient for him to make them. Indeed, as he is on the car, he can survey his load and can determine the number of passengers in some respects better than an outside observer.

Back of Trip Sheet Is Used

In Milwaukee all the space and information required for the conductor in making and putting down the figures on traffic are provided on the back of the usual conductor's trip sheet, which, in this case, calls for the number of passengers on the car at the points of checking. The back of one of the Milwaukee trip sheets is reproduced with a few figures for a through line. For example, at Biddle and Jackson, inbound in the morning, the car carries seventy passengers, but going out, at the checking point on the other side of the city, the load is only twenty. In its return trip the car naturally carries a larger number of passengers at Twelfth and Wells than it does at Biddle and Jackson.

To simplify the work of the conductor, a table is printed at the bottom of the card showing the seating capacities of the different types of cars used. If all seats are filled, it is easy for the conductor to add the number of any standing passengers to the figure shown in this table as the seating capacity of his car.

It is the practice in Milwaukee to continue a traffic count of this kind for three days. The record of the three days is then transferred, with the run numbers, to a large sheet, divided into half-hour periods and with space for all of the information contained on the conductor's trip sheet. This sheet (Form 1822) measures 17 in. x 22 in. A part only is reproduced, but it is sufficient to give a general idea of the information which can be placed upon it. From this sheet a summary is made on Form 1813. Further information regarding seats and cars operated and scheduled is added in the office. From this sheet such charts are compiled as may seem desirable, either for the company's own use or the use of the Railroad Commission. As will be seen from the large blank, the record obtained by this method does not consist merely of occasional readings of cars at certain hours, but readings of all cars at two points throughout the entire day. To get this by street checkers would require at least two shifts of four men each for each day on each route observed.

Where great accuracy is required it is possible, of course, to have supervisors ride the cars and check individual runs, and this practice is quite often followed in Milwaukee, as it has been found by experience that conductors' counts of passengers are apt to be a little high, possibly from 8 to 10 per cent in a crowded car. For a great many purposes, however, such additional checking is considered hardly necessary, especially as too high a figure is on the conservative side as regards seating capacity to be furnished.

FORM 1813

The Milwaukee Electric Railway and Light Company

SUMMARY OF TRAFFIC CHECK No. _____

WEEKDAY
SATURDAY
SUNDAY

MAXIMUM LOAD CHECK OF _____ AT _____

FIRST DAY _____ DATE _____ WEATHER _____

SECOND DAY _____ DATE _____ WEATHER _____

THIRD DAY _____ DATE _____ WEATHER _____

PERIOD OF DAY	INBOUND									OUTBOUND								
	TOTAL PASSENGERS				SEATS		CARS			TOTAL PASSENGERS				SEATS		CARS		
	1st DAY	2nd DAY	3rd DAY	AVERAGE	FURNISHED	REQUIRED	OPERATED	SCHEDULED	REQUIRED	1st DAY	2nd DAY	3rd DAY	AVERAGE	FURNISHED	REQUIRED	OPERATED	SCHEDULED	REQUIRED
6:00-6:29																		
6:30-6:59																		
7:00-7:29																		
7:30-7:59																		
8:00-8:29																		
8:30-8:59																		
9:00-9:29																		
9:30-9:59																		

The Data Are Finally Summarized on This Blank

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Street Space Occupied by Cars and Buses*

A Comparison of Various Types of Single-Deck and Double-Deck Street Cars and Buses in New York and Great Britain—On a Seat Basis Double-Deck Designs Show Up Well, but for American Conditions Cars Do Not Compare Unfavorably

By Daniel L. Turner
Consulting Engineer New York Transit Commission

ONE of the most interesting of all the features observed in England and Scotland was that the city transit companies are not as wasteful of roadway space in the public thoroughfares as they are in this country. In Liverpool, Glasgow and Edinburgh, and also in London, the vehicles used for city transportation, both cars and buses, were most economical in their use of roadway space. It is believed that the same conditions obtain practically throughout England and Scotland.

In order to compare the conditions in this city with those in England and Scotland, the general dimensions of about twenty buses and cars used in transporting city traffic have been analyzed. The results of this analysis are shown in the accompanying table.

British and American Street Cars Compared

First let us consider trolley or tramway cars. Eight types of cars are shown in the table. Three of these are Liverpool, Glasgow and London types; the other five are New York city cars. On the average the three British cars occupy 3.35 sq.ft. of roadway space per seated passenger, and in a single traffic stream occupy 0.46 lin.ft. per seated passenger. The New York cars, on the other hand, on the average occupy 6.39 sq.ft. of roadway space and 0.79 ft. in the traffic stream line per seated passenger. In other words, the New York city cars occupy almost twice as much street space as the English and Scotch cars.

But these average conditions do not tell the whole story. The average of the New York cars is brought down very materially by one car, No. 8 in the table. This car utilizes only 4.6 sq.ft. of roadway space and 0.56 lin.ft. per passenger. But of the most economical type in New York from the standpoint of street use there is only a single car.

A comparison of minimum and maximum types is interesting. The double-deck car in use on the London County Council tramway lines, No. 3 in the table, carries seventy-eight seated passengers, and it utilizes only 3.11 sq.ft. of roadway space and only 0.43 lin.ft. of traffic stream-line space per passenger. The New York double-deck car takes up 48 per cent more street space per passenger than the London car does, and 30 per cent more space in the traffic line. The new Brooklyn Peter Witt car, No. 7 in the table, is the most extravagant in street space on a seat basis in New York City, occupying 7.57 sq.ft. of roadway space and 0.94 lin.ft. per seated passenger. In other words, it uses 2.43 times more roadway space and 2.19 times more stream-line space per seated passenger than the most efficient London car.

A vehicle which would require no more street space per passenger than a pedestrian might be considered nearly ideal in design. A walking person requires 1.96, or say 2 sq.ft. of space. With this amount of space per individual, the crowding would be no greater than on the sidewalk of a very busy street.

Street Space Used by Buses

Now consider the question of buses. Eight buses are given in the table, two of which are used in London and the others in New York City. The most modern type of bus on the London General Omnibus Company's lines seats fifty-four passengers and occupies 3.24 sq.ft. of roadway space and 0.46 lin.ft. of stream-line space per seated passenger, comparing very favorably with the London County Council seventy-eight-seat tramway car. The single-deck London bus, No. 10, developed for street service, but not yet in general use, seats sixty passengers and occupies 3.91 sq.ft. of roadway space and 0.56 ft. of linear space per seated passenger.

The best types of buses in use in New York City do not compare unfavorably with the English buses. The most efficient utilizer of street space among the buses is the Leindorf bus, No. 16 in the table, which occupies 3.28 sq.ft. of roadway space and 0.41 lin.ft. of traffic stream-line space per seated passenger. The same corporation, I understand, is developing a seventy-seat bus, but its dimensions are not now available. The fifty-one-seat bus of the Fifth Avenue Coach Company also compares favorably with the English types. It occupies only 3.5 sq.ft. of roadway space and 0.48 ft. of linear space per seated passenger. The extravagant users of street space among the buses are the miscellaneous buses used on the city's bus lines, taking as high as 7.4 ft. of road space and 0.99 lin.ft. per seated passenger (see Mack bus, No. 13 in the table). Such a bus uses 2.38 times as much stream-line space as the London seventy-eight-seat car. Comparing it with the best bus type the corresponding figures are 2.28 and 2.15 times greater respectively.

The above comparisons are all on a seat basis, for the reason that abroad a relatively small number of passengers are permitted to stand, even during the rush hours, whereas with us the cars are designed to carry the maximum number of standing passengers during the rush hours. If 100 per cent overloads are considered as a maximum on the cars, and 50 per cent overloads as a maximum on the buses, the comparable figures would be somewhat different. Comparing the London County Council car with the new Peter Witt car for Brooklyn, and assuming 100 per cent overloads on the Peter Witt car, the figures would become for the London car 3.11 sq.ft. occupied per seated passenger as

*Abstracted from a report on European conditions presented to the Transit Commission May 9. The report also compared transit conditions in Liverpool, Glasgow, and Edinburgh, and an abstract of this portion of the report will appear in an early issue of this paper. For earlier reports on European conditions by Mr. Turner see issues of this paper for Jan. 13 and Jan. 27, 1923.

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COMPARATIVE USE OF STREET SPACE BY VARIOUS TYPES OF BUSES AND SURFACE CARS

No.	Type	Length Ft.	Length In.	Width Ft.	Width In.	Height Above Top of Rail Ft.	Height Above Top of Rail In.	Seats*	Area Sq.Ft.	Sq.Ft. per Seat	Sq.Ft. per Pass. 100 Per Cent Overload	Lin.Ft. per Seat	Lin.Ft. per Pass. 100 Per Cent Overload
	SURFACE CARS												
1	Liverpool double-deck	30	2	7	4	..	...	64 { 42 up C 22 low L	221.18	3.46	....	0.47	....
2	Glasgow double-deck	30	0	7	2	16	1	62 { 38 up C 24 low L	215.10	3.47	....	0.48	....
3	London County Council double-deck	33	10	7	2	16	0	78 { 44 up C 34 low L	242.50	3.11	....	0.43	....
4	Third Ave. cross-seat	43	0	8	3½	..	...	48	356.47	7.43	3.72	0.90	0.45
5	One-man	22	4	7	8	..	...	30	171.27	5.71	2.86	0.74	0.37
6	Brooklyn center-entrance	45	8	8	5½	11	0½	59	384.48	6.63	3.32	0.79	0.39
7	Brooklyn new Peter Witt	44	6	8	0	10	6	47	356.00	7.57	3.79	0.94	0.47
8	New York Rys. double-deck	44	0	8	3	12	11½	79 { 38 up L 41 low C	363.00	4.60	2.30	0.56	0.28
	BUSES												
											Sq.Ft. per Pass. 50 Per Cent Overload		Lin.Ft. per Pass. 50 Per Cent Overload
9	London General Omnibus Co. double-deck bus	24	8½	7	1	12	3½	54 { 28 up C 26 low C	174.95	3.24	....	0.46	....
10	London Special single-deck bus (Hickman Body Co.)	33	6	7	0	..	...	60	234.50	3.91	....	0.56	....
11	Municipal (N. Y. C.)	26	0	7	4	..	...	30	190.58	6.35	4.14	0.87	0.44
12	White bus	23	4	7	3	..	...	30	169.10	5.70	3.80	0.78	0.52
13	Mack bus	19	10	7	5	..	...	20	147.10	7.40	5.00	0.99	0.66
14	Stewart bus	15	4	6	7	..	...	17	101.00	6.00	4.00	0.90	0.60
15	Fifth Avenue double-deck bus	24	4½	7	4	13	6	51	178.78	3.50	....	0.48	....
16	Leindorf double-deck bus	25	0	8	0	..	...	61	200.00	3.28	2.19	0.41	0.27
	MISCELLANEOUS												
No.	Type	Length		Width		Height		Seats	Area Sq. Ft.	Sq. Ft. per Seat	Sq. Ft. per Pass. with Two Pass.	Lin. Ft. per Seat	Lin. Ft. per Pass. with Two Pass.
17	Packard touring	16	8	5	6	..	...	7	90.3	12.9	45.1	2.38	8.33
18	Cadillac touring	16	0	5	7	..	...	7	89.3	12.8	44.7	2.27	8.00
19	Ford touring	11	8	5	8	..	...	5	66.1	13.2	33.0	2.33	5.83
									Averages	12.97	40.9	2.49	7.36
20	Yellow taxi	14	6	5	6	..	...	5	79.8	15.9	39.9	2.90	7.25

Note 1.58 sq.ft. per standing person—crowded, but one can move through crowd.
1.96 sq.ft. per standing person—crowding no greater than on a sidewalk of a busy street.

*C, cross seats; L, longitudinal seats.

compared with 3.79 sq.ft. for the Peter Witt car, and 0.43 lin.ft. per seated passenger as compared with 0.47 lin.ft. per seated and standing passenger. In the case of the buses the corresponding figures 3.24 and 0.46 of the London General Omnibus type would be comparable with 2.19 and 0.27 respectively for the Leindorf bus. The Fifth Avenue bus figures would remain as 3.50 and 0.48 respectively, because no standing passengers are permitted.

Regulations in Great Britain require the minimum number of standing passengers, even during the rush hours, so the vehicles have been designed to carry the maximum number of seated passengers, which in turn has resulted in a type of vehicle that will utilize the minimum roadway space per passenger. With us, the policy of carrying standing passengers to the limit has resulted in a type of vehicle most extravagant in the use of street space. It seems to me that it is about time to change this policy and compel the production of a type of car that will utilize the roadway space more economically, such as the New York Railways double-deck car. Our best types of double-deck buses should be adhered to and developed for use in congestion, while the single-deck type should not be used under such conditions.

Consider other types of passenger vehicles using the streets, touring cars and taxicabs, for example, No. 17 to No. 20 in the table. On the average the touring cars occupy about 13 sq.ft. of roadway space per seated passenger, if we assume the cars to carry full loads, and approximately 2½ lin.ft. per passenger on the same assumption. But these vehicles are rarely fully loaded, and it is doubtful if their loads would average two passengers, certainly not more than three. On a two-passenger basis such cars would occupy 41 sq.ft. of roadway space per passenger, and on a three-passenger basis 27 sq.ft. per passenger, or these vehicles take up in our congested streets from nine to thirteen times as much roadway space as the most economical street car. It is such extravagant users of our streets that cause our most difficult traffic conditions.

The taxicab is worst of all, occupying approximately 16 sq.ft. of roadway space per passenger, assuming a full load of five passengers, and nearly 3 lin.ft. per passenger. The average load of a taxicab is probably not far from two, on which basis it would occupy about 40 sq.ft. per passenger, or thirteen times as much space as the most economically-designed passenger vehicle would occupy. The answer seems to be that one of the cures for our street traffic ills is to reduce the number of taxicabs and touring cars to a minimum and provide the most economical space-using type of passenger vehicle instead—double-deck cars and buses.

This study means that passengers in a touring car or taxicab are occupying the roadway space that ought to be available for the transportation of twenty-six passengers instead of two. Is there any wonder that our principal streets are congested when there are such a vast number of these two-passenger vehicles in use?

It is my judgment that a completely articulated system of uptown and downtown and crosstown 10-cent fare, seat service buses would be welcomed by a large number of people who now use touring cars, taxicabs, trolleys and rapid transit lines from necessity rather than from choice. This would take many of the extravagant space-using vehicles off the streets. In turn, by reducing the interference to surface cars, the latter would be able to provide 5-cent fare service in the interests of the people who desire to use them, or could not afford to use the 10-cent fare service. By these means, with a more extensive luxury bus service and a greatly improved surface car service resulting therefrom, everybody would be happier with their transit facilities.

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New Cars for North Shore Branch Line

Reduced Weight, Low-Floor Height, Inclosed Vestibule Both Front and Rear, Are Features of New Cars for Libertyville Branch

EMBODYING many features characteristic of the latest practices in car design, the new cars recently placed in service on the Libertyville branch of the Chicago, North Shore & Milwaukee Railroad meet satisfactorily the requirements for this class of service.

The new cars are of the standard, double-truck, four-motor, curved side type, manufactured by the Cincinnati Car Company. They have a total weight of 40,000 lb., which compares with 70,000 lb. for the interurban cars replaced on this branch. The interior resembles that of the heavy North Shore cars in the Chicago-Milwaukee service. The car is divided into two sections with a toilet located on one side of the car at the dividing partition. Seats of the reversible cross-seat type, manufactured by Hale & Kilburn, of full spring construction, covered with the conventional North Shore green plush, are used in the main section of the car, while the same type, covered with a high grade of Fabrikoid, are used in the smoking compartment. Electric heating is used with thermostatic control provided by the Railway Utility Company, while Garland ventilators are used in order to insure the proper circulation of air.

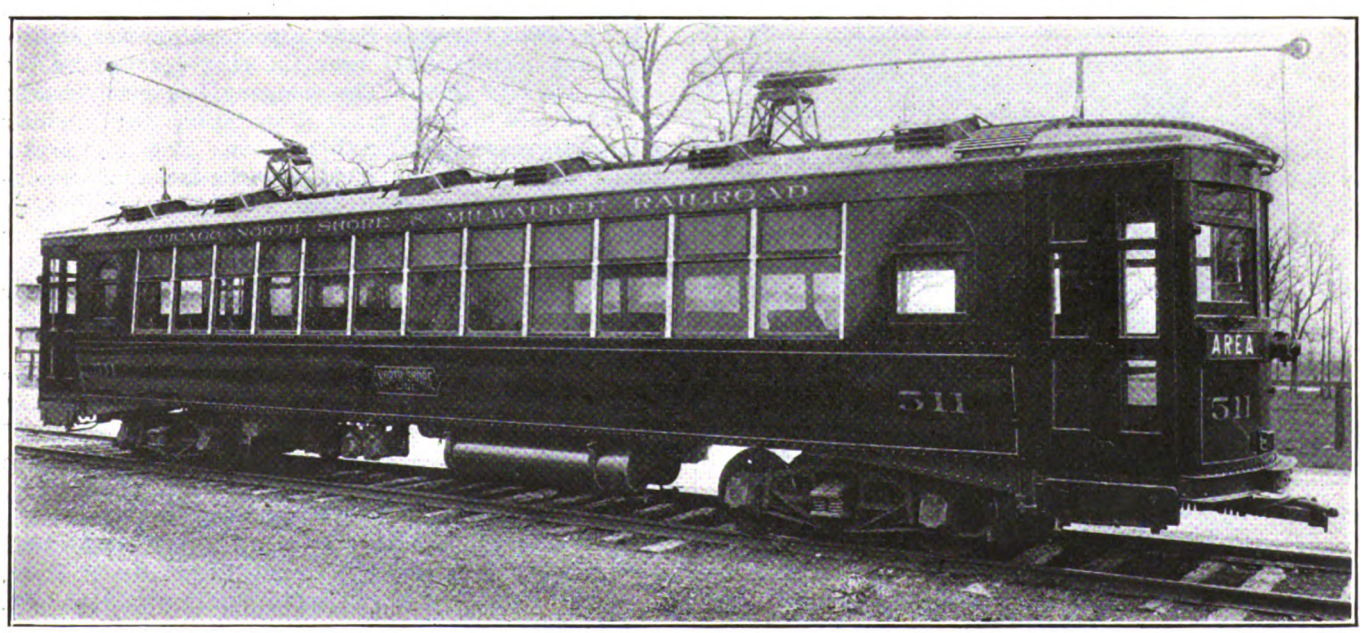
A two-step entrance is made possible by the use of 26-in. wheels and a low clearance truck of the arch bar type with combination elliptic and coil spring construction. The trucks have a wheelbase of 5 ft. 4 in., and are each equipped with two 40-hp. motors and Smith-Ward automatic slack adjusters. The principal dimensions of the North Shore car are as follows:

Over-all length	47 ft. 2 in.
Length of platform	4 ft. 4 in.
Door opening	36 in.
Truck centers	28 ft. 6 in.
Width of aisle	22 in.
Width of seat	37 in.
Rail to first step	16½ in.
First step to platform	14 in.
Seating capacity	52

Two Compartments, Fabrikoid and Green Plush Seats, Center Toilet, No Bulkheads and Platform Floors Flush with Body Floor

From the above it will be noted that the platforms are rather small, but this has been taken care of by the omission of bulkheads, thus making the car interior and platform one continuous compartment. The car has been designed for double-end, two-man operation. It is equipped with VanDorn automatic couplers and HL multiple-unit control for train operation. The car is not intended for one-man operation nor is it equipped with safety appliances.

The Libertyville branch, as it is known, connects the town of Area with the main line of the Chicago, North Shore & Milwaukee Railroad at Lake Bluff, passing through the towns of Libertyville and Roundout en route. Service is maintained on a thirty-minute headway, it requiring twenty minutes to make the run. Co-ordination of the schedules makes it possible to connect with the through trains for Chicago or Milwaukee at Lake Bluff. In this distance of 8.6 miles



40,000-Lb., 47-Ft., Fifty-two-Passenger Car for Branch Line Service

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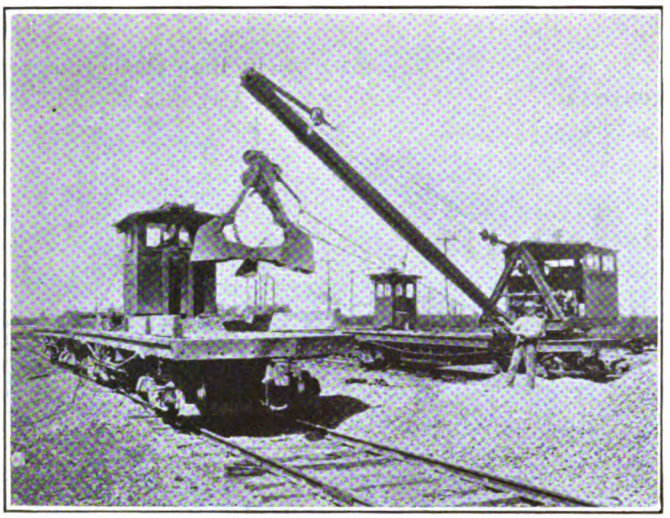
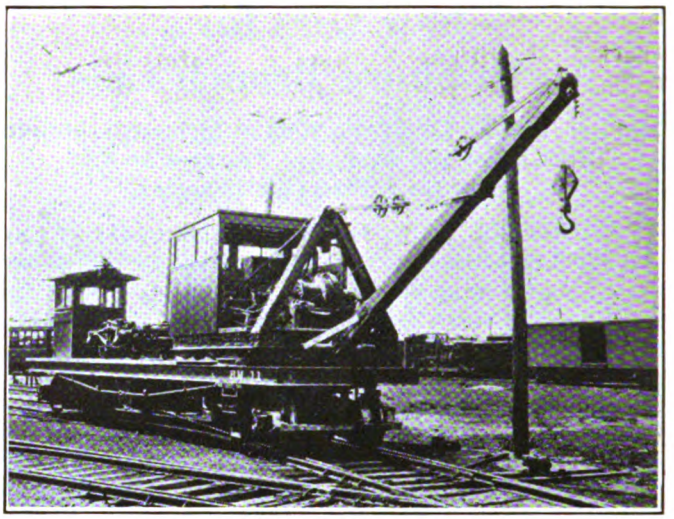


The Clamshell Is Used with the Long Boom



The Short Boom Has a 10-Ton Lifting Capacity

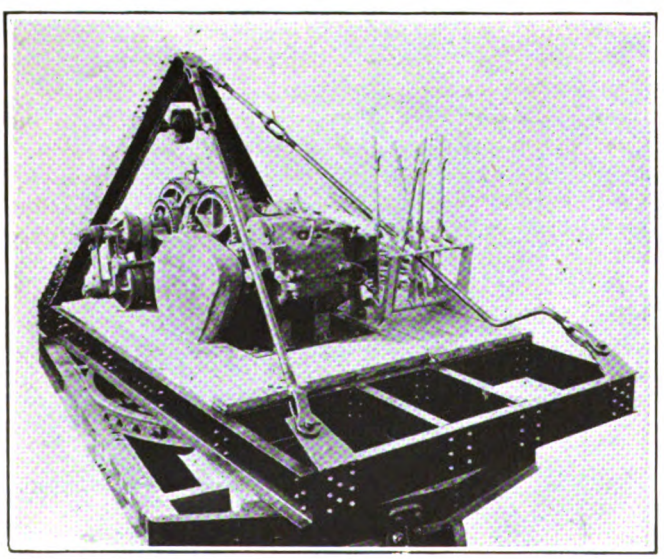
there are seventeen station stops. A schedule speed of 25 m.p.h. with a maximum speed of 40 m.p.h.. is provided.

There has been no change in service with the installation of the new cars, the only saving incurred by the investment being the saving in power and perhaps in maintenance. To provide patrons with an up-to-date, high-grade new car has been the main object of the company in making this installation.

Crane Car Has Interchangeable Hoisting Booms

Heavy Framework Is Feature of Crane Car Built by Buffalo & Lake Erie Traction Company— Attachments Add to Its Utility

SEVERAL departures from customary practice are embodied in the design of a crane car which has been built at the East Twelfth Street shops, Buffalo & Lake Erie Traction Company, Erie, Pa. This car is equipped with two wooden booms which are interchangeable, the shorter being 18 ft. in length and the longer one 35 ft. Both booms have the same general 12-in. x 12-in. cross-section, but the 18-ft. boom is made of long-leaf yellow pine, whereas the longer is of spruce.



The Carriage for the Crane-Operating Mechanism Is Made of 8-In. I-Beams

The car, which is 45 ft. long, has a frame of 10-in. I-beams with 8-in. intermediate sills. Archbar trucks with a 6-ft. 6-in. wheelbase were built at the company's own shop. Four GE-204 motors are used with K-34 control. The carriage for the crane-operating mechanism is composed of 8-in. I-beams and channels, with an A-frame at one end, as shown in an accompanying illustration.

The hoisting mechanism consists of a K-12 controller and one GE-80 motor geared to a drum. On the rear of the carriage is a counterweight of 8,000 lb. With the 18-ft. boom at an angle of 60 deg. the lifting capacity of the crane is about 10 tons. A clamshell of ½ cu.yd. capacity and a bucket of the same size for handling brick add greatly to the utility of the crane. The cost of construction was approximately $8,000, including labor and material. All second-hand material used was charged at market prices.

Reading Transit's Carsonia Park Rehabilitated

THE Reading Transit & Light Company, Reading, Pa., owns Carsonia Park, a popular summer amusement and picnic resort near the city, reached by the company's city lines. The company has newly leased the park site and has made preparations for handling a large increase in traffic this season. That this expectation is reasonable is indicated by the fact that on Sunday, May 6, the park attendance was greater than on any previous day, despite the fact that the regular amusement season had not yet begun. The company has refitted thirty summer cars in addition to its regular service and has built new stations and tracks at the park.

The Metropolitan Edison Company, which supplies power to the park and railway, has erected a fireproof substation near the park, 31 x 99 ft. in size. This will normally be fed by a 66,000-volt transmission line from the West Reading power plant of the Edison company, but will have other power connections to safeguard it against interruptions to service. This substation will also supply power to the communities of Mount Penn, Pennside, Stony Creek, Reisston, Jacksonwald and St. Lawrence.

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Engineer Recommends Enlarging Platforms to Permit Double Doors—Would Equip Present Single-Truck Cars with Air Brakes and Safety Devices and Operate with One Man—Principal Objection to Them Is Overcrowding—Rescheduling Would Decrease Standees 60 per Cent—Various Ways of Improving the Service Are Suggested

Proposed Service Improvements in New Orleans

IMPROVEMENTS in service are considered in Section 4 of the report by John A. Beeler, for the city of New Orleans, on the local transportation situation. The section deals first with equipment. It is shown that two types of equipment are in general use here. These comprise 320 large double-truck cars averaging fifty seats, 330 smaller single-truck cars averaging thirty seats and forty-two trailers averaging sixty seats. Of the 320 large double-truck cars 100 are new and are equipped with double folding doors at both front and rear, affording quick loading and unloading facilities. The engineer comments that the doors of the other cars should be similarly arranged as rapidly as possible.

In connection with the small cars, the report states that much prejudice exists against these due to the high steps and narrow entrances and exits, but mainly because of heavy overloading. Checks and counts made show that during periods of heavy traffic loads of ninety to one hundred passengers were frequently encountered, where half as many would have made a full load. The arrangement of entrances and exits is bad. The platforms should be extended and lowered and the door capacity increased to permit flow in and out simultaneously. Equipped with air brakes, automatic door control and with modern automatic safety devices, an efficient one-man safety car would result. The outlay would be about one-fourth of what new safety cars would cost.

This type of car, rightly used in its proper sphere, would be a great advantage to the service. Trainmen need have no fear of losing their positions, as the engineer comments he has yet to find a single instance where safety cars have been used that it was necessary to discharge trainmen from the service. In fact, they will probably benefit, as operators of the one-man type car are usually paid a higher wage.

Of the trailers, the report states that those now in use are an obsolete type and should be replaced with modern cars at the earliest possible date. There are excellent opportunities on the heaviest lines where the street traffic is heavy for the employment of lightweight, inclosed type modern trailers, seating sixty to sixty-five. Their use will more nearly assure seats for all passengers than any other practical method. They will reduce maintenance costs, power consumption and accidents.

It is suggested that, with its climatic conditions, New Orleans is an ideal place to use double-deck trailers. In fact, with the wide gage, a low-hung type with inclosed upper deck is feasible. Such an arrangement would make possible a seating capacity of 100 to 125 per car, which would forever put at rest the seat question on all lines where trailers could be used.

Trailers are proposed for use on the St. Charles, Tulane-St. Claude and Canal Street lines. Seventy-five modern trailers would relieve an equal number of motor cars seating fifty-two passengers and at the same time increase appreciably the seats furnished. A trailer car-hour will cost to operate about $1.25 per hour less than for a motor car. This item alone would make a saving of $300 a day on these three lines.

The report also recommends a redistribution of equipment among the various lines in order to place each type of car in service under traffic conditions where it will most nearly provide the ideal service. The larger cars are specified for use where a combination of both good frequency and capacity is required. The small cars with their light weight and quicker acceleration are specified for use where the traffic is lighter, but where the frequent headway possible with their use will induce travel and reduce overcrowding. By this plan the headways will be, in general, increased on all of the important routes.

TABLE I—PRESENT AND PROPOSED SERVICE STANDARDS IN NEW ORLEANS

Cars	Car-Miles		Seat-Miles		Car-Hours		Car-Miles per Car-Hour	
	Present	Proposed	Present	Proposed	Present	Proposed	Present	Proposed
Large...	19,562	28,814	999,352	1,498,328	2,158	2,864	9.06	10.06
Small...	24,977	14,588	720,780	437,640	2,767	1,498	9.02	9.75
All.....	44,539	43,402	1,720,132	1,935,968	4,925	4,362	9.04	9.96

Similarly, schedules are to be improved through the straightening of routes, elimination of unnecessary stops, reduction of congestion and by taking slack out of present schedules, which are considered to be too slow. The report states that cars now run normally for a distance, then slow down to a crawl until a time point is reached, then resume the normal free running speed for a while. This extreme irregularity in running speed is most annoying to patrons and has been known to stimulate the purchase of flivvers by those who should be paying carfare. Layover time is not now generally provided at line terminals, the running time having been made slow enough to cover this. It would be better to make the running time faster and put the slack absolutely required in the layover.

Another feature that should not be overlooked is that when the interval between cars exceeds five minutes some even division of the hour should be used, thus making it easier for the rider to know when to expect

TABLE II—CARS REQUIRED TO GIVE PRESENT AND PROPOSED SERVICE

	Large Cars		Small Cars		All Cars	
	Present	Proposed	Present	Proposed	Present	Proposed
A.m. rush period.....	163	220	212	111	375	331
Non-rush period.....	98	130	119	69	217	199
P.m. rush period.....	186	270	248	121	434	391
Early night period.....	95	123	134	68	229	191
After 8:30 p.m.....	68	98	97	56	165	154

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a car. With a five- or ten-minute headway cars will be scheduled to arrive at a certain point at equal intervals of the hour, while with a nine- or eleven-minute service there is no way for patrons to tell when to expect a car. Where two or more lines with infrequent headways operate on joint tracks it is desirable, when practicable, to effect a combination of the different headways to prevent the bunching of cars.

According to the proposed scheduling of cars, the average loading of the large cars in the maximum a.m. hour would be decreased from sixty-five, at present, to fifty-nine; in the maximum p.m. hour, from seventy-one, at present, to sixty-three. For the small cars the average loading would be decreased in the maximum a.m. hour from forty-three, at present, to twenty-nine, and for the maximum p.m. hour, from forty-five to thirty-two. The basis for estimating service required during the non-rush hours was to provide a seat for every passenger at the maximum point on the line, based on half-hour averages. Largely increased seating facilities were then proposed for the rush hours. On the basis of these recommendations, the report shows that the number of passengers per seat for the maximum a.m. hour would be decreased from 1.3 to 1.2, for the maximum p.m. rush hour from 1.4 to 1.2, on lines where the large cars are used, and on lines on which the small cars are used from 1.5 to 1.0 in the maximum a.m. hour and from 1.6 to 1.1 in the maximum p.m. hour. The average seating for all cars would be improved from 1.4, at present, to 1.1 passengers per seat in the maximum a.m. hour, and from 1.5 to 1.2 in the maximum p.m. hour. The proposed arrangement gives 21 per cent greater seating capacity, or, to put it another way, lowers the maximum number of standees 60 per cent in the evening and 75 per cent in the morning.

The report comments that it is easy to see why there is prejudice in the mind of the car rider against the small car. With its narrow doors and restricted platforms, it nevertheless shows under present conditions an average loading over seating capacity of 60 per cent during the maximum hour. On the other hand, the large car, with its wider aisles, double doors and more commodious platforms, shows only 40 per cent overloading. Is there any wonder, then, that patrons throughout the city express the preference for the large cars, without giving thought to the frequency of headways? With the small car modernized and operated as proposed, better service will result than is economically possible with the larger type. The betterment in the loading and the more effective use of the equipment are demonstrated by the figures given showing a comparison in present and proposed loading.

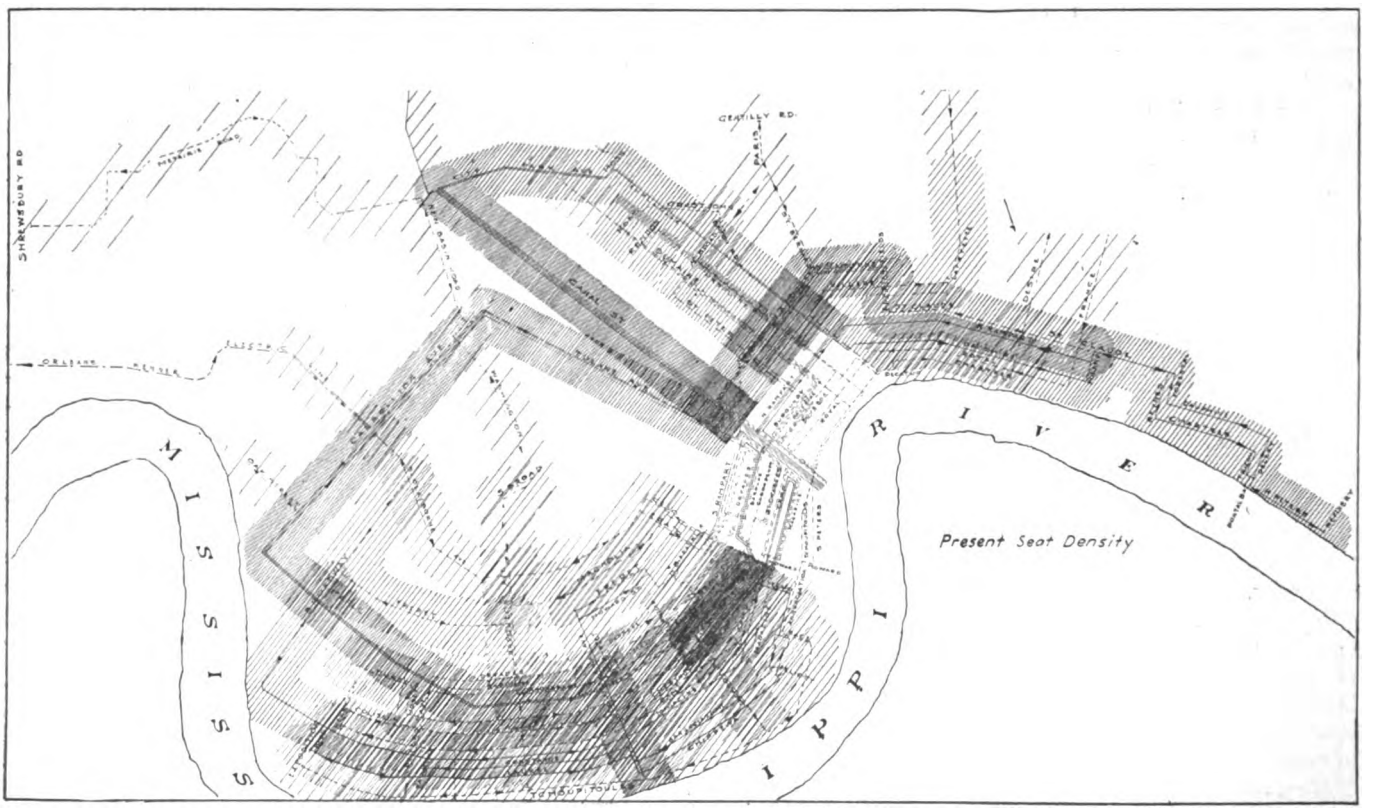
A summary of the present and proposed service as indicated by car-miles, seat-miles, car-hours and car-miles per car-hour is given in Table I. The car requirements to provide this service are summarized in Table II.

In giving the proposed service with 563 less car-hours, as shown in Table I, than required by the present plan, a good idea of the importance of the relation of proper routing to the transportation problem is obtained. With the estimated saving of $2 per hour, expenses can be reduced $1,126 per day, while the service is actually extended and improved.

General Operating Improvements

Under this heading the report states that there are many factors the adoption of which will bring marked advantages to the service. It is pointed out that all of these except the first one discussed are wholly within managerial control.

Passenger Stopping Places.—Distance from the business section is not by any means the only factor that determines the time necessary to reach it. The number of stops made is the factor that does more to limit the capacity and reduce the quality of service than any other one thing. Almost any district can be brought relatively closer by a reduction in the number of stops.



Seat Density on New Orleans Street Railway Under Present and Proposed Service and Routing Plans. As Drawn, Each

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In New Orleans the stopping places average fourteen to the mile. This is entirely too many for good results. An average spacing of 660 ft., or eight stops to the mile, is standard practice in the larger cities where good surface car facilities exist.

It is pointed out that even in making eight stops to the mile the running speed of a car is reduced 50 per cent. In other words, one-half of the time is consumed in making the stops. It means a complete stop every forty-five seconds when making a speed of 10 miles an hour, and it is necessary to make practically all of the stops during the rush hours. With the big cars stops should never be closer than eight to the mile. With the smaller and lighter cars it is not quite so important.

Designation of Stops.—The location of every stopping place should be plainly indicated. Loading platforms are self-indicating. At other points, however, the stops should be designated by painting a white or light yellow band, a yard wide, around the trolley pole about 7 ft. above the ground. These can be seen farther at all times than lettered boards.

Destination Signs.—The general practice in New Orleans is to display a route sign regardless of direction or destination. This may be right for short local runs, short cross-town lines, shuttles, etc. Some of the through city lines, like Jackson-Claiborne, carry two route designations, one on each end of the car. When the car is headed toward North Claiborne Avenue the front of the car reads N. Claiborne, while on the rear it reads Jackson Avenue. It is not at all clear to those unfamiliar with the city or the car routing. A person desiring to go toward Jackson Avenue sees a car passing designated Jackson Avenue, and should he board it he would be informed it was bound toward Claiborne; properly, this route sign should read "Jackson-N. Claiborne," and the supplementary destination sign displayed in conjunction with it should clearly show the direction of the trip.

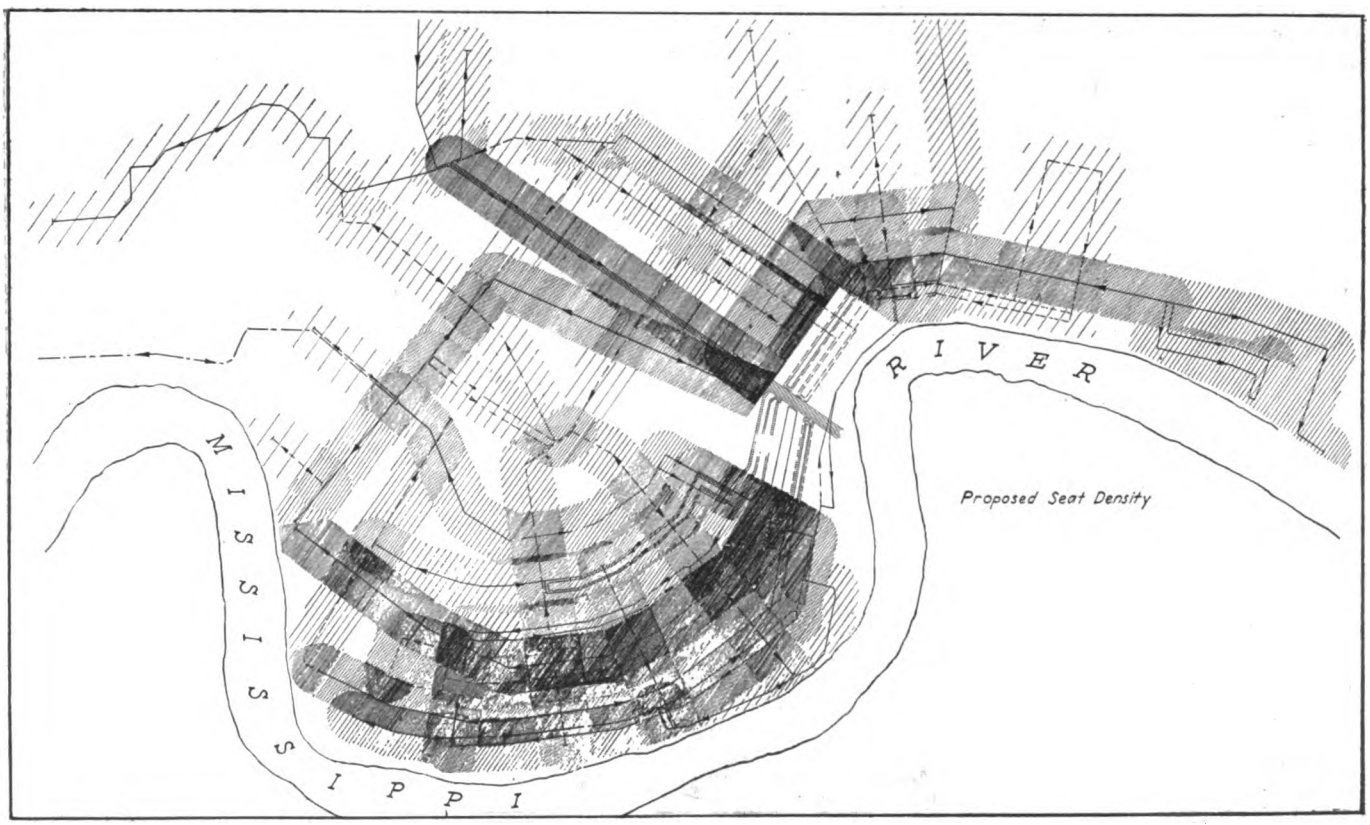
Similarly, inbound St. Charles Avenue cars now carry a sign reading "Tulane Belt." These cars reach Tulane after a while, but first go to Canal Street, then down to the Wells Street Loop, where they turn again, proceed along Canal to Rampart, and finally to Tulane. Under the proposed plan the St. Charles cars would display at all times the St. Charles route sign, together with the destination sign reading "Canal" when inbound and "Carrollton" when outbound. The engineer recommends that all destination signs be of the illuminated type.

Double Berthing.—Double berthing, or loading of cars in pairs, should be employed at all important stops included within the congested district, and wherever loading platforms are provided. The first car to approach the stop should always take the forward position. When a second car arrives while the first is still standing, it should invariably take the second place, and when it goes forward after taking on and discharging passengers, it should proceed without stopping at the forward position.

Street Collectors.—There is no one thing that pays better dividends than the employment of a live bunch of energetic young men to assume the duties of conductors at the front end of cars at congested points during the period of heavy traffic. Service is speeded up, the loading equalized, delays reduced and the strain on the line relieved when it is ordinarily greatest. The result can be measured in the good-will engendered by this added convenience and courtesy extended the public.

In New Orleans the plan would be especially applicable. To a large extent it would segregate the present mixed loading. This would be gratifying, especially to women and children.

Trackwork.—Generally speaking, the new trackwork is of an excellent type, but the cost is high. This is largely due to the fact that the equipment and facilities available for such work are inadequate. There is



Line per Inch Represents Fifty Seats per Maximum Rush Hour. Areas Were Shaded 1,000 Ft. Each Side of Tracks

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too much done by "main strength and awkwardness," and too little by modern labor-saving machinery. Material and supplies are scattered in widely separated storage yards. Proper care of it is as difficult as getting it to the job is costly. Unless the department is given better equipment, rapid and economical work of large proportions is out of the question.

Electric Track Switches.—There are many locations where these devices can be used to the great improvement of the service. Their use at all regular points of track divergence where car movements are frequent is most desirable.

Power Saving.—While the power charges covering railway operation, as evidenced by the company's statement, are low, it is apparent to a close observer that the energy consumption is far from economical. Brakes are applied before the current is shut off and cars started before the brakes are released. Little or no effort to coast is evident. Level tracks, such as those in New Orleans, particularly lend themselves to coasting.

All cars should be equipped with some type of modern power-saving device. Its application and proper use will not only save power, but the cost of maintenance of both electrical and mechanical equipment will be reduced. Minimizing power consumption with a given schedule requires uniform acceleration and a minimum of braking at a uniform rate. Smoother operation results, the operator has better control of his car and accidents are reduced. A safe estimate would be that from 10 to 15 per cent of the power now used could be saved.

The company has been making considerable expenditures in adding needed power facilities. It should not overlook the field of power conservation. One-quarter of a cent a mile is a conservative estimate of the saving possible. This will amount to $108.50 per day.

One-Man Operation.—The application of the one-man principle of operation should be made on all the small cars as soon as they can be remodeled and the safety and automatic features installed. There are scheduled in the proposed plan 1,498 small car hours per day. A saving of 50 cents per hour would reduce operating expenses $749 daily.

There is no valid reason why the extension of the one-man principle cannot be made to include certain of the lines using the larger cars, for after all it is simply the utilization of labor-saving devices to reduce the hardship of manual labor and improve the skill and capacity of the trainmen. With cars equipped with a full line of automatic labor-saving and safety devices and with the assistance of street collectors at heavy loading points an operator should not have any more to do than at present. In fact, it would be easier, cleaner and nicer work.

The report then lays particular emphasis on the importance of enlisting the support and co-operation of employees and suggests the adoption of a co-operative plan along the lines successfully employed in a number of cities. Some suggestions are also made as to how patrons can help in speeding up and improving the service.

Carrying Safety to the Public—V*

An Important Factor in an Organized Safety Campaign Is a School for Drivers of Commercial Vehicles—It Brings Realization that They Must Co-operate

BY C. W. PRICE
Vice-President in Charge of Public Safety,
Elliott Service Company, New York City

DURING the past four years schools for drivers of commercial vehicles have been conducted in a number of large cities, including Chicago, Detroit, Milwaukee and St. Louis, and always with a large attendance and far-reaching results.

Except through a general educational campaign, it is difficult to reach owners and drivers of private cars with any direct service, but it is possible to gather large numbers of drivers of commercial vehicles into a school for group instruction. These are the men who, in proportion to their numbers, are the largest users of the streets. If they can be interested, they are, therefore, in a position to do much to reduce the hazards.

To secure a large attendance at the school the following plan has proved most successful: A complete list of owners of commercial vehicles is obtained and a strong letter is sent to each, outlining the plan and purpose of

*Fifth of a series of ten articles.

Posters of Attractive Design Emphasize Some of the Common Hazards

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Posters of this Type Were Used in Connection with the Instruction Work of the Drivers' School

the school, and emphasizing the direct service which the school will render to employers of drivers, computed in dollars and cents. The employers are asked personally to urge their drivers to attend, and they are requested to send in lists of the drivers who have promised to do so. A few days before the opening of the school the members of the drivers' school committee reach by telephone all employees who have not responded.

The course of study in the school includes twelve lessons. Each lesson is divided into two parts, one of which covers points of mechanical safety, while the other deals with traffic laws and the rules of safe driving. Each driver is furnished with a set of twelve printed lesson outlines.

In order to maintain interest in the school and to get the best results from the lessons it is important to have a director who is able to lead and enthuse the drivers. He should know traffic safety and should be able to direct the general discussion which should be made a prominent feature of each session.

The sessions of the school are usually held on a stated night each week and each week's topic is presented by a different speaker. The speakers on mechanical safety are selected from among mechanical experts in garages, superintendents of garages and teachers in automobile schools. Traffic policemen, judges of traffic courts, safety engineers and employers of drivers can usually be induced to present the lessons on traffic laws and the rules of safe driving.

The continued attendance of the drivers throughout the course and the permanent results accomplished in convincing the drivers will depend on securing speakers who not only know their subjects but, what is more important, know how to present each one in a simple and convincing manner. In many of the schools the drivers sing one or two of the old war songs at the opening of the school. This always is done with good effect. Motion pictures and lantern slides are used to illustrate the lessons and to furnish entertainment.

At the last session of the school an attractively engraved diploma is presented to each driver who has attended at least nine of the twelve lessons. It is customary to make the occasion as impressive as possible by having one or two prominent speakers at this session.

In the various drivers' schools which have been conducted it has been found that the drivers go out of these schools not only informed regarding the mechanical safety of their machines and the rules of safe driving but, of far greater import, they go out with a changed attitude, with a new sense of their obligation to help make the streets safe, with a new thought about the traffic policeman and their relationship to him. They have come to see that the traffic judge and the traffic policeman are their friends and are doing their duty in trying to safeguard every driver.

In several cities a school for women drivers has been conducted with gratifying success. The course is usually limited to six lessons, and the sessions are held in the afternoon. In one city, at the close of the school, a tournament was held in the local armory. One of the features of the program was a contest of the drivers in handling their own cars. The sales agents of various popular makes of automobile had on exhibition the chassis of their cars, thus enabling each woman to get first-hand information regarding the mechanical points of her car.

SAFE DRIVERS' CLUBS ORGANIZED

In this chapter mention should also be made of the safe drivers' clubs which have been organized in several cities. While these clubs are usually organized with the primary object of raising money, they may be made to serve in stimulating interest in safety. The members are secured through mail solicitation, letters being sent to a complete list, or to a selected list of owners of cars. The membership fee is usually one dollar. Every member receives a membership card and an emblem for his car. The one appeal which seems to win membership is that each driver of an automobile should be willing to do his "bit" by paying one dollar to help make the streets safe for him and his family.

In Milwaukee the club is governed by an executive committee consisting of superintendents in charge of motor vehicles. This committee did effective work in building up the membership of the club, had supervision of the school for drivers, issued monthly bulletins to the club members and took an active part in promoting traffic safety.

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Illinois Utilities and Colleges Co-operate

University of Illinois and Northwestern University Prepare Plans for Instruction Specially Adapted to the Needs of Utilities

SEVERAL utility associations in Illinois have formed a joint committee to co-operate with the colleges of commerce and business administration of the schools in the state and in such ways as will insure to the industry a supply of young men versed in the administrative subjects which are peculiar to the public utility business, and likewise insure to the student an opening in the field for which he has been prepared.

A suitable curriculum has been planned by two of the large universities, through co-operation between the deans of their colleges of commerce and business administration and the utility committee. A study of the requirements was made with a view to incorporating in the regular commerce course those subjects which would familiarize the students with the problems confronting the public utility companies. It is not the desire to make an engineer of the student, yet he will be familiar with engineering to such an extent that he will be able to understand blueprints and the fundamental principles of mathematics. He will have what may be termed "descriptive engineering." His training will include also instruction in the relation of public-service corporations to the public, the various methods of regulation and control, public-utility valuation, rate-making, service, capitalization and financing. He will have a thorough knowledge of economies and business methods.

Following is the text of a letter which has been sent out by the joint committee to the utility companies in Illinois, which explains the plan:

Public-utility companies have long felt the need of men who have had special training in the economics, business administration and law governing the incorporation and operation of public utilities. Some companies have endeavored to impart this information to certain members of their supervisory force by means of lectures, or by encouraging individuals to take special courses in schools of commerce. It is just as essential to have young men especially trained along these lines entering the service of utilities as it is to have men trained in the various engineering fields, such as mechanical, civil or electrical. Definite co-operation between Illinois colleges and universities and public-utility companies of Illinois to bring about the desired results have been attained, largely due to the efforts of a joint committee representing the Illinois Electric Railways Association, the Illinois State Electric Association, the Illinois Gas Association, the Illinois Telephone Association, the Illinois Bell Telephone Company and the Illinois Committee on Public Utility Information.

Every phase of the utility industry and its interests has been given full and practical consideration. The plan contemplates curriculums in the colleges and universities—probably full college courses in the long run—which will tend to do two things of immense value to the industry, namely (1) educate regular classes of young men, especially for the public-utility industry, in all of its branches, much as they are now educated for agriculture, finance, journalism or the professions; and so increase the supply of college-made men so badly needed in the utility business; (2) establish instruction in the fundamentals of the utility business as an essential part of college courses in economics and the like, so that better understanding of the utility industry and its problems may permeate both instructing forces and student bodies.

At the University of Illinois and Northwestern University a start has been made in and along these lines in the college of commerce and business administration. Probably most of the higher educational institutions in the state, if not all, can be interested if we of the utility business do our part. And we have a very definite part to perform, as the students will not take this course on public utilities and the colleges and universities will not continue to teach it unless we absorb the young men into our organizations after they have completed the courses. We must assist in the operation of the plan in the following ways: (1) By helping to stimulate interest in the public-utility curriculum among those entering the colleges; (2) by giving summer vacation employment to as many as possible of the students who are taking subjects in the public-utility curriculum; (3) by employing the students of public-utility subjects when they are graduated and then seeing to it that they are assimilated and developed in our various organizations as examples of the opportunities for college men in the public-utility industry; (4) by utilizing college faculty members whenever possible for study, surveys, research or other work, for which they are especially fitted by their special knowledge and faculties.

Execution of the educational program sketched in the foregoing has been submitted to the following executive committee of five: B. I. Budd, Chicago Elevated Railroads, chairman; George R. Jones, Public Service Company, speakers' bureau, vice-chairman; R. V. Prather, secretary Illinois public utility associations; A. G. Mitchell, secretary Illinois Telephone Association; G. W. McRae, Illinois Bell Telephone Company, and H. A. Johnson, secretary.

This executive committee cannot do much without the co-operation of the public-utility companies. The co-operation. to be effective, should come through some one man in each company and that man should be the chief executive of the company or one reporting directly to the chief executive. You are hereby requested to designate the man in your company with whom we may pursue this matter systematically and in detail. We would also like to know how many students you will promise to employ for summer work each year and how many graduates from these courses you will take into your organization each year.

All who have sat in the joint committee sessions are convinced that we are inaugurating in this something of inestimable helpfulness to the utility industry. Your cordial support is, therefore, counted on.

PUBLIC UTILITIES CURRICULUM
COLLEGE OF COMMERCE, UNIVERSITY OF ILLINOIS

First Year

Principles of Accounting; Survey of Modern Industries; Economic History of the United States; Rhetoric and Themes; Military Training and Gymnasium; Electives (Science, Mathematics or Languages).

Second Year

Intermediate Accounting; Principles of Economics; Economics of Money and Banking; American National Government; State and Local Government; Principles of Business Administration; Business Letter Writing; Military Training; Electives (Science, Mathematics, Language or the Social Sciences).

Third Year

Principles of Marketing; Business Law; Corporation Finance; Principles of Railroad Transportation; Freight Shipment; Municipal Governments; Constitutional Aspects of Social and Industrial Problems; Principles of Public Utilities; Public Utility Accounting; Free Electives.

Fourth Year

Principles of Public Finance; Labor Problems and Labor Organizations; Municipal Problems; Public Utility Finance; Law of Public Utilities; Regulation of Public Utilities; Problems of Special Utilities; Personnel Management.

PUBLIC UTILITIES CURRICULUM
SCHOOL OF COMMERCE NORTHWESTERN UNIVERSITY

First Year

Economics
English II
Accounting I

Second Year

Corporation Finance
Investment Securities
Accounting II
Business Law I and II

Third Year

Required:
Public Utilities
Business Organization
Marketing and Distribution
Elective (one elective required):
Selling by Mail
Office Management
Government
Sociology

Fourth Year

Required:
Statistics and Statistical Methods
Elective (two electives required):
Employment Management
Money and Banking
Resources and Trade
General Psychology

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Association News & Discussions

And There Arose a New King Which Knew Not Joseph*

Some Intensely Interesting and Practical Advice on Public Relations Work by the Man Famous for His Common Sense Editorials

By Bruce Barton

WHAT I have to say will consist principally of two stories, which I think have a direct application to the utility business.

The first concerns a member of my profession, an advertising man, who was in the employ of a circus. It was his function to precede the circus into various communities and there to call at the newspaper offices and make sure that the notices would be flattering and to put on the fence posts and the barns pictures of the bearded lady and the man-eating snakes, and finally to get in touch with the proprietor of some store and contract with him for the space on either side of the elephant to be used for advertising purposes in the parade.

So, coming to a cross-roads town one time he found that there was only one store and the proprietor did not receive him enthusiastically. Said the proprietor, "Why should I advertise? I have been here for twenty years. There isn't a man, woman or child around these parts that does not know where I am and what I sell and how I do business." The advertising man answered very promptly, because in our business if we hesitate we are lost, and he said to the proprietor, pointing across the street, "What is that building over there?" The proprietor said to him, "That is the Methodist Episcopal Church." The advertising man said, "How long has that been there?" The proprietor said, "Oh, I don't know; seventy-five years probably." "And yet," said the advertising man, "And yet, they ring the church bell every Sunday morning."

My second story has also a religious flavor. It relates to a gentleman named Joseph, who is now deceased. Those of you who, like myself, were brought up on the Bible may have found some account of his very remarkable business career in that book. Those of you who have not read that book or who do not have it in your libraries may have heard of him through the works of Rudyard Kipling, because Mr. Kipling said of Joseph this, as you will remember: "Who shall doubt the secret hid under Cheops' pyramid was that the contractor did Cheops out of several millions, and that Joseph's sudden rise to controller of supplies was graft of monstrous size worked on Pharaoh's swarthy civilians."

But the account of Joseph in the Old Testament is much more complete and to his credit. You remember that he left his country under difficulties and, coming into a strange country, through his diligence and intelligence, he rose until he became the principal person in the state, second only to the King. Then there comes in that account, in that story, what I regard as one of the most amazing, one of the most staggering lines that has ever been written in a business history, a line that I think ought to be engraved deep on the office wall of every man who has anything to do with public relations, because with no interruption, no explanation, the account which has just finished telling of Joseph's remarkable career (and he reached a point where his public relations were widespread and where his private relations had all the good jobs in the Kingdom) goes on to say:

"And Pharaoh died, and there arose in Egypt a new King which knew not Joseph."

Now, gentlemen, I believe that that is the greatest sermon ever written on the subject of public relations.

When we gathered in this room this afternoon there were in this country in bed sick several thousand old men. It perhaps is indelicate for me to refer to that fact, but it is a fact, and we are grown up and we have got to face these things. On these old men you gentlemen collectively have spent a considerable amount of time and a considerable amount of money. It is to be supposed that you have made some impression upon them regarding your service and your purposes and your necessities. And in this interval while we have been sitting here those old men have died and all your time and all your money and whatever you have built up in the way of good-will in their minds—all those things have passed out with them.

In the same interval, in the same half hour, there have been born in this country several thousand lusty boys and girls to whom you gentlemen mean no more than the Einstein theory. They do not know the difference between a Mazda lamp and a stick of Wrigley's chewing gum. Nobody has ever told them that "Ivory soap floats" or that children cry for Castoria, or what sort of soap you ought to use if you want to have a skin that people would like to touch. Nobody has ever told them any of the other facts that are so vital in maintaining existence in these complex modern times.

The whole job of giving to them all the things that they are going to need in order to be able to form an intelligent public opinion and to exercise an intelligent influence in the community has to be started from the beginning and done over again.

So the first very simple thing that I would say to you (and it is so simple that it seems to me it ought to be said at every convention of this kind) is that this business of public relations is a very constant business, that the fact that you told your story yesterday should not lead you into the delusion of supposing that you have ever told it. There is probably no fact in the United States that is easier to impress upon people's minds than the fact that Ivory soap floats, and yet the manufacturers of Ivory soap think it not inconsistent or wasteful to spend more than a million dollars a year in repeating that fact over and over again.

It is a day-by-day and hour-by-hour business, gentlemen. Every day and every hour "the king" dies and there arises a new "king" in this country to whom you and all your works mean absolutely nothing.

Now, the second thing and very simple thing that it seems to me I might say to you is that in your dealings with the public, in what you write and say to them, you have got to be genuine; at least, you have got to appear to be genuine.

When I came to New York a great many years ago I had a lot of trouble with banks. I had great difficulty in finding any bank that would be willing to accept the very paltry weekly deposit that I wanted to make, and I finally found one which was not as closely guarded as the others, and I succeeded for over a period of three years of being insulted by the teller every Saturday. And at the end of three years when I came to draw out my money I had an audience with the vice-president who wanted personally to insult me.

I said to myself, if I live and grow old in this town, some day I think I would like to take a crack at this situation. And so as the years passed, as they have the habit of doing, and I lived and grew old, one day a bank came in to us and said they would like to have us do some advertising for them. I said to these bankers, "Now

*Address made before convention of National Electric Light Association, New York, June 5.

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you go back to your office and shave off all the side-whiskers that there are in your bank and you take all the high hats and carry them out into the back-yard of the bank and you put them in a pile and light a match to the pile and burn them up, because I am going to advertise to people that you are human, and it may be a shock to have them come in and find you as you are."

And the ad said, "There is a young man in this town who is looking for a friendly bank, a bank where the officers will remember his name and where some interest will be shown when he comes in," etc.

And it was very successful. It was too successful. It was so successful that we could not control it, and all over the country there broke out a perfect epidemic, a kind of measles, of "friendly banks." Bankers who had not smiled since infancy and who never had had or needed an electric fan in their offices, suddenly sat up and said, "Why, we are friendly."

Well, our bank dropped out. The competition was too keen. But it culminated, I think, in a letter which I saw and which was mailed by the president of a really very important bank in a large city of this country. I won't attempt to quote it verbatim, but it was to this effect:

"Dear Customer: As I sit here all alone in my office on Christmas evening thinking of you and how much we love you, I really wish that you and every other customer could come in here personally so I could give you a good, sound kiss."

Well ,that is a trifle exaggerated, but the fact is this—if you don't feel these things you can't make other people feel them. Emerson said, as you will remember, "What you are thunders so loud I cannot hear what you say." Unless there is back of this desire for better public relations a real conviction, a real genuine feeling that you are in business as a matter of service, not merely as a matter of advertising service—unless there is that, then it is very dangerous, indeed, to attempt to build public relations on any other ground.

The third very simple thing, and the last thing that I suggest, is this: In dealing with the public the great thing is to deal with them simply, briefly, and in language that they can understand.

Two men delivered speeches about sixty years ago at Gettysburg. One man was the greatest orator of his day, and he spoke for two hours and a half, and nobody in this room probably can remember a single word that he said. The other man spoke for considerably less than five minutes, and every school child has at some time in his career learned Lincoln's Gettysburg Address, and remembers it more or less all his life.

Many prayers have been uttered in the Word—many long, fine-sounding prayers, but the only prayer that any large majority of people have ever learned is the Lord's Prayer, and it is less than two hundred words long. The same thing is true of the Twenty-third Psalm, and there is hardly a Latin word in it. They are short, simply, easily understood words.

Asking an advertising man to talk about advertising at a convention like this is a good deal like asking a doctor to talk about health. I have listened to many such addresses and they are all about the same. The eminent physician says, "Drink plenty of water. Stay out doors as much as you can. Eat good food. Don't worry. Get eight hours sleep. And if you have anything the matter with you, call a doctor."

So I say to you that there is a certain technique about these things, and if you have anything seriously the matter with you there probably is some doctor in your town who has made a business of that thing, and it may be worth your while to call him in.

But in the meantime, and in this very informal and necessarily general talk, I say to you, "Be genuine, be simple, be brief; talk to people in terms and in language that they understand, and finally, and most of all, be persistent."

You can't expect to advertise in flush times and live on the memory of it when you are hard up. You can't expect to advertise when you are in trouble, or about to be in trouble, and expect to get anything in that direction. It is day-by-day and hour-by-hour business.

If the amount of money that has been thrown away by people who advertise spasmodically was all gathered together it would found and endow the most wonderful home for aged advertising men and their widows in the world. Don't throw any of that money away. If it is worth doing at all, it is worth doing all the time.

For every day, gentlemen, the "king" dies, and there arises a new "king" who knows not Joseph.

Public Relations Main Topic of N. E. L. A.

Annual Meeting Held in New York with Attendance of Some 7,000—Customer Ownership and Technical Subjects Also Given Much Attention

A FIVE-DAY convention of the National Electric Light Association was held at the Commodore and Biltmore Hotels, New York, June 4 to 8. Probably the proceedings of greatest interest to electric railway men were those devoted to the building of better public relations. The principal ideas expressed along this line are treated in later paragraphs in this report.

Gen. Guy E. Tripp, chairman of the board, Westinghouse Electric & Manufacturing Company, spoke on the future of superpower systems, which he thought was bright, but the fact that they are monopolies will make them shining marks for the advocates of public ownership. However, he did not think they could well be acquired by the public, because their interstate business took them out of municipal or state scope and he saw objections from the several states to Federal control.

According to the committee on customer ownership, the sales of securities of electric light and power companies directly to customers during 1922 consisted approximately of $145,000,000 of preferred shares, $16,000,000 of common shares and $14,000,000 of bonds and debentures. This is a noteworty advance over 1921 when the aggregate total as reported reached $80,000,000. The total annual sales of securities during 1920 was estimated to be $35,000,000. Statistical information appended to the report indicates that in the past eight years no less than 425,000 customer owners have been attracted to the possibilities of investing in the securities of local electric light and power companies and the prediction is made that within three years there will be no less than one million people owning such securities. The cost of distributing these securities is becoming lower each year.

The report of the committee on insurance was presented by Ed. Wolff, chairman of last year's committee. It spoke of considerable reduction secured in premiums on both liability and fire insurance through a better knowledge of what the insurance companies require. Unfortunately, where companies are insured through local agents these agents are not always anxious to reduce the rates, because their commissions would thereby be reduced, and some companies are much indisposed to disturb their agencies. Mr. Wolff pointed out that the machinery in getting new rate schedules is extremely cumbersome, but this work would be greatly helped if companies kept carefully compiled experience records. This is becoming more common. The percentage reduction in the fire insurance rate was approximately 25 per cent, and for auto truck liability, 31 per cent. From reports received from ninety-one companies a saving in premiums of $103,769 was recorded. The lowest reported was $25 and the largest approximately $25,000, the average being $1,140.

Dwight N. Lewis, president National Association of Railway and Utilities Commissioners, in speaking of public ownership, said, in part:

"The committee of our national association on public ownership and operation reporting at our convention last year at Detroit, most emphatically repudiated government ownership, but it was just as emphatically favorable to public ownership with private operation, with protection both for the producer and the consumer through state regulation.

"The government should concern itself with the purely governmental affairs, protecting both persons and property in their constitutional rights and leave to private capital and initi-

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ative the advancement of business affairs. The rights of the public may always be secured by proper oversight and regulation, and this should not go so far as to destroy incentive for investment of capital and talent. There are some who believe that for every economic ill there is a legislative remedy, a sort of quack cure-all. I think what we need most in more than one line of industry in this country today is a more carefully arranged diet with the proper nursing of an enlightened public conscience. I don't believe a weakened patient is best cured by the drastic purgatives and deadening narcotics of ill-advised statute law."

L. E. Pierson, chairman board of directors Irving Bank-Columbia Trust Company, New York, emphasized the essential character of the electric utility service by saying that should it cease functioning for a single day, modern life, as we know it, would go out. Mr. Pierson saw tendencies toward municipal ownership and said:

"If only the utilities themselves were concerned the prospect of government ownership would be serious but not alarming. The capital invested in the utilities could be withdrawn and placed in purely private industries. The plants could be sold or put to other purposes. The engineers, the executives and the technical personnel would still find their knowledge and experience in demand. The real victim of any such wholesale change would be the nation as a whole. Industry in general would suffer, politics would replace efficiency, and mounting taxes would quickly convince the public that it is infinitely easier to criticize public utilities than to operate them."

Richard T. Ely, professor of economics at the University of Wisconsin, spoke about the connection between utility operation and education. He said, in part:

"In my judgment, what is needed is a central research institute with its own board of trustees, amply and permanently supported with its own funds handed over to it without hampering conditions of any sort or description, but commissioned to organize the public utilities educationally, to search fearlessly for truth and to diffuse knowledge. The scope of the work should reach from high schools, Y.M.C.A.'s, etc., through the colleges to graduate courses and research in the universities."

Public Policy Session

A PUBLIC policy committee session was held Thursday evening at Carnegie Hall, the speakers being Julius H. Barnes, president of the Chamber of Commerce of the United States, and Martin J. Insull, who presented the report of the public policy committee. Mr. Barnes spoke of the resolution passed last month by the Chamber of Commerce of the United States, commending the state unit as the proper agency of public utility regulations and said: "This is the judgment of the business opinion of the country as to what is fair and intelligent in public relations."

The addresses and music at the meeting on Thursday night were broadcasted through special arrangements with the broadcasting stations in New York, Pittsburgh, Chicago and Schenectady, so that more than five million people were able to listen to them. This is undoubtedly the most extensive broadcasting ever attempted, and more than one hundred men and women were employed in maintaining telephone connections between the four stations.

Public Relations Discussions

IN INTRODUCING the chairmen of committees in charge of different phases of the public relations work, H. T. Sands, chairman of the public relations section, spoke about the organization of a speakers' bureau as an auxiliary to the work of state committees on public utility information, and declared the idea that an effective address must be made by a polished orator is incorrect. The public is more interested, he said, in acquiring facts in regard to an industry than in listening to flights of oratory. Two films have been distributed by the section, one entitled "Back of the Button," the other "Yours to Command," but the distribution falls short of what it should be due to the difficulty of the industry in understanding the public mind.

The committee on educational institutions recommended that the association could well undertake to endow two or three professorships which could be intended primarily to facilitate research and secondarily to provide for the teaching of a series of public utility courses. Such a department would require an endowment of $20,000 to $30,000 a year. It was the belief of the committee that when the time is ripe for such an endowment the central-station industry could well afford the expenditure.

The committee on employee relations with the public finds that fourteen member companies have issued employees' manuals and suggests that the association prepare and publish a loose-leaf manual of this kind, giving facts about the origin and growth of the industry, space for local information or instruction on the duty of the employee to help mold favorable public sentiment to the company, and how these objects can be attained.

The committee on manufacturers' advertising mentioned several companies which have conducted national advertising campaigns to build up confidence in the private ownership and operation of electric light and power companies and in the sale of electrical appliances. This assistance was commended. The report also said that a number of security houses had cooperated by running advertisements recommending public utilities' securities for investment. In connection with individual offerings of issues, much has been said in advertisements in favor of securities of this kind.

The committee on public speaking commended the work along the lines of providing public addresses conducted by the state public utility information committees and the Public Utilities Advertising Association, and spoke particularly of the effective work conducted in the Rocky Mountain district, in Boston and elsewhere. Mention was also made of a series of lectures given by Carl D. Jackson, former president of the National Association of Railway and Utilities Commissioners. At educational institutions he spoke on general economic problems and brought the utility industry into his talk in a most interesting way. He also addressed bankers, editors, state and city officials and presidents and members of faculties of several educational institutions. This was thought by the committee to be the largest thing done this year in the way of publicity through educational work.

The committee on relations of financial institutions described its efforts to draft a law which can be introduced into the legislature of New York to legalize the investment of savings banks in the securities of gas, electric power and light and telephone utilities. An effort was made to include in this list electric street railway securities, but as the representatives of the savings banks were not convinced of the advisability of including these securities, the committee did not press the point further. The law as drafted is thought to meet the views of the savings bank committee, but as the Savings Bank Association has resolved this year to support no project for the enlargement of the field of investment of its funds the bill will not be introduced this year.

The committee on women's public information spoke particularly of the need of getting the women employees of the company together for educational work along the line of better public relations between the utility company and the customers. The results so far are declared to be worth while.

The fundamental reason why it is necessary to make the effort to inform the public of the function and purposes of the public utility was discussed at length by Don Seitz, business manager of the New York *World* who said that the electric utility pioneers failed in the early days to sell the idea of electric light and power to the public, so they formed an alliance with the politician. Over-capitalization became a feature of early utility operation and the unfavorable sentiment thereby created still lingers in many minds. The facts as they are must be carried to the public consistently and continuously until the beneficent influence of the capital invested in public utilities is understood and appreciated. Nail down the facts, said Mr. Seitz, until it is universally realized that the purpose of the public utility is to provide convenience for everybody and service for every body.

A paper by Robert Lindsay, president Cleveland Electric Illuminating Company stated that the public information bureau is the only mechanism

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available for representing the four elements in the public utility group—the electric light and power company, the telephone system, the gas company, and the street railway. In the final analysis, the public holds the fate of the utility industry in its hands but only through mutual co-operation is it possible to develop the highest type of service at the lowest rate. But this co-operation can only be effected when the methods and purposes of the utilities are interpreted to the public and understood. Information bureaus, however, cannot accomplish this by merely stating that the service is good and that the rates are low; it must be demonstrated also by the acts of the utility, and the bureau that gets only funds and no active support from its members will not go very far. The bureau should also be made the agency through which important news is issued to the public, for if it is allowed to become merely a clipping bureau its usefulness will be much impaired. Moreover, even though there be sincere co-operation among all the public utilities, each individual company must in addition keep up its own public relations work.

At the final meeting of the Public Relations Section, short talks were given by several members of state regulatory commissions as well as by prominent central station men. The meeting was called to order by Chairman Sands and the first speaker was M. H. Aylesworth, executive manager of the N.E.L.A. Mr. Aylesworth said that experience has shown that it is not sufficient for a utility company simply to give the best service of which it is capable. The company must also advertise the fact that it gives service. On the other hand, he said, it will not do merely to advertise without actually giving the service. Satisfactory public relations can be built only on the basis of giving the service and telling the story to the people.

The second speaker, Hon. W. D. B. Ainey, a member of the Public Service Commission of Pennsylvania, said that he visualized the function of a regulatory commission as being that of the equals sign in an equation with the duty and the privilege of the utility on one side and the privilege and the duty of the public on the other side. It is for the commission to keep the equation properly balanced. He particularly stressed the point that the public is more likely to be swayed by emotion than by logic, and he spoke of the inestimably greater value of personal contact as compared with the printed page.

The Virginia State Corporation Commission was represented by the Hon. Alexander Forward, who said that it was his experience that the utility which receives the greatest amount of consideration from the public is the one which always has time to listen to complaints. Conversely the company which pays little heed to the troubles of its customers receives but little consideration from the public. Mr. Forward mentioned also the necessity for publicity so that people shall understand what the utilities are trying to do. In this respect the street railway has the advantage over other utilities, but the latter may advertise in newspapers and send out publicity matter with their bills. By proper handling of news stories, valuable publicity can be had without buying advertising space.

The fourth speaker was the Hon. E. V. Kuykendall, commissioner of the Department of Public Works of the State of Washington. He drew attention to the fact that the decisions of regulatory commissions have more frequently been unfair to the utilities than unfair to the public. Nevertheless the public has become suspicious of the commissions. This situation he characterized as one phase of the war reaction, like the restlessness which follows a fever, and he recommended that the fundamentals of valuation, rate making, etc., should be included in school textbooks on civics.

Hon. Clyde M. Reed, member of the Kansas Public Utilities Commission, spoke, and Commissioner H. G. Wells of Massachusetts told some of the difficulties that have been experienced there. He said that three-quarters of the utility companies gave the commission no trouble, but that the service given by the remaining one-quarter was the cause of frequent and characteristic complaints from customers. The majority of the utilities in his opinion are trying to carry out the teachings of the public policy committee; and the others would do well to follow that example.

Customer Ownership Session

THE session of the customer ownership committee was held Thursday afternoon, June 7, with M. R. Bump in the chair. B. C. Forbes, editor *Forbes Magazine*, New York, said that what is needed in the utility business today is not men of light but men of leading. In a plea for wider distribution of the securities of utilities, he said that the great reason for the downfall of governments and dynasties was that the great mass of the common people were not able to get ahead of the game. By becoming investors they place themselves in an entirely different position and the country is in no danger. In the last eight years the light and power companies have attracted 425,000 customers to become stockholders, and he is of the opinion that within three years more there will be a million customer-owners.

Mr. Forbes mentioned a prize contest conducted by his magazine on the benefit of customer ownership of public utilities. Many excellent articles were received, and he recommended that the prize-winning papers be reprinted for distribution by utility companies. The arguments will then be presented by the public itself, and will carry more weight than when material in the nature of propaganda is prepared by the utilities' publicity men.

The opportunity presented the utilities by the customer-ownership plan brings with it a new responsibility to hold up the quality of the securities. He suggests that a vigilance committee be formed to attend to this vital question.

Employee ownership is believed by Mr. Forbes to be of equal importance with customer ownership. When public questions are being considered the working classes can roll up more votes on election day than any other class in the country. Whether we are to move toward state or municipal ownership will depend in no small measure on how this employee and customer-ownership movement succeeds or fails.

In conclusion, he said that if you transform America into a nation of investors you will have a happier, more contented and more cheerful people.

E. K. Hall, vice-president American Telephone & Telegraph Company, New York, emphasized the points made by Mr. Forbes and paid particular attention to the statement that the securities offered the customers must be gilt-edged, or else the public would lose confidence in the utilities as investments.

Louis H. Egan, president Union Electric Light & Power Company, St. Louis, pointed out that theoretically the customers should hold common stock so that they would feel the fluctuations of the business. Anything tending to cut down the dividends or affect the solvency of the company would then be examined with particular care by the customer-investors. As the risk of common stock may be considered too great, he makes a compromise by selling the preferred stock to his customers. In his case the stock is one-third of the capital, and this is divided equally into two classes, so that the preferred represents one-sixth of the entire investment in the property. He has been able to sell the entire issue of new preferred stock to his customers with relatively little effort, and has also considered the sale of higher-grade investments to them.

John A. Britton, vice-president Pacific Gas & Electric Company, San Francisco, told of some of the experiences of his company in the sale of securities to customers, in which he said it was a pioneer. He said that there is a pride of ownership in the average person that can be used to advantage in connection with inducing the customers to participate. It is, however, no use to try to give poor service because the customers are also owners of the property. As soon as they discover that such a policy is in force they forget their holdings and register their complaints.

Technical Section

THE prime movers committee, C. F. Hirshfeld chairman, presented a 374-page report in two sections. Emphasis was placed on recent innovations, such as higher pressures, reheating of steam, stage bleeding, useful life of turbines and internal-combustion engines. Plants

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are now being considered with boiler pressures from 400 lb. up to 550 lb. and steam temperatures of 650 to 750 deg. F.

Development in the art of steam-power production has progressed far enough to make it entirely feasible to attain a goal of one kilowatt-hour per pound of coal in the near future, according to Fred N. Bushnell, Stone & Webster, who made an address on "Higher Steam Pressures and Improvement in Station Economy." One means of attaining this mark is through the use of much higher steam pressures. Already steam pressures up to 1,200 lb. have been definitely planned for commercial installation. For an experimental plant in England a critical pressure of 3,200 lb. will be adopted. Attainment of one kilowatt-hour per pound of coal cannot be reached by higher pressures alone. There must be co-ordination of this with heating of the feed water by multistage bleeding of turbines, careful selection of auxiliaries, proper design of stokers, furnaces and heating surfaces of boilers, superheaters and economizers, and burning of pulverized coal.

Prof. A. G. Christie, Johns Hopkins University, made a very frank appraisal of powdered fuel. In general, he said that while powdered fuel has many points in its favor, there is a great danger in the extensive adoption of an underdeveloped practice by enthusiasts. The decision on whether to use powdered fuel depends entirely upon each individual installation. Before there is a general adoption of powdered fuel, there is a great necessity to have power station records to analyze. Furthermore, there is an opportunity for considerable improvement in equipment. None the less, Prof. Christie commended manufacturers for the great strides they have made so far.

On account of the almost unprecedented adoption of new practices in the central-station field, some of which are almost radical in the absence of extensive experimental data, and the fact that the use factor of equipment now being adopted is indefinite, there is more necessity than ever of giving serious consideration to obsolescence in determining the economies of new innovations, asserted Peter Junkersfeld. Furthermore, the prospective capacity factor or usefulness of the unit must be carefully estimated.

In the report of the underground systems committee, G. G. Post chairman, two developments of great interest and importance to the central station industry are apparent:

First—Improvements in the quality of paper-insulated, lead-covered cables have made it possible to reduce the thickness of insulation without reducing the factor of safety of operation. Manufacturers have estimated that on this account a saving of from 10 to 15 per cent has been made in the price of cable in the last two or three years.

Second—The use of the kenotron for testing high voltage cables with direct current promises to result in the ability to detect incipient failures of cables so that weak spots may be removed and the troubles due to cable failures in service largely eliminated. During the year 1922 one company was able by means of the kenotron almost to eliminate failures in service on a number of 6,600-volt rosin oil cables.

The committee called attention to the report of the American committee on electrolysis published in 1921. Too much emphasis cannot be laid upon the desirability of organizing electrolysis committees in all cities where the rail return system of electric railways is used as it is only possible to co-ordinate the mitigative work of the various utilities owning underground structures by causing their representatives to get together and from time to time decide upon measures which will be the most economical for the utilities as a whole. In other words, the problem should be dealt with as though one company owned and operated all of the underground systems and structures.

The underground-cable structure is no less a part of a superpower scheme than the 110,000 and 220,000-volt overhead lines, declared W. S. Murray in an address before the Technical Section. To realize the future rôle the highest voltage electric cables are to play one has but to look at the rapidly forming necessity of conducting large quantities of electric power beneath the earth's surface. Our overhead day within our cities and on the approaches to them is drawing to a rapid close. Henceforth what we shall need is not only 33,000-volt but 66,000-volt cables. Too much emphasis cannot be placed on the importance of properly relaying systems to make the alternating-current network as reliable, flexible and economical as direct-current networks.

The overhead systems committee, L. M. Klauber chairman, has this year continued its work along the general lines of standardization and the investigation of new and improved practices. The report, of 176 pages, is a résumé of the information which has been gathered during the past year and covers such subjects as specifications for construction materials and methods, poles and supporting structures, insulators, insulator research, line sectionalizing and protective devices, transformer installations, construction and maintenance equipment and methods, wood pole transmission lines, joint use of poles, and transpositions.

According to information obtained by the electric apparatus committee, R. H. Tapscott, chairman, the service rendered by automatic alternating-current substations has been reliable, and keen interest in this development is being shown. Very convincing information regarding the reliability of automatic direct-current substations has been obtained during the past year in St. Louis and Cincinnati, the former being of 1,800 kw. rating and the latter of 1,875 kw.

At least two systems of complete remote supervision and control of distance switching over telephone lines have been developed and are being installed. Several companies have installed equipment to provide communication over their high-tension transmission lines. The operation of carrier-current apparatus is very satisfactory, and communication can be maintained through disturbances which would cripple the line telephone.

A definition of circuit-breaker duty cycle has been agreed upon by the A. I. E. E. protective devices committee and the electrical apparatus committee of the N. E. L. A.

Inductive Co-ordination

The report of the inductive co-ordination committee, R. N. Conwell chairman, reviews the progress made during the year. As a whole the year's work has advanced along lines of development outlined in the last report.

Co-operative procedure between the Bell telephone system and the N. E. L. A. was one of the chief activities during the year and resulted in the adoption of the joint "Principles and Practices," in the Dec. 9, 1922, report of the joint general committee. This is probably the outstanding achievement of the year. Continued organization and expansion of the activities of the geographic division and local committees on inductive co-ordination was another prominent result of the year's work.

Officers Elected

AT THE meeting on Friday the following were elected president and vice-presidents National Electric Light Association for the ensuing year:

President, Walter H. Johnson, Philadelphia Electric Company, Philadelphia, Pa.

First vice-president, John A. Britton, Pacific Gas & Electric Company, San Francisco, Calif.

Second vice-president, J. E. Davidson, Nebraska Power Company, Omaha, Neb.

Third vice-president, R. F. Pack, Northern States Power Company, Minneapolis, Minn.

Fourth vice-president, H. T. Sands, Charles H. Tenney & Company, Boston, Mass.

A.S.M.E. Nominates Officers

AT THE spring meeting of the American Society of Mechanical Engineers in Montreal, May 28-31, the nominating committee presented the following nominees for the offices of the society for next year. Election by ballot will be held in the fall.

President: Fred R. Low, Editor *Power*, New York City.

Vice-president: George I. Rockwood, Worcester, Mass.; M. L. Cooke, Philadelphia, Pa.; W. J. Sando, Milwaukee, Wis.

Managers: E. O. Eastwood, Seattle, Wash.; F. A. Scott, Cleveland, Ohio; E. R. Fish, St. Louis, Mo.

Treasurer: W. H. Wiley, New York.

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American Association News

Welded Rail Joints

THE meeting of the executive committee of the welded rail joint committee was held in Cleveland, Ohio, June 1, 1923, at the offices of the Cleveland Railway, with the following committee members and guests present: E. M. T. Ryder, vice-chairman; Dr. H. L. Wittemore, representing Dr. G. K. Burgess, chairman; W. F. Graves, representing C. A. Adams; J. Wolfe, representing E. J. McIlraith; W. W. Wysor, J. H. Haylow, representing G. L. Wilson; R. C. Cram; C. F. Gailor, representing H. M. Steward; G. C. Hecker and W. Spraragen, secretary. Several members of the committee on way matters of the A.E.R.E.A. also were present as guests.

Secretary Spraragen presented a financial statement showing the amount of contributions, the amount of expenditures to date and the balance on hand.

Mr. Ryder, who presided in the absence of Dr. Burgess, stated that there had been a change in the financial arrangements between the American Welding Society and the National Research Council in regard to the services of its secretary. A resolution was passed fixing the amount to be paid to the American Welding Society by the welded rail joints committee for the services of its secretary.

Secretary Spraragen presented a statement showing the status of the shipments of rail joints for test purposes. He stated that approximately one-third of all joints had been shipped to the various laboratories and called attention to the necessity for prompt action in regard to the shipment of the remaining joints, so that it will be possible to make tensile tests before the Emery 1,150,000-lb. testing machine at the Bureau of Standards is dismantled.

Mr. Wolfe presented for Mr. McIlraith a report and drawings covering the design of a repeated impact testing machine delivering blows that represent approximately the impact delivered by an average car wheel passing over a cupped rail joint. After a discussion it was finally agreed that there were so many factors involved as to make it practically impossible to approach actual service conditions with this machine. Several modifications were suggested. Another feature discussed was the type of foundation and method of supporting the test joints. It was finally agreed to prove the design submitted by Mr. McIlraith, and the committee authorized the purchase and erection of a repeated impact testing machine at a cost not to exceed $2,000. The machine will be erected at the Bureau of Standards, Washington, D. C.

A telegram from M. B. Rosevear, chairman power distribution committee, asked that the testing machine be arranged to test trolley wire and collectors simultaneously.

Mr. Wysor then submitted a report and drawings covering the design of a rotary service testing machine. It was the sense of the committee that the design as submitted was satisfactory except for a few details. The committee voted an expenditure of a sum not to exceed $12,000 to build and erect such a rotary service testing machine at the Bureau of Standards, Washington.

Upon invitation of J. H. Alexander, president of the Rail Welding & Bonding Company, the committee visited its plant, where a very interesting description was given of the research work in the development of seam-welded rail joints. Data collected by the Rail Welding and Bonding Company were made available to the committee.

Way Committee

The committee on way matters of the American Electric Railway Engineering Association met in the offices of the Cleveland Railway on May 31. Reports of the various sub-committees were presented and action taken on each.

In connection with sub-committee No. 1, on standardization of frogs and car clearance easements, data were submitted with a view to reducing the number of standard frogs. The committee decided that formal action at this time was not justified, and recommended that a further study of the subject be made by next year's committee. In regard to car clearance easements, the sub-committee reported that it had been unable to confer with the committee on unification of car design. As this subject was considered to be distinctly a matter of car design rather than a way matter, it was decided to recommend that the subject be discontinued as an assignment to the way committee. It was further recommended, however, that a request be made that several way engineers be appointed members of the next year's committee on unification of car design.

A report of sub-committee No. 2 on substitute ties was presented. It was pointed out that several designs of substitute cars are in use on a considerable mileage of track. The committee felt that this subject was of great importance and that it should be continued. Steps were taken to secure co-operation between this committee and the tie committee of the A. E. R. A., and it will be requested that next year's tie committee have representatives of the way committee in its membership.

A report of sub-committee No. 3 was read, consisting principally of a statement of the sub-committee's activities in co-operating with the committee on buildings and structures. There was considerable discussion as to whether or not the subject of the design of small bridges, culverts and trestles should be assigned in the future to the buildings and structures committee or to the way committee. It was the sense of the meeting that this subject was primarily a way committee subject, and it was recommended that it be assigned to next year's committee.

Sub-committee No. 4 on the design of track construction for paved streets stated that the specifications had been submitted also to a committee of the American Society of Municipal Improvements, and it was the understanding that the specifications had been approved by the latter body. Formal action of the A.S.M.I. will no doubt be taken at the annual convention of this society in October. The specifications as submitted by the sub-committee were approved by the way committee with minor changes. If adopted by the A.E.R.E.A. and the A.S.M.I., these specifications should permit the establishment of more harmonious relations between city engineers and electric railway engineers as they provide for the first time a design for track construction in paved streets which appears to have the unanimous approval of all concerned.

Sub-committee No. 5 reported that the work of the welded rail joint committee had been followed and that a report of the work thus far will be summarized and included in the final report of the committee on way matters.

The sub-committee on review of existing standards reported that all of the standards on way matters in the engineering manual had been reviewed and that a number of revisions bringing the specifications into conformity with the latest and most generally accepted practices has been made. A complete report covering in detail the changes recommended will be included in the report of the way committee.

A report covering the revision of specifications for manganese steel switch pieces was presented and resulted in a great deal of discussion, the report subsequently being verified and approved.

Those present were W. F. Graves, chairman; H. H. George, vice-chairman; C. F. Gailor, secretary; E. M. T. Ryder, C. A. Alden, Victor Angerer, E. B. Entwistle, J. B. Tinnon, W. W. Wysor, J. H. Haylow, H. Fort Flowers, G. C. Estill, Charles H. Clark, Mr. Wolf, as representing A. McIlrath, and G. C. Hecker of association headquarters.

Charles A. Coffin Prize

THE committee of the American Electric Railway Association on the Charles A. Coffin Foundation prize is urging every electric railway company that contemplates participating in the award to advise the committee of its intention as promptly as possible. A representation of the railway company's activities and accomplishments covered by the field of the award should be in the hands of the committee by Aug. 15. The conditions of the award were set forth in a letter of March 19, published in ELECTRIC RAILWAY JOURNAL for March 24, page 529.

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Maintenance of Equipment

Grinding Cylinders and Boring Bearings

ACCOMPANYING illustrations show equipment used in the Fairview shops of the Lehigh Valley Transit Company, Allentown, Pa., for grinding compressor cylinders and reboring the crankshaft bearings. Compressor cylinders which have become scored are babbitted and then ground by the use of this fixture. For the grinding operation the equipment is installed in the position ordinarily occupied by the compressor motor. The supporting framework has holes which fit those used for bolting the motor to the compressor frame. The mechanism is driven by a small motor with a belt and gearing attachment. When in position, the herringbone gear on the geared end meshes with that which drives the crankshaft.

A special piston is used for the grinding. This consists of a regular piston which has been cut in two and provided on the inside with means for connecting to the regular connecting rod. A spring arrangement forces the two pieces apart, so that they bear firmly against the lining of the cylinder. On the outside of the grinding piston are numerous small holes, which collect and distribute the emery grease. Additional emery grease is applied with the hand as needed. A valve grinding compound made by the Hall-Thompson Company, Hartford, Conn., is used in Allentown.

The grinding piston is turned as it is being driven, which is accomplished by means of a ring screwed into the end of the piston.

In babbitting the cylinders where there are grooves, these are scraped with a steel scraper to clean them, and these are made deep enough to hold the babbitt lining. A brass scraper is then used to coat the iron so that the babbitt will stick when applied.

Attachment Also Provided for Boring Crankshaft Bearing

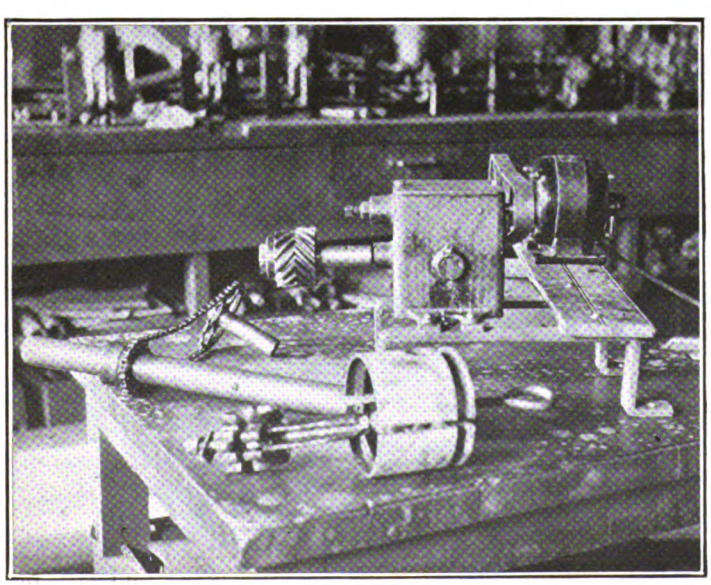
The same driving mechanism as that for grinding cylinders is used for boring out the crankshaft bearings. The herringbone pinion is removed from the geared end of the mechanism and a sprocket is substituted. The boring bar has a similar sprocket, but of smaller diameter. This is placed in position after the bearings have been babbitted, and the driving mechanism operates the boring bar through a chain, which fits around the sprocket.

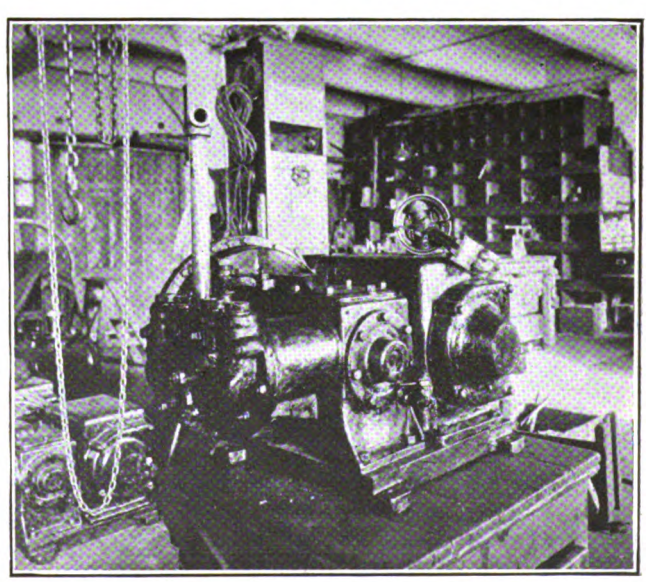
By use of this method perfect alignment is assured since the boring of all bearings is done by the same bar which is supported to insure accurate alignment.

Bending Carlines on Tire Bender

IN ITS car construction and repair work the West Penn Railways, Connellsville, Pa., has occasion to use many bent sections of steel. Where continuous curving is necessary the usual method on many properties is to bend the steel about a metal former, forcing it into position by hammers or swages. This company has obtained better results by the use of a tire bender, such as is familiar to the wheelwright. This device consists of three bending rolls, which are adjustable to produce various degrees of curvature. The standard tire bender has cylindrical rolls for flat strap tires. To accommodate angles and T sections, such, for instance, as are used in making carlines, the rolls furnished with the bender are replaced by rolls having grooves in the middle to accommodate the webs of the steel sections. This does not, incidentally, prevent the bending of flat sections on the same rolls, so that it is not necessary to change them every time such sections are bent.

Proper adjustment of the rolls for any curvature is made easily, and all carlines are thus bent to the same radius without deformation, such as is customary when they are hammered into shape in a former. The





At Left, Mechanism Used for Grinding Compressor Cylinders and Boring Crankshaft Bearings. At Right, Westinghouse D 2 EG Compressor in Place for Overhauling. Grinding Piston Shown on Top of Compressor

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fitting of the carlines is easier and the assembly work that much reduced.

The facility with which the bender may be used for various operations makes it a valuable adjunct to the shop.

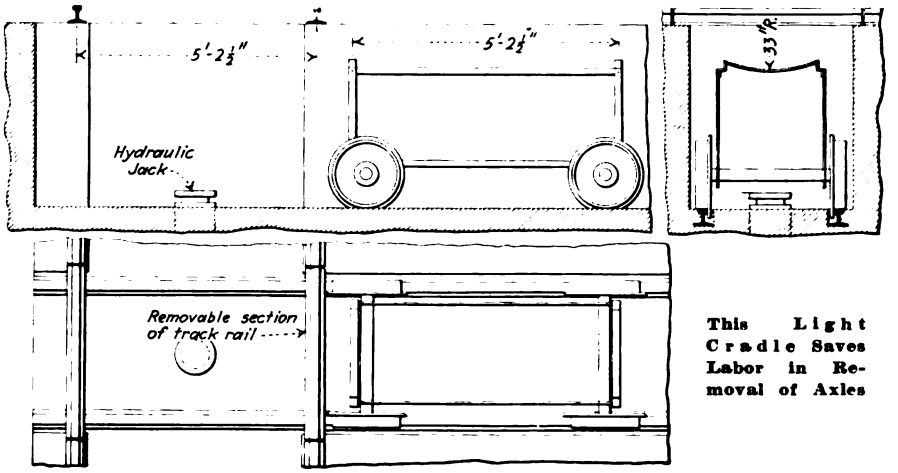
Devices for Building Up Axles and Flanges

ACCOMPANYING illustrations show attachments which have been added to an old scrap lathe for driving axles and wheels while they are being built up by arc welding. Axles are placed in the lathe centers and the lathe operating head is driven in the usual manner. As the back gearing of the lathe does not sufficiently reduce the speed a small countershaft is belted to the back shaft of the lathe, and a small pulley on this countershaft is belt-connected with a collar clamped on the axle by means of set screws. With this arrangement a very slow speed is obtained, and this can be adjusted so as to meet the desired speed of welding.

As the axle is belt-driven, it can be turned readily by slipping the driving belt. To facilitate this a clamp is fastened around the axle and the welder uses it as a handle for stopping the axle at any desired location or for bringing it back to any position should it rotate too far.

By this method all worn seats of axles are built up by applying the metal spirally around the axle and thus minimizing welding strains, producing a result similar to that secured with an automatic welding machine.

The same mechanism is used for rotating wheels, but in this case the wheel is belted to the back axle of the lathe, the belt passing around the wheel. The axle carrying the wheels is supported at the ends by two horses in a position convenient for the welder.

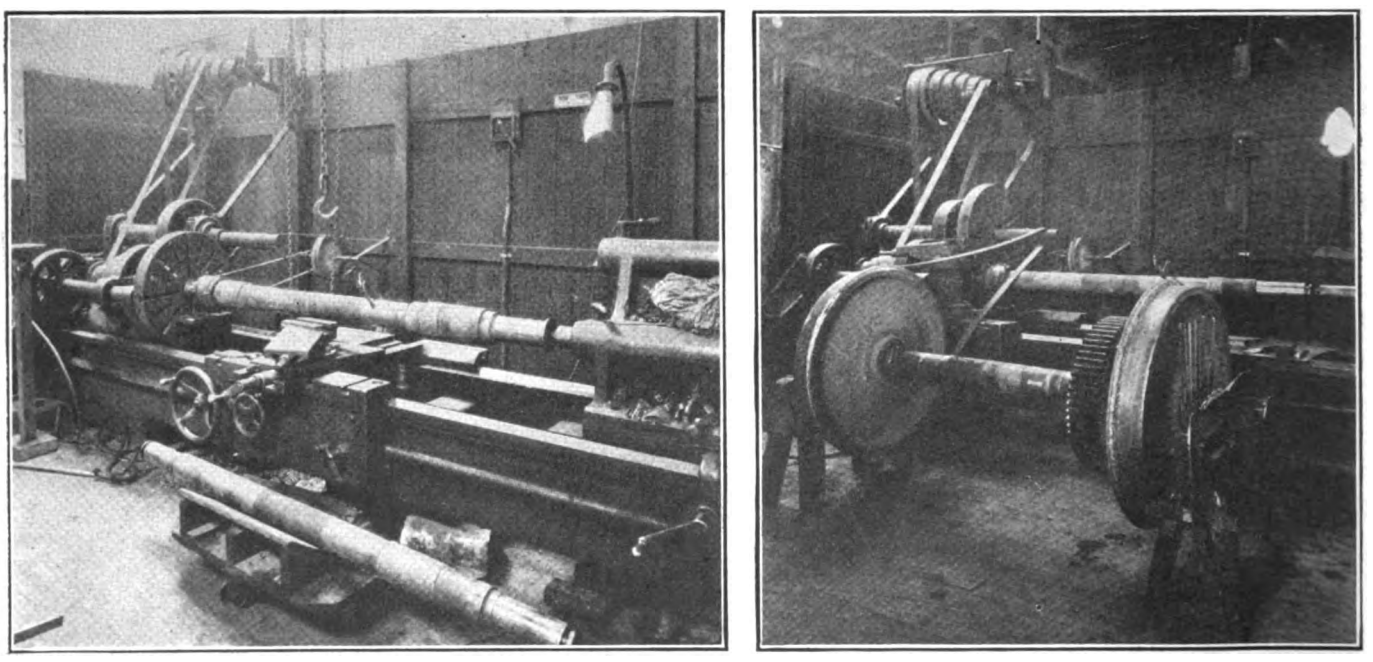


This Light Cradle Saves Labor in Removal of Axles

Convenient Method for Removing Axles

THE Beaver Valley Traction Company of New Brighton, Pa., has at its Junction Park shops a novel method for removing wheels and axles from single-truck cars. A small pit is constructed at right angles to the main track pit. A light carriage of iron strap is made with four wheels to run on a transverse track at the bottom of the side pit. This carriage has a wheelbase the same as the track gage. The top crossbars of the carriage are curved with a radius of 33 in. to take standard wheels. The short section of the track rail above this transverse pit is made removable.

In using this wheel carriage the car is run out of the pit so that one of its axles is directly above the center of the side pit. The body and truck are then jacked up, and the removable section of rail is taken out. The small carriage is then run in to line up with the wheel, after which the hydraulic jack is dropped, and the axle falls with it so that the wheels rest on the carriage. The carriage is then run out to one side, and the wheel and axle may be removed by a crane. A new axle may then be substituted for the one taken out and the car put back in service without being held up longer for the repairs to the axle.



At Left, Belting Attachment to Old Lathe for Rotating Axle During Welding. At Right, Arrangement for Rotating Wheels for Building Up Flanges by Welding

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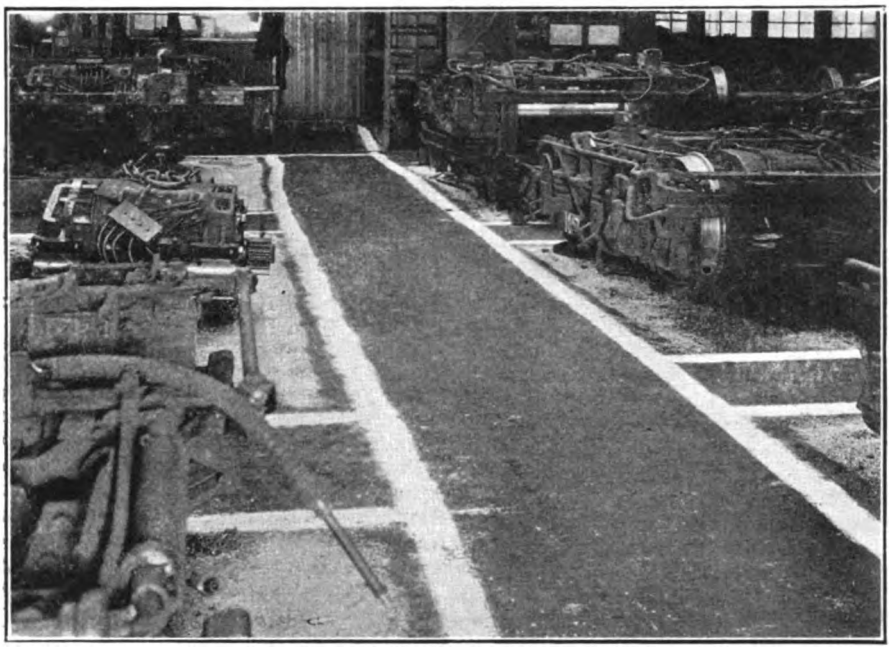


Truck Overhauling Shop Divided Into Sections by Whitewashed Lines

Eliminating Disorder in the Truck Overhauling Shop

THE accompanying illustration shows a section of the Thirty-ninth Street shop of the New York Consolidated Railroad, Brooklyn, N. Y. In order to eliminate the disordered appearance from having various truck parts scattered over the floor, the truck overhauling section is divided into squares by whitewashed lines on the floor. Each truck to be overhauled is set in the center of such a section and the various parts are not allowed to accumulate in the aisles. Sawdust is used on the floor and this is renewed at frequent intervals.

In addition to eliminating the disordered appearance by this method, the work is greatly facilitated as the men do not need to jump over various parts while working and also there is less danger of accidents happening.

Helical Gears Show Little Wear

THE West Penn Railways, Connellsville, Pa., has been using helical gears on its cars for a number of years. The original installation is still in use, and now has made approximately 500,000 car-miles. After this amount of service, the wear is very small, the gear being worn about $\frac{3}{64}$ in. and the pinion $\frac{1}{32}$ in.

This type of gearing has now been adopted as standard by the company. According to Daniel Durie, general superintendent, it has been found that much better service is obtained from the cars thus equipped. Vibration is so much less that the wear on many parts of the equipment is reduced materially. Axles and motor bearings show this especially.

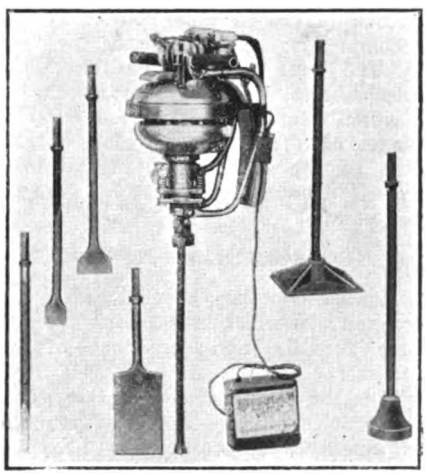
Another important feature is that commutation is much improved. Motors of the non-interpole type are in use almost exclusively on the interurban cars. With ordinary spur gearing there was considerable difficulty from flash-overs when the voltage went up above 650, but with the helical gears it has been found possible to apply 700 to 720 volts without trouble. In fact, commutation on the motors under these conditions is better than it was at considerably lower voltages with spur gears.

New Equipment Available

Gasoline Hammer Drill

A GASOLINE impact drill of the air hammer type has been placed on the market by the Pennsylvania Gasoline Drill Company, Philadelphia, Pa. This drilling unit is self-contained and portable, so that one man can operate and transport it from place to place. It combines the action of an air hammer and a gasoline engine in such a manner that the drilling unit has but two moving parts, the hammer piston and the flywheel assembly. There is no crank or connecting rod and no spring or other yielding member used in the internal construction. Exhaust valves or camshafts are not found necessary, as the air and gas passages are fixed ports, cut through the solid steel of the cylinder.

The down or power strokes of the hammer piston are made with approximately 900 lb. of gasoline explosive force thrusting it forward to hit the drill bit. The flywheel is employed only to return the hammer piston on the upward or compression stroke. Approximately 1,800 impacts are struck each minute. For carburetion, a gasoline mixing valve is used which permits the drill to be worked at any angle. While the drill continues to run at full speed, the operator shifts it from one position to another and to any desired angle without affecting its operation. To start the drill, the operator gives the rim of the flywheel a pull by hand and it starts.



Gasoline Drill and Street Opening Tools Used

Lubrication of the various parts of the drill is provided by scoops, fixed to the hub of the flywheel, which, in turn, runs in a reservoir of oil and delivers a supply to the moving parts. A four- or six-cell dry battery is used for ignition.

Special alloy steel of 210,000-lb. tensile strength is used in the impact members of the structure. To avoid checks, flaws and other imperfections, these parts are machined from solid steel billets. When these parts are heat treated, recording instruments are employed to avoid unknown variations in the heats, thus giving uniformity in the steels. Machining dimensions with very close tolerances are fixed to assure the interchange of repair parts.

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The News of the Industry

Conciliation Board Reports

Recommends the Eight-Hour Day for Ottawa Employees—Company Refuses to Accept

The board of conciliation appointed under the industrial disputes act to consider a dispute as to hours of work and wage rates between the Ottawa Electric Railway and those of its employees who are members of Amalgamated Division 279 presented its majority report on June 2. The representative of the company on the board dissented from the award.

The board recommends the establishment of the eight-hour day throughout all the departments of the business and an increase in wage rates sufficient to make the daily wage the same as was earned before in nine hours. It also recommends the abolition of the "pull in" and "pull out" carhouse time allowance so that the net result to the individual employee is a reduction in wages of about $25 per year, but the cost to the company of establishing the eight-hour day would be $115,440 per annum.

COMPANY STATES ITS CASE

A statement has been issued by the company in which it explains the reasons for its non-acceptance of the findings.

It is the company's contention to the board of conciliation that no reasonable arguments were presented on behalf of the employees proving the necessity for the eight-hour day and that it would neither increase the railway revenue nor the efficiency of the service. That if adopted the fare would inevitably be raised because the present revenue of the company could not stand the $115,440 a year which the institution of the eight-hour day would cost the company. To prove this the company presented figures showing that with a conceded value of between $4,500,000 and $5,000,000, an actual cash investment to March 31, 1923, of $4,220,762, and with net profits for 1922 of $278,914, for 1921 of $235,615 and for 1920 of $282,250, the average for the past three years was $265,593.

On the matter of wages the company claimed that it had accepted increases in wages recommended by various boards because the cost of living was abnormal. The board of conciliation last year brought out the fact that the cost of living had dropped 24 per cent. It recommended a reduction in wages of 12½ per cent, still leaving a large margin in favor of the employees. Further, that under the present wage scale a conductor or motorman can earn, without working overtime, $1,500 a year.

The company contended that the board indicated an increase in yearly wages was not considered necessary, but recommended the 6 cents an hour increase for the single purpose of establishing the eight-hour day. In fact the company argues the adoption of the majority report would mean a slight decrease in the wages to the individual trainman because it recommends the abolition of the "pull out" and "pull in" time allowance about $25 a man a year.

In conclusion the company says it cannot continue to accept recommendations from boards of conciliation which constantly add large sums to its operating expenses. Since 1918 six boards have been created by the Department of Labor to deal with the disputes between the company and Division No. 279. Feeling that the eight-hour day is not necessary or justified, the company suggests that employees who are not satisfied seek employment in some other occupation.

Plans Revived for Connection with Cincinnati Loop

Officials of the Cincinnati Rapid Transit Commission are keenly interested in reports from Indianapolis that the directors of the Indianapolis & Cincinnati Traction Company have revived plans for a connection with the Cincinnati rapid transit loop now under construction.

C. L. Henry, president of the Indianapolis & Cincinnati Traction Company, was one of the original boosters of a rapid transit loop which would afford entrance for interurbans into Cincinnati. Plans submitted by Mr. Henry several years ago, which had tentative approval of the Rapid Transit Commission, called for an extension of the line from Rushville, Ind., to Harrison, Ohio, thence through Westwood and the Mill Creek Valley to a point in Cumminsville where connection with the loop was to be effected.

At a recent meeting of directors of the Indianapolis & Cincinnati Traction Company it was stated a more convenient route had been selected by way of College Hill. The entrance to the city would be made over the track of the Cincinnati & Dayton Interurban Railway and to the loop at Spring Grove Avenue.

Frank S. Krug, chief engineer of the Cincinnati Rapid Transit Commission, said that the proposed change in the plan from Harrison by way of College Hill would eliminate the necessity of building a large viaduct over Mill Creek and represented a saving of at least $750,000.

Electrification Approved

Governors of New York and Massachusetts Sign Bills Calling for Large Capital Expenditures

Governor Smith of New York has signed the measure requiring the electrification of all railroads in the city of New York. Many representatives of the New York Central and other roads, such as the Baltimore & Ohio, operating on Staten Island, vigorously opposed the bill at the public hearing held during the week ended June 2. They declared that to comply with this order was impracticable. The law, it is estimated, if made effective will require the expenditure of between $50,000,000 and $100,000,000 before Jan. 1, 1926. The electrification measure was ostensibly directed against the New York Central's west side freight line in New York City, but as drawn is all inclusive in its provisions. Except in the case of the lines of the Baltimore & Ohio Railroad on Staten Island, nearly all the lines of the other companies entering New York are already electrified.

The electrification bill amends the public service commission law of New York as follows:

Sec. 53-a. Electrification of railroads in certain cities. No railroad corporation, operating a railroad or a part thereof within the limits of a city of the first class having a population by the last state or federal census of 1,000,000 or more, shall on or after Jan. 1, 1926, use any motive power in the operation of such railroad or part thereof within the limits of such city, except electricity to be generated, transmitted and used in said operation in a manner to be approved by the Public Service Commission. The commission shall have power to prescribe the location, elevation, size, kind and construction of poles, wires, safety devices, conduits, and all erections, buildings, fixtures, appurtenances and equipment used or found by the commission desirable, to be used in the electrification, maintenance or operation of such railroad or part thereof within the limits of such city.

Sec. 2. This act shall take effect immediately.

BOSTON ELEVATED WILL OPERATE LINE

Governor Cox of Massachusetts has signed the so-called Dorchester Rapid Transit Bill, providing for the operation of electric trains over the Shawmut Branch of the New Haven road from a point near Andrew Square, South Boston, to Fields Corner. It is intended that the Boston Elevated Railway shall operate the line.

The improvements intended to be carried out under the provisions of this measure call for the expenditure of more than $5,000,000. Of this amount it is expected that the State will be called upon to contribute about $4,000,000, while it is expected that the expenditure on the part of the Boston Elevated Railway for rolling stock and other equipment will account for the other $1,000,000 of the total expenditure.

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Purchase Proposal Explained by Milwaukee Company

The Milwaukee Electric Railway & Light Company has recently explained in display space in the daily newspapers the recent reports of a proposed operating and option-to-purchase contract between the company and the city of Milwaukee.

The contract under discussion is being negotiated by committees representing the city and company, subject to ratification or rejection by the people. It will, if ratified, give the city more power than it now has to supervise the company's services. It will give the city an option to purchase the company's property at any time, on six months notice, at a price agreed on in the contract, plus cost of additions to date of purchase. It will provide a financial interest for the city in economies resulting from closer co-operation between the city and company in operating matters. The company explains that purchase by the city, at such price, would assure preferred shareholders repayment in full of every dollar they put into this business. This is the case at present, and must continue to be the case, according to the company, under state regulation of the company's financing of new growth from year to year.

In regard to bus service the company says that it aims to supply its transportation customers with whatever new forms of service they may desire. The company is operating one of the largest fleets of fast passenger and express motor buses, in city and interurban service, attached to any American street railway system. In this connection it says:

> Your company will supply increased bus service as fast as increase of public demand will warrant it. We think you need have no fear that your city government will discriminate against your company, in this field, in favor of folks from the outside. And you need have no fear of your company's ability to hold its field against all comers, in fair and open competition. We have never bragged of it, but your company for years past has been known among experts throughout the country as a leader in the invention and adoption of the best new methods and devices for improving street railway service, as well as in the other branches of its business.

The company also explained the idea behind the recently-installed city bus service, and said that "as in all large and rapidly growing cities increase in population provides plenty of work for both car and bus lines."

Wages Increased in Evansville

Frank L. Haas, vice-president and manager of the Southern Indiana Gas & Electric Company, operating the city car lines in Evansville and the Evansville & Princeton Traction Company, has announced a new wage agreement for the conductors and motormen, effective June 1. The new wage agreement calls for an increase of 4 cents an hour for employees on two-men city cars and also the same increase for interurban employees. The pact carries an increase of 5 cents an hour for employees on one-man cars.

The old wage pact, which expired at midnight, May 31, was for 36 to 41 cents an hour for two-men cars in the city, and 40 to 45 cents for one-man cars, and 38 to 43 cents for employees on the company's interurban cars.

The employees on the Evansville & Princeton Traction Company get a 4-cent increase, flat.

New men will continue to receive a 1-cent increase upon every six months of service.

Ordinance on One-Man Cars Introduced

Operation of one-man cars by the Columbia Railway, Gas & Electric Company, Columbia, S. C., will be permitted under an ordinance introduced by title into the City Council. The ordinance was introduced by the Mayor, who said he had a letter from the South Carolina Railroad Commission showing that that body had given the railway company authority to put on the one-man car in Columbia. There have been rumors for some time that the one-man cars would be used in Columbia. Charleston uses that system. The Columbia railway, which charges a fare of 7 cents with 3 cents for transfers, has, according to reports, been losing money and the adoption of the one-man car will reduce expenditures. At the present time, two-men cars are in operation. Jitneys, charging 10 cents per passenger, operate extensively in Columbia and have cut into the revenue of the car company to a considerable extent. Orders for new equipment have been referred to previously in the ELECTRIC RAILWAY JOURNAL.

Minimum Wage Scale Increased in Birmingham

A material increase in the minimum wage scale of workers is provided under a three-year contract which has been signed by the Birmingham Railway, Light & Power Company of Birmingham, Ala., and Local No. 725 of the Amalgamated Association, according to an announcement on May 25 by R. P. Bernhart, president of the local. The new contract became effective on June 1 and succeeds a one-year contract now in effect.

No change, it is stated, is made by the new contract in the existing maximum wage scales. The new contract, it is stated, provides better working conditions. Mr. Bernhart stated that it was ratified by the union by a 9 to 1 vote.

Trainmen on the extra board are guaranteed a minimum of six hours a day under the new contract. Under the old contract they were guaranteed a minimum of 105 hours in fifteen days. Based on 125 men on the extra board, Mr. Bernhart stated that this provision of the new contract will represent an increase of about $25,000 a year. Under the new contract, it is stated that regular trainmen get better runs and that a number of split runs are eliminated and new runs created. The minimum wage for shopmen, including apprentices and helpers, is increased by the new contract from 2 to 12 cents per hour, it is stated.

Mr. Bernhart estimates that seventy men will be affected by these increases in wages.

Queensboro Subway Tunnel Open

© Wide World Photos.

The last rock of the Queensboro subway extension to Times Square was broken a short time ago. Work was started on the tunnel last August and it is hoped that it will be completed by January, 1924, which will be nine months ahead of schedule. More than six tons of dynamite was used to drill through the rock from Grand Central to Bryant Park.

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California Lighting Company Wins Coffin Medal

The Southern California Edison Company, Los Angeles, of which John B. Miller is president, was presented on June 7 with the gold medal of the Charles A. Coffin Foundation, offered for the first time last year to the electric public utility company of the United States which made the most notable contribution during the year to the development of electric light and power service. This is the first award of the medal to be made by the foundation, which was created by the General Electric Company. The recipient was selected from eighteen electric light and power companies which submitted their year's records for consideration, and the decision is understood to have been extremely close. The presentation of the medal was made during the meeting of the public policy committee of the National Electric Light Association, which was holding its annual convention in New York. Frank W. Smith of New York, president of the association and chairman of the association's Charles A. Coffin prize committee, officially presented the medal.

The award of the medal was accompanied by the presentation of a check for $1,000, to be applied to the employees' benefit fund of the Southern California Edison Company, under the terms of the foundation.

The foundation comprises a fund of $400 000, the income from which is to be devoted to rewarding outstanding service in the electrical field. In addition to the gold medal to be awarded annually to an electric light and power company, provision is also made for a gold medal to be awarded to an electric railway company and for certain fellowships to graduates of American colleges and technical schools.

Commission and Mayor in Parleys on Transit for New York

A spirit of co-operation on the part of the city administration was manifested at the hearing recently before Mayor Hylan on modifications of the Transit Commission's plan for new rapid transit facilities for boroughs of Manhattan, Brooklyn and Queens. The Mayor stated emphatically that he proposed to give the public transit routes which it most desired.

Chairman McAneny of the Transit Commission told the Mayor the commission had accepted modifications of its crosstown route and the Washington Heights route which bring them into conformity with the Mayor's plans. He declared little change would be necessary in the proposed extension of rapid transit lines to Flushing and to Fort Hamilton or in the plans for completing Nassau Street line. Mr. McAneny urged approval of these routes by the Board of Estimate so that construction work could be started at once.

The Mayor expressed doubt as to the advisability of tying up new lines with existing lines operated under lease by private companies, and stated his desire to place the city in such a position financially that it could recapture any rapid transit properties deemed advantageous.

Wants Electrification of Roads Entering St. Louis

Director of Public Safety James N. McKelvey of St. Louis is sponsoring a move to compel the railroads entering St. Louis to electrify their lines within the city limits. It is part of the drive now under way for smoke elimination.

Mr. McKelvey has obtained and is studying a copy of the bill recently signed by Governor Smith of New York and referred to elsewhere in this issue providing for the electrification of steam railroads within New York City by Jan. 1, 1926.

City Counselor Haid will be requested for an opinion of the legality and advisability of a city ordinance for St. Louis to eliminate other than electric locomotives in St. Louis. Prof. E. T. Ohle, chairman of the St. Louis Smoke Advisory Committee, has stated that the McKelvey plan is worth consideration. The railroads have not been consulted.

Test Run Over Route Where Accident Occurred

Further investigation has been made by the New York Transit Commission of the accident about 5:03 p.m. on May 1, to a double-truck closed car No. 20 of the Manhattan Bridge Three-Cent Line. This car while eastbound was derailed at the Bridge Plaza, on the Brooklyn side of the Manhattan Bridge, and collided with two iron trolley poles between the tracks. The car was badly damaged and thirty-three persons were seriously injured. The preliminary investigation made by this commission indicated that either the brakes failed or the motorman failed to apply the brakes before reaching the reserve curve. As a result of further investigations made by the engineers of the commission, it developed that the equipment provided six methods of stopping the car:

1. By service application of the brakes from the motorman's valve.
2. By an emergency application of the brakes from the motorman's valve.
3. By an emergency application of the brakes from an overhead emergency valve.
4. By application of the hand brake.
5. By application of power to the motors through reversing them.
6. By the regenerative effect of the motors being short-circuited should power fail.

A car with equipment similar to the one in the accident was operated over the various grades of the line and stops made by all of the preceding methods. These tests showed that with maximum speeds of as high as 25 to 30 m.p.h., very short stops could be made upon the severe grade of the Manhattan bridge and that even had the air brake and the brake rigging of the car become entirely inoperative and the power lost for any reason the last-mentioned method of braking could still have been used in an effort to stop the car.

Maximum of Fifty-five Cents for New York State Men

The recent acceptance by employees of the New York State Railways in Rochester, Syracuse and Utica, N. Y., of the offer of the company, which embraced a wage increase of 5 cents an hour, was brought about after a series of conferences that were held in the three cities.

The men originally sought a scale up to 65 cents an hour. The wage prior to the increase was 46, 48 and 50 cents for employees of three, six and twelve months or more, respectively. Five cents an hour is added to each of these wage figures by the new contract, accepted by the men in simultaneous meetings in the three cities the morning of June 2. The chief opposition to the acceptance of the company's offer was encountered in Rochester. It is said that there was little opposition in Utica or Syracuse.

It is significant that the New York State Railways is the only large operator in the state which officially recognizes the trolleymen's union. The new contract, which expires on May 1, 1924, made no mention of a closed shop. Quite a number of employees, however, do not belong to the union at the present time.

According to officials of the New York State Railways, the wage increase involves an estimated additional expense to the company of $500,000 for the year.

Twelve per Cent Advance on Beaver Valley Lines

An agreement was recently entered into between the trainmen and management of the Beaver Valley Traction Company, New Brighton, Pa., whereby the men will receive an increase in wages approximating 12 per cent. At the same time wages of the carhouse and shopmen were voluntarily given a boost equal in percentage to the trainmen's advance. Recently employees on trackwork were given an advanced rate.

The co-operation of the employees in building up the business and in effecting economies were sufficient reasons for the increase, in the opinion of the company's representatives, although the present revenues of the company did not justify the increase. It has been many years since there was a wage dispute on the lines of the Beaver Valley Traction Company.

Journal Helps to Enforce Law

Considerable publicity has been given in the local newspapers in Buffalo to the article in the May 26 issue of the ELECTRIC RAILWAY JOURNAL entitled, "Bootlegging Jitney Rides in Buffalo." Parts of the article have been reproduced and newspapers have printed editorials calling upon the city authorities to enforce the anti-jitney law because of the unfavorable impression which is going out of Buffalo by reason of the illegal operation of buses in the city.

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Strike in Albany

Service Restored Between Schenectady and Interurban Lines—Jitney Service Gains

A new trolley men's union started to function among the employees of the United Traction Company in Albany and Troy on June 2, when the company officials discharged about a score of the leading members thereof. The day following, Sunday, and the day of the opening of the Elks' state convention, the men went on strike. Three or four cars were stoned early Sunday morning in Albany, the police promptly arresting the disorderly persons. The company was able, however, to maintain a 60 per cent service in the city of Albany on Sunday, although service with Rensselaer, Troy, Watervliet and Cohoes was not had until evening. The strike lasted exactly three days, all of the men except those the company had permanently discharged returning to work. The new union admits its defeat.

Service was restored between Schenectady and the cities served by its interurban lines this week, and while no attempt was made to run the full schedule, such trains as were operated received a goodly amount of patronage.

Schenectady Lines Also Affected

In the city of Schenectady an increased number of cars are being operated, although at seven o'clock at night the cars are put in the carhouse. They are carrying many passengers.

Rioting and disorder broke out in Schenectady on June 6, when three or four cars became stalled in the heart of the city, as the result of which one of the workers is in the hospital and three arrests were made. Further rioting occurred in the middle of the night when an attempt was made to return some cars that had been left on the streets to the carhouse, during which several shots were fired.

The Mayor highly commended the police for their prompt and efficient work and called upon the citizens and strike breakers to preserve law and order in the future.

Report Expected on Findings

The state investigation being conducted by the Industrial Commission, which was to have concluded its work on June 7, with the taking of the testimony of J. F. Hamilton, again postponed its final session until June 13, at which time it is hoped to conclude its work and render a report through the public press of the result of its findings. Union officials and Harry B. Weatherwax have already been examined, the latter having been catechized quite thoroughly as to capitalization, earnings, dividends and the general condition of the company as well as his personal reasons for entering into a new working agreement with the union.

Jitney service during the hot weather has gained considerable impetus between the cities affected by the strike, and with the temporary tie-up of the Albany lines on Sunday, motor service between Albany and Troy, which has been running in the face of injunction orders ever since the big Albany strike, gained a new lease of life. A regular terminal has been established opposite the post office in Albany, with a starter in charge, and cars proceed as rapidly as loaded. The starter is paid 25 cents for each loaded car dispatched.

On June 3 jitneys were being dispatched to Schenectady, Troy and Midway Park at the rate of one every two minutes from the Albany terminal. A similar terminal arrangement is had at Schenectady for its interurban service. No attempt has been made by the jitneys to compete with the regularly established and duly licensed bus routes.

The Schenectady Railway has not yet applied for an injunction to stop jitney service in that city.

Conference Called on Chicago Situation

In an effort to avert the threatened street car and elevated railroad strike in Chicago Mayor Dever called both sides in the wage controversy into conference in his office in the city hall on June 8. Although the Mayor has met the various groups separately several times during the past week, this was the first joint meeting of the officials of both local transportation companies and the union representatives. The deadlock over the 10-cent an hour increase demanded by the men continues.

A resolution was adopted on June 4 delaying the taking of a strike vote. William Quinlan, head of the union, presented the resolution at the meeting of the street car men's union at Carmen's Hall. It set forth that Mayor Dever asked the men to refrain from doing anything to "intensify the situation" until he had further chance to work for a settlement without an actual blockade of transportation.

The resolution set forth that the men would lose nothing by granting this "fair request," but would strengthen their position. It called for a continuation of the wage negotiations, which were broken off early during the week ended June 2. If the officers, aided by the Mayor, are unable to get a settlement proposal worth while submitting to the men, they are empowered, if they deem it necessary, to take a vote of the membership on the question of a walkout.

The younger members of the union started a stampede as soon as the resolution was read. In the midst of the bedlam Mr. Quinlan pounded his gavel and declared the resolution adopted. The meeting was declared adjourned.

While the way was opened for continued negotiations between officials of the local transportation companies and the union men, a threatened walkout of the trackmen, who number 2,000, was also headed off. They also met Monday night all primed for a strike vote, but Samuel P. Luzzo, president of the union, announced that late in the afternoon he had held a conference with G. A. Richardson, vice-president in charge of operation of the Chicago Surface Lines, and that the companies had conceded that when the wage scale is fixed for the trackmen it will be made retroactive, being given the same date as that of the trainmen. A threatened "sympathetic strike" of the substation electricians, whose wage agreement does not expire until later in the year, was also forestalled by this action. Employees of the Elevated Lines are expected to take similar action at their meeting on June 9.

Wages Increased in Philadelphia

In conformity with the wage increases of the Cleveland Railway the general committee under the Co-operative Plan has agreed that the scale of wages of the trainmen of the Philadelphia Rapid Transit Company be increased 1½ cents an hour. The new scale in cents per hour effective May 1, 1923, is as follows:

	Men New	After Three Months	After One Year
Surface motormen and conductors ..... (Operators—one-man cars, 5 cents additional.)	59	62	64
Elevated motormen ...	62	65	67
Elevated conductors ..	59	62	64
Elevated guards	59	61	62

The Co-operative Plan for Collective Bargaining provides as a basis for determining wages the average of the wage scales of the electric railway companies in Chicago, Detroit and Cleveland.

News Notes

One Dead in Accident.—One person is dead and four injured as the result of a runaway car of the Sixth and Amsterdam Avenue route speeding down the hill on Amsterdam Avenue and 118th Street, New York, jumping the track and crashing into a five-story apartment building. The accident occurred on June 7. The damage to the front wall of the building is estimated at $15,000.

Wages Advanced Five Cents.—The Pennsylvania-Ohio Electric Company and the Youngstown Municipal Railway, operating city lines in Youngstown and Warren, Ohio; New Castle and Sharon, Pa., and interurban lines connecting those cities, have entered into new wage agreements with their car service employees, granting an advance of 5 cents an hour. The new wage scale is 48 cents an hour for the first three months of service, 51 cents an hour for the next nine months and 57 cents an hour after one year, with 5 cents an hour additional on each classification for one-man operation.

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Financial and Corporate

Warrant Basis in Seattle

Railway Employees Will Take Action—Five-Cent Fare Accumulates $550,000 Deficit

The Seattle Municipal Railway system is now on the warrant basis and will continue to operate on warrants for the next year as regards supplies and equipment purchased. Warrants stamped "not paid for want of funds" were issued for the April bills for supplies and equipment.

In the meantime the men's union is debating plans of procedure offered it, in case warrants issued for its members' pay and stamped not payable because of lack of funds are presented them in lieu of their checks. The head of the trainmen's union states that the union will take no action as a body until the warrants have been offered them, believing that the City Council will find some way to meet the payroll with negotiable warrants. If no such action is taken, the union members may ask for an injunction restraining the city treasurer from laying aside any money for interest on the purchase contract on the theory that labor has the first claim on the car lines' receipts.

Under the 5-cent fare, the lines will have accumulated a deficit of more than $550,000 during the months of March, April, May and June. This must be reckoned with other charges in the issuance of warrants. The fare bill raising cash fares to 10 cents, with sale of tokens at three for 25 cents, will be passed over the veto of Mayor Brown, but will not become effective before July 4.

A. W. Leonard, president of the Stone & Webster interests in Seattle, recently returned from a business trip to Boston. He has advised City Council members that the Old Colony Trust Company, trustee for the holders of the bonds issued by the city of Seattle to purchase the railway system, will be glad to discuss proposals for an extension of time in which to pay off the obligations. The first requisite for entering into negotiations would be the establishment of an "adequate fare." Mr. Leonard was not prepared to say whether the 8½-cent fare proposed would be deemed "adequate."

Files Suit to Force Payment on Chicago Railway Certificates

Holders of series 1 certificates of the Chicago Railways filed suit in the United States District Court in Chicago on May 28 in an effort to force payment of dividends at the annual rate of $8 a share with accruals on that basis from Aug. 1, 1917. The suit is directed against the company, its officials, the City of Chicago and Martin J. O'Brien, city comptroller. The municipality and the city comptroller are made parties to the suit because the latter failed to certify to bonds to which the company is entitled for extensions of its system as required by ordinances.

It is charged that under the plan for the reorganization of the Chicago Railways the series 1 certificates were to receive $8 a year cumulatively out of the net earnings before the railways should build up any surplus or make other disposition of net earnings. The payments, amounting to $240,000 a year were made up until Aug. 1, 1917. Since then the company has been used to build up a surplus, which now aggregates about $2,000,000, it is alleged in the bill. Back dividends to Aug. 1 amount to $48 a share or about $1,400,000.

The bill also asks that the company be restrained from selling, transferring or encumbering any first mortgage bonds which already have been issued to it or to which the company is entitled by means of capital expenditures.

The suit was filed in behalf of Mahlon D. Thatcher and Miss Helen P. Luce of Pueblo, Colo., and Rhode Island Hospital Trust Company of Providence, R. I.

$54,000,000 Valuation for St. Louis

Figure of Commission Contrasts with Company's Claim of $70,000,000 and City's Contention for $29,805,957 — Commission's Figure $43,347,790 Less than Par Value of Outstanding Securities

THE Missouri Public Service Commission handed down a decision on June 4 fixing the value of the property of the United Railways of St. Louis for rate-making purposes at $51,761,348, plus the Missouri Electric, a suburban subsidiary company, at $781,949, as of Jan. 1, 1919.

This means a valuation of approximately $54,000,000 because more than $2,000,000 has been added to the property since the date mentioned. The receiver of the United Railways claimed a valuation of $70,000,000, and the city's attorney contended for $29,805,957 as a rate basis value.

Will Seek Rehearing

Whether the valuation would be accepted by the receiver and the various groups of security holders had not been decided when this report was written. However, a rehearing of the case will be asked for by the railway company.

In its decision the commission stated it had taken into consideration the rule of the Supreme Court of the United States as enunciated in the Southwestern Bell Telephone case a few days ago, holding that reproduction value must be considered in evaluating public utility properties.

The commission gave the details of the valuation as follows:

Actual investment cost of physical property other than land	$35,013,419
Add 50 per cent to cover increase in prices	17,506,710
Total	$52,520,129
Deduct 30 per cent for accrued depreciation	$15,756,038
Total	$36,764,071
Add for construction overhead costs	5,252,013
Add for land at present market value	3,262,470
Add franchise (money actually expended	208,522
Add for working capital and stores and supplies	2,151,014
Add for promotion, cost of financing and consolidation	2,700,000
Add for going concern value	2,500,000
Total fair present value as of Jan. 1, 1919	$52,838,110

Of the foregoing amount $1,056,762 is not useful in transportation service. Hence the rate base as of the date aforesaid is $51,761,348, the commission comments.

It will be noted that the commission deducted $15,756,038 for accrued depreciation from the estimated reproduction cost of the property other than land.

The valuation figure is $43,347,790 less than the par value of the stocks, bonds and receiver's certificates of the company, which on Dec. 31, 1920, had a market value of $30,725,975. No prediction on the effect of the decision on the market value of stocks could be obtained from financiers in St. Louis. The normal effect would be to make the market value approach the appraised value.

The commission also announced that no increase would be made in the present 7-cent fare in St. Louis at this time. On the other hand, it declared that fares could not be reduced, as the present earnings of the railways are at the rate of 6.4 per cent on the valuation announced.

Additional Property Fixed at $1,056,762

A formal statement issued by the Missouri Public Service Commission, commenting on its decision, follows:

"The proceedings before the Public Service Commission for a valuation of the property of the United Railways, was brought to an end by the decision of the commission, as announced today, fixing the value of the property of the United Railways, of St. Louis for rate making as of the first day of January, 1919, at the sum of $51,761,348.

"The value of the company's additional property of the same date, which is not used for serving the public, was fixed at $1,056,762, making a total valuation of all the property of the United Railways, as of Jan. 1, 1919, of $52,838,110. The net additions to the property since the first day of January, 1919, to the end of the year

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1922, makes the total value of all the property at the end of 1922 the sum of $53,222,012.

"The revenues for the year 1922 were $20,166,386 and the operating expenses, including $1,500,000 for depreciation, were $16,741,231. This left $3,425,155 for a return upon the total valuation of $53,222,012 at the end of 1922, which is 6.4 per cent thereon.

"Under such a showing the commission finds that the rates should not be increased; neither can they be decreased until revenues are increased or expenses reduced.

"The value of the property of the United Railways as fixed by the commission is $43,347,790 less than the par value of the stocks, bonds and receiver's certificates of the company now outstanding.

"The value as fixed included the property of its subsidiaries, the Florissant Construction, Real Estate & Investment Company, which owns 500 acres of land in St. Louis County, and the St. Louis County Railroad, which owns 2 miles of track in St. Louis County now leased to the Missouri Electric Railroad, which in turn owns and operates an electric railroad from Wellston to St. Charles.

"A separate valuation was made by the commission of the property of the Missouri Electric Railroad and the commission fixed the value of the property of that company as of Jan. 1, 1919, at $781,949. The inventories and appraisals as made by the engineers were of that date.

"The accountants of the commission made an audit of the books of the companies for the purpose of ascertaining the cost of the property now in use. Their report shows the cost of the property of the United Railways in use as of Dec. 31, 1919, to have been $47,863,728. The report of the accountants is subject to further adjustments because complete accounting records were not available.

Three Years Spent in Appraising Property

"The commission engineers under the direction of Chief Engineer J. L. Harrop spent three years in making a detailed inventory and appraisal of the property of the company. There was no dispute as to the inventory of the property.

"The case turned largely upon land values, the unit prices to be used in making the appraisal of the other physical property, the intangible values claimed by the company and deductions for accrued depreciation. The commission allowed the company for land at its present market value as estimated by its engineers and added thereto $175,000. The commission sustained the city in making large reductions for depreciation.

"The construction overhead costs as fixed by its engineers were reduced from $7,387,693 to $5,252,013, which was a victory for the city.

"In response to the ruling of the Supreme Court of the United States as announced in the recent case involving rates to be charged by the Southwestern Bell Telephone Company, the commission added 50 per cent to the appraisal by its engineers of the physical property of the company other than land, to wit: $15,506,710. That amount was added to represent increased costs which prevail now over the costs incurred by the company at the time the property was constructed. That was one of the points urged by the receiver and the company and their attorneys.

"The commission sustained the contention of the city and refused to allow any part of the $7,000,000 contended for by the company for property which had been superseded and rendered useless by changing the roads from horse and cable road to electricity. The company claimed large allowance for cost of promotion, consolidation financing and going value, which were greatly reduced by the commission.

"A final analysis of the report of the commission shows the investment cost of the property of the United Railways as estimated by its engineers, plus the present fair market value as of the date of the appraisal, to be $48,587,438.

Valuation Case Started in 1918

"The accountants' report shows the cost of the property in use at the time of the transfer of the capital stock of the constituent companies to the United Railways, was $25,001,134, and that there were issued on account thereof by the United Railways stocks and bonds to the amount of $51,654,329. The property thus acquired by the United Railways was leased for operating purposes to the St. Louis Transit Company. The Transit Company continued to operate the property until Nov. 1, 1904, at which time it became insolvent and returned the properties to the United Railways.

"The property of the United Railways as valued by the commission included all the lines in the city and in St. Louis county, excepting that of the Missouri Electric Railroad, which was separately valued.

"Counsel for the company and the receiver contended for a valuation of the properties of the United Railways of $60,000,000. C. E. Smith, engineer for the city, estimated the value of the property for rate making at $40,000,000."

The valuation case was instituted in 1918. It grew out of an application made by the United Railways to raise its rates above that fixed in its franchise from the city to meet increased wages of its employees and other increased operating costs.

The commission authorized an increase of the fares from 5 to 6 cents for adult passengers in 1918. The Supreme Court upheld the power of the commission to increase fares above the rates fixed by the franchise. The commission thereafter arbitrated and settled a controversy between Rolla Wells, receiver, and his employees as to wages. The commission subsequently increased the fares from 6 to 7 cents for adult passengers, which is the fare now being charged. The report of the commission in the case contains more than 100 typewritten pages and marks the end of a long controversy, the case having been finally submitted to the commission for decision by the filing of the company's reply brief on March 20, 1923.

Communities Must Support Utilities or Lose Service

In its decision upholding the opinion of the State Public Utilities Commission, permitting the Indiana, Columbus & Eastern Traction Company to abandon its lines between Columbus and Grove City, the Ohio State Supreme Court revealed what the attitude of a community toward its utilities should be. The issue was referred to in the ELECTRIC RAILWAY JOURNAL for May 12, 1923.

The court ruled that, after careful reading of the entire records, one is convinced that the utility could have continued to serve the community if it had had its support and co-operation. Further, it is apparent that the community cannot support truck and bus service, operate privately-owned autos and at the same time afford sufficient patronage to the rail line to justify its continued operation.

The court said, in its findings, that it was a matter of astonishment that the village, city and state executive officials, together with hundreds of people in the vicinity where the line operated, could appeal to the court to compel the continuance of a service, when the conditions which made that service unremunerative were of their own choosing.

In the opinion of the court the commission realized the economic problem, because the original order of abandonment of May 9, 1922, was suspended until Sept. 1, 1922, evidently for the purpose of probation, to determine whether the protestants were earnestly and sincerely desirous of continued railway service.

The court said that it was deplorable that the community must lose the service of the utility and that the community would indeed sustain a severe loss. It might even be that some plan of co-operation between the utility and the community could be made to save the situation, but the court ruled that the legal processes presented by this review must be resolved in favor of the commission. For that reason the utilities commission's order was affirmed by the court.

The traction line expects to abandon service about July 1 on the branch, that period of time being granted by the court to the residents along the line to offer the company some satisfactory proposition or to take over its operation, but to date, such plan has not been forthcoming, and all indications point to complete abandonment of traction service on the branch when the limit expires.

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B. R. T. Reorganization Approved

Provisions of Agreement Drawn Up by Representatives of Security Holders Sanctioned by State Body

The New York Transit Commission approved on June 4 the reorganization of the Brooklyn Rapid Transit Company. This action removed the last legal obstacle to the reorganization and marks the end of the receivership, which has lasted for four and a half years. According to members of the reorganization committee, the Brooklyn Rapid Transit Company may be succeeded by the recently incorporated Brooklyn-Manhattan Transit Corporation as the holding company of the B. R. T. system early during the week commencing June 11.

The commission also approved the merger of the New York Municipal Railway Corporation into the New York Consolidated Railroad. The latter company operates the B. R. T. rapid transit lines. The New York Municipal Railway Corporation, the stock of which is owned by the New York Consolidated, was organized in 1912 to conduct contractual relations with New York City in its lease of subways. The merger of the two companies is part of the reorganization plan.

The name of the new company to be formed by the merger has not been made public. A meeting of the B. R. T. reorganization committee on June 4 authorized the purchasing committee to buy the New York Consolidated Railroad when it is offered for sale. Approval of this purchase by the United States District Court is expected at once, in which case articles of incorporation of the new company were expected to be filed in Albany on June 8.

The commission based its action in approving the reorganization plan and the merger on a thirty-page opinion by Commissioner Le Roy T. Harkness.

Mr. Harkness listed the benefits of the organization plan as follows:

1. Termination of Receiverships. Under the reorganization $5,000,000 cash and a $50,000,000 prior lien mortgage to take care of future needs are provided for rapid transit capital expenditures.

2. Long-Time Financing—The whole B. R. T. subway financing was based upon the issuance of nearly $60,000,000 six year 6 per cent notes, which during the war were replaced by three-year 7 per cent notes. This condition is remedied and the situation safeguarded by refunding these notes into long-term bonds carrying 6 per cent interest.

3. Payment of Debts.

(a) Receiver's Certificates and Accrued Interest—Receiver's certificates aggregating $12,000,000 and now carrying 8 per cent interest are paid off. Unpaid and accrued interest amounting to $27,000,000 is paid in part and the balance adjusted, thus clearing the way to paying current bond interest.

(b) Tort and Contract Creditors—Claims of tort creditors estimated at $2,200,000 are to be paid in cash in full. Claims of general contract creditors amounting to $1,600,000 are to be adjusted.

4. Provision of New Money—Stockholders are to supply $26,000,000 of new money for the purpose of the reorganization, of which $5,000,000 is to go for rapid transit needs, and the balance after paying claims and expenses, to provide additional working capital. This, with the new $50,000,000 prior lien mortgage, should put the new company in a strong financial condition, especially on the rapid transit side.

5. Public Participation—A voting trust agreement, put in evidence, provides for three representatives of the public on the board of directors.

6. Further Readjustment—This readjustment and the settlement of the legal questions that have abounded during the receivership paves the way for pressing to a conclusion the commission's plan for the readjustment of all the transit lines in the city.

7. Bettered Service and Restoration of Transfers—Over and above all, from the standpoint of the riding public, is the opportunity the reorganization gives for bettered service and the restoration of transfers as and when net earnings increase.

Mr. Harkness discussed the objections put forward by the city, which included opposition to a holding company, failure to consolidate the surface line properties, the receipts over expenditures and the valuations placed upon the company's properties by the commission. He said that the absence of the Brooklyn City Railroad, the lease of which by the B. R. T. was abrogated during the receivership, was unfortunate. He pointed out that this company might, however, come into the reorganization in the future.

Regarding the alleged overcapitalization and lack of sufficient margin of receipts over expenditures, Mr. Harkness said that a reasonable margin was indicated.

In discussing methods of valuation, Mr. Harkness held that in this case, original value less cost of putting in first-class condition was a reasonable method of calculation. On this basis the valuation of the B. R. T. properties was fixed at $164,992,589.

On June 5 the properties of the New York Consolidated and the New York Municipal Railway Corporations were sold to the representatives of the reorganization committee for $26,500,000, with the approval of Judge Mayer, on June 7.

The terms of the proposed reorganization were reviewed at length in the ELECTRIC RAILWAY JOURNAL for Feb. 17, 1923, page 304.

Sale of Waukesha Plant Being Negotiated

The Wisconsin Gas & Electric Company, Racine, a subsidiary of the Milwaukee Electric Railway & Light Company, has applied to the Wisconsin Railroad Commission for authority to issue $400,000 of serial notes for the purpose of paying in part the purchase price of the electric and gas plants of the Waukesha Gas & Electric Company, located about 25 miles from Milwaukee and 35 miles from Racine.

At present the output of the steam generating plant of the Waukesha Gas & Electric Company is supplemented by a high-tension transmission line from which the Milwaukee Electric Railway & Light Company has been supplying this company with additional energy from its Lakeside power plant.

The Waukesha Gas & Electric Company is owned by the American Gas Company, Philadelphia. The annual report of the company as rendered to the Wisconsin Railroad Commission, for the period ending Dec. 31, 1920, discloses a valuation of $983,032.

New Orleans Stock Off List

The stock of the New Orleans Public Service, Inc., both common and preferred, will be taken off the list of the New Orleans Stock Exchange. Official notification has been received by Howard W. Newman, president of the Exchange, from R. S. Hecht, chairman of the board of the Public Service, Inc., declaring that the stock is ineligible for listing under the rules of the Exchange.

Mr. Hecht stated further in his communication that the Chase National Bank, the Electric Bond & Share Company and allied interests not only control 90 per cent of the common stock as the result of the reorganization agreement, but recently became the owner of 50 per cent of the preferred stock. It was also stated by Mr. Hecht that those interested in the rehabilitation of the New Orleans system were of the opinion that it would be best to let the stock prove its value during the period of one year (the trial year) under which the public utilities are now being operated by agreement.

It was shown by Mr. Hecht that the preferred stock of the corporation advanced from 75 to 87½, under sales made in units of ten shares, between April 15 and May 15.

Jersey Central Traction Applies for Abandonment

The Jersey Central Traction Company, Keyport, N. J., has made application to the State Utilities Commission for permission to abandon its entire system of trolley lines. In its application the company gives as its reason for desiring suspension the wide use of automobiles by residents of Perth Amboy, South Amboy, Keansburg, Atlantic Highlands, Keyport and other towns. According to General Manager Hitchcock, the company has been running behind in operating expenses at the rate of $6,000 per month. The Jersey Central Traction Company employs more than 100 men and owns 40 miles of track and thirty-six cars.

Auction Sales in New York.—At the public auction rooms of A. H. Muller & Sons, New York, on June 6 there was sold $1,000 of the Oregon Electric Railway's first mortgage 5 per cent bonds, due 1933, interest May and November, 47 per cent.

Consolidation of Maryland Companies Proposed.—The Potomac Public Service Company and the Cumberland Edison Company will be merged into one company, known as the Maryland Public Service Company, according to present plans, which will be the subject of a hearing in Baltimore before the Maryland Public Service Commission. Both companies are controlled by the American Water Works & Electric Company.

Bids Made for Old Equipment.—The Southern Wisconsin Railway, which plans to build a railroad from Madison to the Sturgeon Bay region by way of Fond du Lac, has submitted a bid for

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the ties and rail of the Wisconsin Interurban line, which formerly operated in Madison and in Portage, but which went out of business early in 1922 due to bankruptcy. The cars of the company in Portage were sold to a Portage concern. These cars were dismantled and the trucks used under converted sand cars.

Common Stock of New Jersey Corporation on 8 per Cent Basis.—The directors of the Public Service Corporation of New Jersey have declared a quarterly dividend of $1 on the new common stock, payable to stockholders of record June 15. The quarterly dividend of $1 on the new common places this issue on a $4 annual basis, equal to $8 annually on the old stock, which was exchanged on a basis of one share of old common for two of new no-par value stock.

Quebec Railway Financing Arranged.—The newly authorized issue of preferred shares of the Public Service Corporation of Quebec, subsidiary of Shawinigan Water & Power Company, will be used in part to retire the $500,000 bond issue of the company outstanding and the remaining preferred will be used as funds are required. Future financing of the Quebec Railway will be done through the medium of the Public Service Corporation, the funds to retire the impending maturity of underlying bonds having been supplied through that company.

Passes Into New Hands.—Control of the former Lima-Defiance division of the Indiana, Columbus & Eastern Traction Company, passed into the hands of the newly organized Lima & Defiance Railroad on June 1. The transfer was made in accordance with the terms of sale approved by the Federal court at Toledo. Eventually, the new company plans the use of gasoline motor cars on the line, but at present electric cars will be used with power supplied by the Northwestern Ohio Light & Power Company at Lima.

United Railways Plan Declared Operative.—The plan of the United Railways Investment Company, Jersey City, N. J., for the transfer of its Philadelphia Company holdings to a new company, known as the Pittsburgh Utilities Company, has been declared operative under the alternative proposition of the plan to transfer the stock subject to a lien of a part of the outstanding collateral trust bonds of the United Railways Investment Company. Ladenburg, Thalmann & Company, in charge of the negotiation, reported on April 26, that not enough bondholders have agreed to the conditions to make the transfer free of the lien of the entire issue.

Application Made to Sell Line.—Application has been filed with the State Utilities Commission of Ohio for authority on the part of the Pennsylvania-Ohio Electric Company to sell to the East End Traction Company, Youngstown, a line of railway in East Youngstown. The appraised value of the line is $525,994, in payment of which the East End Traction Company agrees to sell $360,000 in 7 per cent first mortgage bonds and to issue $165,994 in common stock at $100 a share, in order to raise the necessary funds. The line in question extends from Stop 10 in East Youngstown to a point on the Ohio-Pennsylvania state line where the Pennsylvania-Ohio Electric Company main line intersects the East Youngstown branch.

Offer Gold Bonds.—A syndicate including Halsey, Stuart & Company and W. A. Harriman & Company are offering $3,900,000 of the Potomac Edison Company's first mortgage gold bonds, Series "A," 6½ per cent. The price is 97 and accrued interest to yield 6¾ per cent. The bonds are dated May 1, 1923, and are due May 1, 1948. The Potomac Edison Company was incorporated Oct. 16, 1922, under the laws of Maryland, as the Williamsport Power Company, and will acquire all the properties and franchises formerly owned by the Edison Electric Illuminating Company of Cumberland, Md., and the Cumberland Electric Railway, which own and operate without competition the power and light business in Cumberland and vicinity and the street railways in Cumberland.

Preferred Issue Offered to Yield 7.53 per Cent.—An offering of 3,500 shares of the Eastern Wisconsin Electric Company's cumulative 7 per cent preferred stock is being made by Paine, Webber & Company, New York, N. Y., at 93 per share, to yield 7.53 per cent. The company was incorporated under the laws of the state of Wisconsin in 1917 for the purpose of owning and operating public utility properties, and serves directly or indirectly twenty-five communities with various classes of public utility service including electricity for light and power, gas, street and interurban railways. The district centers around the cities of Sheboygan, Fond du Lac and Oshkosh, having a total estimated population of 110,000.

Funds Deposited to Pay Interest.—It was announced in Portland, Ore., on May 25 that the Great Northern Railroad and the Northern Pacific would again advance money to pay the semi-annual interest which came due on May 1 on the $2,000,000 of outstanding first mortgage 5 per cent bonds of the Oregon Electric Railway. It had previously been learned in New York that up to May 23 the company had not deposited with the trustee for the holders of the bonds funds to pay the interest, but the opinion was expressed by the informant of the ELECTRIC RAILWAY JOURNAL that the funds undoubtedly would be deposited shortly. This matter was referred to in the issue of this paper for May 12.

Last Minute Intervention in Receivership Case.—Joseph B. Cotton, representing a group of bondholders, has filed with the court on behalf of their trustee, the Bowling Green Securities Corporation, a petition to intervene in the New York Railway receivership case. Judge Mayer, presiding in the matter, declared that he thought all parties were acting in harmony so that the receivership might be adjusted in the near future. He pointed out that if the request for delay were pressed it meant that the matter of clearing up the receivership question would have to be postponed, and declared that he thought the court had not been fairly dealt with. When Mr. Cotton filed his petition Judge Mayer was sitting in an adjourned session of the court to pass upon the form of a decree for the foreclosure of the mortgage on the Broadway & Seventh Avenue Railroad. Parties to the action were attempting to expedite an appeal from judge Mayer's ruling that mortgages secured by bonds may be foreclosed in receiverships.

$1,225,000 Value of Superior Lines.—The Wisconsin railroad commission has fixed the value of the operating property of the Duluth Street Railway in Superior at $1,225,000. This is an increase of $268,000 since the last valuation in August, 1921, following the appeal of the company for a new valuation upon which a new rate could be determined. In all probability the company will ask for an increase in fares from 6 cents to 8 cents. The valuation which has been announced by the commission shows an increase of $508,313 over that of June 30, 1911, over which the controversy raged during the last fight for an increase in rates. That proceeding resulted in the increasing of rates from the sum of 5 cents to 6 cents. The Duluth Street Railway, in its appeal for a new valuation, stated that $1,750,000 was considered a "fair and reasonable" figure. The total income of the Superior lines during the first eleven months of 1922 was $351,863. Operating expenses and taxes amounted to $331,026. A loss of $7,537 was shown for the first eleven months of 1921.

Merger of Subsidiaries Planned.—The United Railways & Electric Company, Baltimore, Md., has perfected a plan for the merger of its divisional companies into a single corporation, the purpose being to simplify its corporate structure and to make favorable provision for the parent company and its subsidiaries. The system of the United Railways & Electric Company, it is explained, divides itself naturally into two parts. On one hand the old city lines and old suburban lines, and on the other the new suburban lines. Practically all of the old lines became one in the consolidation of 1899. The new suburban lines have been built by separate companies in order to obtain the best price for securities by giving the investor a first lien upon the new properties. It is proposed to consolidate and unite the Sparrows Point line and the Halethorpe line with the Maryland Electric Railways, which also owns certain trackage, into one company under the broad charter powers of the Maryland Electric Railways. All of the stock of the consolidated company will be owned by the United Railways & Electric Company.

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Traffic and Transportation

United States Supreme Court Passes Ruling on Municipality Jurisdiction

In two practically parallel cases decided on June 4, with Associate Justice Sutherland reading the opinions, the United States Supreme Court declared that a municipality cannot regulate electric railway fares outside the corporate limits.

In the case of the Georgia Railway & Power Company, the Georgia Railway & Electric Company, R. C. Hickman and others against the town of Decatur, Ga., the companies, one the owner and the other the lessee of a railway line, operated in Decatur under an ordinance fixing the fare between Decatur and Atlanta at 5 cents. In 1920 the fare was increased to 7 cents, and litigation arose. Hickman and other citizens living on another car line which had a 7-cent fare into Atlanta intervened, alleging that a 5-cent fare was discriminatory, inasmuch as the state commission agreed to the increase by the line in litigation. A preliminary injunction was affirmed by the State Supreme Court, but reversed by the United States Supreme Court, which held that the ordinance was not binding outside the corporate limits of Decatur.

The same corporations and J. D. Malsby and other citizens appealed a similar injunction which had been granted the city of College Park, Ga., having a 5-cent fare ordinance to Atlanta, which the companies attempted to increase to 7 cents. After the ordinance was accepted as a franchise, the corporate limits of College Park were extended. The Supreme Court held that the ordinance was effective only as to the old corporate limits.

Interurban Parlor Car Service Started in Wisconsin

Parlor car service between Milwaukee and Sheboygan, Wis., was started on April 30 by the Milwaukee Northern Railway, which was recently acquired by the North American Company. The parlor car, known as the Lake Shore Limited, gives daily service, leaving Sheboygan at 8 a.m. and connecting on its arrival in Milwaukee with the Eastern Limited of the Chicago, North Shore & Milwaukee (electric) Railroad for Chicago. Only one stop is made en route. The reduction in running time over regular trains is 29 minutes. The car leaves Milwaukee at 5:15 p.m. There is thus created direct electric interurban connections between Sheboygan and Chicago. A charge of 25 cents over and above the regular fare is made for parlor car seats. The car used in the new service was built in the Cold Spring shops of the Milwaukee Electric Railway & Light Company, another subsidiary of the North American Company. It is luxuriously appointed and compares favorably in its appointments with steam road parlor chair cars.

No Temporary Eight-Cent Fare in Buffalo

The International Railway, Buffalo, will be unable to put into effect a temporary 8-cent fare on the local lines in Buffalo as a result of the Ryan bill signed by Governor Smith. The new law was sponsored by Senator Ryan of Troy and deprives the Public Service Commission and public utilities companies from putting into effect temporary schedules of rate increases. Under the old law any public utility could file a schedule increasing its rate with the Public Service Commission, and, after the expiration of thirty days, put it into operation temporarily upon one day's notice, providing no adverse ruling on the application had been made by the commission.

The Ryan law now prevents the International Railway from putting the proposed 8-cent fare into effect in Buffalo until after hearings are held by the commission and a final order is made by the commission. The commission's order in such event would be permanent, not temporary, as had been proposed.

Auxiliary Bus Service Extended

The Connecticut Company started a through bus service between Mill Plain, Branford, and State and Chapel Streets, New Haven, on June 10. It is intended to serve through riders and those residents of the section between East Haven Green and Branford not served by the trolley. Forty-five-minute service is operated during the day and one and one-half-hour service during the evening. Two twenty-five-passenger vehicles are used.

The running time from Branford Green to State and Chapel Streets is thirty-five minutes. The fare is 10 cents for each fare limit, or 30 cents for the entire trip. Transfers are issued from the bus and accepted on the trolley to the first fare limit in Branford and New Haven. Transfers are also to be issued from the trolley to the bus in both cases and accepted on the bus as 7 cents toward payment of the first fare; that is, a transfer received on a trolley car with the payment of 3 cents entitles the passenger to ride to the first fare limit on the bus.

The bus is operated express between the easterly side of East Haven Green and State and Chapel Streets, stopping on inbound trips only to discharge passengers and on outbound trips only to take on passengers destined to points beyond East Haven Green.

Movement Against Jitneys Planned in Detroit

In connection with the move to bar jitneys from the streets of Detroit, Ross Schram, assistant general manager of the Department of Street Railways, contends that the jitneys are clogging traffic and that their drivers are taking $1,000 a day from the municipal railway. The drivers are using their 1922 licenses as the police refuse to issue new permits on account of the pending litigation as to the legality of their using the streets, from which the Council thought it had legislated them.

In a letter to Mayor Doremus, Mr. Schram states that the injunction case has never come to trial, mainly through reluctance on the part of the department to force the issue until such time as the department felt it had improved service on its own lines. He thinks the time has now arrived to attempt regulation of jitney operations, in justice to the department of street railways.

The carrying of 20,000 passengers daily by the jitneys means that Detroit is probably losing $350,000 a year, which would otherwise be available to help the citizens purchase their own railway lines.

Mr. Schram says that the department of street railways now has the equipment necessary to handle the 20,000 people who patronize the jitneys. Since the first of the year, 180 new cars have arrived in the city and twenty more are on the way. This will give 200 cars to use in place of the jitneys, and a study is now being made to determine on what lines the cars are most needed.

According to Mr. Schram most of the jitneys are privately owned and when an owner desires to use his car he withdraws it from the jitney service. No complaint is made by officials of the city against competition by the Detroit Motorbus Company as that company furnishes a reliable transportation service.

The corporation counsel is ready to proceed immediately in court to have the injunction dissolved which has prevented the jitneys from being ruled off the streets.

On the other hand an ordinance has been prepared by the attorney for the jitney operators designed to license and regulate the operation of jitneys.

$750,000 of Buses Ordered for Los Angeles

The Los Angeles Motor Bus Company, organized by the Pacific Electric Railway and the Los Angeles Railway to operate motor-bus feeder lines in the city of Los Angeles, has ordered $750,000 of the most improved type of motor buses. This action is in line with the promises of the two railways to the city of Los Angeles after the defeat of the McAdoo bus scheme at the May 1 election. The order for the new buses was placed on May 26 with the Moreland Motor Truck Company, Los Angeles. The buses will cover routes totaling approximately 70 miles.

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The $750,000 order calls for two styles of the latest type of motor buses manufactured by the Moreland concern, both single and double decks. The single-deck buses will seat twenty-six and the double-deck ones fifty-six passengers.

Hearing on One-Man Car Operation by Cincinnati Interurban

A hearing on the operation of one-man cars by the Cincinnati, Georgetown & Portsmouth Interurban Railway was held before the Public Utilities Commission at Columbus on June 4.

The street railway employees' union of Cincinnati contends that the one-man operation of the interurbans is dangerous and wants the commission to stop it.

The hearing brought out the fact that employees of the interurban road have asked for a considerable increase in wages and that the company has served notice on them that it desires to terminate its contract with the employees.

A number of witnesses testifying for the company, residents of points served by the road, said the service was satisfactory and that they did not consider it dangerous.

At the beginning of this year the Cincinnati, Georgetown & Portsmouth Interurban Railway began the operation of one-man cars on its line. The new type cars, however, were operated by two men until April 29, when the one-man system was formally put into operation. A decision will be given later.

Rerouting of San Diego Lines Improves Service

The so-called Sixteenth Street cut-off of the San Diego Electric Railway, San Diego, Calif., has been completed and on May 1 the Logan Avenue line and the National City and Chula Vista interurban line were routed via Broadway and the new track on Sixteenth Street, instead of the former route via Fifth and Market Streets. The new arrangement furnishes improved and increased service to the suburban cities of National City and Chula Vista. Electric cars will operate every twenty minutes to Eighth and National Avenue, National City, and alternate cars will continue to Third Street, Chula Vista, but motor coach service connects every forty minutes with the cars that stop at Eighth and National, thus giving Chula Vista twenty-minute service also. The motor coaches operate by way of Highland Avenue, to Third Street, Chula Vista, thus serving different territory from the electric cars, but with the same terminals. The interurban cars will operate on express schedule between Thirty-first Street and National Avenue and Twelfth Street and Broadway, making only compulsory stops.

Passengers from the northeast part of the city, under the new arrangement, can transfer to the Logan Avenue and interurban lines at Twelfth and Broadway and at Sixteenth and Broadway, thus saving the ride to the downtown district and consequent loss of time in reaching the industrial section.

New Ordinance Proposed by Jitney Men in Birmingham

Jitney men are circulating petitions for an election on a jitney regulation ordinance drawn by the Jitney Owners' and Operators' Association of Birmingham, Ala. They will seek to have this ordinance adopted at the polls as a substitute for the jitney regulation features of the ordinance recently adopted by the City Commission, when a settlement of issues with the Birmingham Railway, Light & Power Company was effected. One mass meeting has already been held by the jitney men and others are to be arranged.

The proposed ordinance is to be presented to the commission under the initiative feature of the Birmingham charter. This provides that on a petition of 1,500 citizens legislation can be initiated. The law requires that the proposed ordinance be set out in full on the petition. When the names have been checked and found sufficient the commission must either adopt the ordinance presented without amendment or alteration or must submit the ordinance to the people at an election.

Thirty-eight of the petitions are in circulation. The ordinance carries about the same regulations now in force —not those provided in the ordinance to go into effect July 1. It provides for an association of jitney men which shall maintain a revolving indemnity fund of $2,500 in lieu of the $10,000 indemnity bonds provided by the city in its new ordinance. It removes all of the other restrictions included in the new city ordinance which would tend to eliminate the jitneys. Membership in the association maintaining the indemnity fund is made voluntary in the proposed ordinance.

Program of Improvements Offered for Exclusive Rights

The Berkshire Street Railway, in a letter from General Manager C. Q. Richmond to the Mayor and the aldermanic committee on street railways, has proposed that the company be granted a monopoly of transportation by barring all jitney traffic. This is made a condition to the adoption by the company of extensive changes for the improvement of railway service, including partial conformance to the aldermanic committee's plan for "lap-overs" of zones during factory rush hours. This would reduce the cost of rides in many instances in the morning and late afternoon hours, but the rate for noon-hour rides would remain as at present.

The most important of these competing lines is the bus line from Pittsfield to Dalton and a proposed bus line from Pittsfield to Great Barrington, for which a petition has been filed by Frank J. Hazard, Pittsfield, and Burton L. Millard, Winsted, Conn.

Four Tokens for Twenty-five Cents.—The International Railway, Buffalo, has been directed by the Public Service Commission to issue four tokens for 25 cents between Hoffman station and Martinsville on the Buffalo-Lockport interurban division under the same rules as those governing a 10-cent cash fare.

Trackless Trolley Bill Signed.—The Governor of Wisconsin has signed the bill which gives permission to City Councils to grant franchises for the use of trackless trolleys. The measure is understood to have been introduced primarily in the interest of the Milwaukee Electric Railway & Light Company.

Allows One-Man Cars to Operate.—The Lykens Valley Railway, Williamstown, Pa., has been authorized by the Public Service Commission to operate one-man cars in the upper end of Dauphin County. The permission is granted on the condition that all cars are stopped on the near sides of grade crossings.

Bus Operation to Start on July 1.—The Des Moines City Railway will put buses into service on several lines during the present year and at least two lines will be in operation by July 1. The buses will be used as supplemental service and will be extensions of present lines. The first service to be started will be on the University and Walker Streets lines. The City Council has given its approval to the use of buses.

Urges Restoration of Skip Stop.—The return of the skip-stop system on the lines of the Cincinnati Traction Company as a contribution to the improvement of traffic conditions in Cincinnati has been recommended by attorney Michael G. Heintz in an article in the *Evanstonian*, the official organ of the Evanston Welfare Association. The Cincinnati *Times Star* of recent date refers to Mr. Heintz's views and quotes what he has to say about the frequency of car stops as it affects Evanston. The skip-stop plan, he believes, would bring about a shortening of running time and be a preventive for traffic congestion. Further, that it would prove a benefit not only to the car rider but also to the automobile rider.

Mail Men Must Pay.—The Morris County Traction Company, Morristown, N. J., has issued orders to its conductors to collect fares from letter carriers, who hitherto have ridden without charge. The order applies to all points along its lines from Lake Hopatcong to Maplewood, with some question still existing as to its enforcement in Summit, where a clause in the franchise stipulates that mail men shall ride free. Charles Fields, manager of the traction company, says that the change was made with the approval of Postal Inspector Campbell of that district. Mr. Fields said it was intended to sell postmasters books of 7-cent tickets, which will be given to carriers for use in deliveries, but that some of the carriers had abused the privilege and had ridden free outside the limits of municipalities where they worked.

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Book Reviews

E.M.F. Electrical Year Book

Electrical Trade Publishing Company, Chicago. 1,030 pages.

The second edition of the "EMF Electrical Year Book" is a combined dictionary, encyclopedia and trade directory of the electrical industry. Of its original 14,000 or so topics, nearly half have been rewritten or thoroughly revised and several thousand new topics added. Definitions cover the entire range of electrical terms. The encyclopedia topics include facts and figures on each branch of the industry, complete lists and data of electrical associations, periodicals, libraries, colleges, etc. About 3,150 classifications of electrical and related products are included, with listings of manufacturers. The topics dealing with electric railways and their equipment were prepared by C. C. Beck, W. T. Thorn, C. S. Holcomb and August J. Fry.

Essentials of Transformer Practice

By Emerson G. Reed. 265 pages The D. Van Nostrand Company, New York.

The sub-title of this book states that it is a treatment of the theory, design and operation of the transformer, from a practical engineering viewpoint, prepared primarily for the engineering student and the designing and operating engineer.

Only those theories, however, are developed which have a direct bearing on design and operation. The author states that the series of lectures given by him before the Electric Club of the Westinghouse Electric & Manufacturing Company was the nucleus of the work, which was supplemented by matter in several papers presented before the National Electric Light Association. This material has been revised and rearranged and new matter added to form the present book. The entire work is written from the viewpoint of the commercial designing engineer and appears to be thoroughly practical and to the point.

Highways and Highway Transportation

By George R. Chatburn, professor of applied mechanics and machine design and lecturer on highway engineering at the University of Nebraska. 472 pages. Thomas Y. Crowell Company, New York, N. Y.

The primary object of this book, as stated by the author, has been to sketch briefly and simply the development of the transportation systems of the United States, to indicate their importance and mutual relations, to present some practical methods used in the operation of highway transports and to make seasonable suggestions for the betterment of the roads and of the usable machines for the benefit and pleasure of mankind.

The principal part of the text is divided into two parts—the development of highways and their uses. The first part treats of the relation of transportation to civilization generally, explaining briefly how the two have grown together like children at school, how each helps the other and how the development of one is the measure of the other. Automotive transportation for business and pleasure, including rural motor express and bus lines and their effect on production and marketing, is described and discussed.

Of particular interest to the electric railway man is a chapter on railroads, giving the development of the railroad with a brief description of the electric railway. The chapter on highway accidents and highway aids to traffic calls attention to many types of accidents, including railway crossing accidents, with suggestions for their mitigation.

The book appears to be sensibly written and is well illustrated. As a general treatise on the subject, it is worthy of the reader's attention.

New Edition of Cook's Wiring

Interior Wiring and Systems for Electric Light and Power Service. By Arthur L. Cook, professor in Pratt Institute, Brooklyn, formerly electric power engineer Westinghouse Church, Kerr & Company. Second edition. John Wiley & Sons, Inc., New York, N. Y.

Wiring is a subject which concerns the electric railway engineer who has in hand the lighting and power supply for shops, stations, carhouses, etc. To all such a manual of this sort will prove useful. It goes somewhat beyond the field specified in the title in the selection of motors, some elementary illuminating engineering and choice of systems. It contains many reference tables, conveniently arranged.

The Engineering Index for 1922

Published by the American Society of Mechanical Engineers, 29 West Thirty-ninth Street, New York, N. Y.

This is the twenty-first volume of the Engineering Index and the fourth to be issued by the A.S.M.E. It is based on some 1,300 periodicals, reports and other publications regularly received during the year by the Engineering Societies' library. This is the largest volume issued in the series, exceeding that for 1921 by approximately 15 per cent, and has a total of 675 pages. The references have also been made exceedingly concise, so that the total number of articles listed is far greater than ever before. Approximately half of the references are from foreign periodicals, some 20 per cent being from periodicals printed in Great Britain or its possessions, and approximately 30 per cent from representative publications of Belgium, France, Germany, Italy, Spain, South America and other foreign countries.

The Young Man and Civil Engineering

By George F. Swain, consulting engineer, professor of civil engineering in Harvard University. The Macmillan Company, New York, N. Y.

Under the editorial direction of Prof. E. Hershey Sneath of Yale University, the Macmillan Company is issuing a vocational series consisting of a dozen books written by leading men in as many different vocations. Several of these will deal with engineering, the first to be issued being that by Prof. Swain. The books will be useful to young men who are selecting a vocation or who, having selected one, wish to gain a broad view of its history and possibilities.

In his book Prof. Swain gives an inspiring picture of engineering in general and civil engineering in particular, showing how all engineering is related and at the same time how it is subdivided. Taking up each branch of civil engineering in turn he tells of what it consists and points out its relation to the others. He then takes up the qualifications necessary or desirable in the civil engineer, stating among other things that he should "have a perception of the true relations of things or a sense of proportion which will indicate what measures or projects that are physically possible will really conduce to the use and convenience of man."

The book as a whole makes stimulating reading. It will be helpful to any one who may be called upon to advise an aspirant for the career of a civil engineer, giving as it does suggestions regarding education, professional posregarding education, professional possibilities in this field, and the general told in a delightful and helpful way.

Year Books

Spring is the season for the appearance of the year books of national and local societies. Among those which have recently appeared and which may be useful to electric railway men are the following:

American Engineering Standards Committee, 29 West Thirty-ninth Street, New York City. This contains practically everything that one would need to know about the committee. The electric railways figure largely.

American Institute of Electrical Engineers, same address as above. A 500-page volume containing alphabetical and geographical distribution lists of the 14,401 total membership, consisting of fellows (574), members (6 honorary, 2,212 regular) and associates (11,609). Students to the number of 2,673 are stated to be enrolled representing nearly 100 educational institutions.

Society for the Promotion of Engineering Education. F. L. Bishop, secretary, University of Pittsburgh.

This list of names of 1,608 engineering educators and others and eighty-seven educational institutions will be useful to electric railways desiring to co-operate with the teaching fraternity in promoting employee training.

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Personal Items

New President in Toledo

B. C. Adams Has Succeeded Frank R. Coates, Who Has Assumed Larger Duties in New York

Benjamin C. Adams, vice-president and general manager of the St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo., operated by Henry L. Doherty & Company, will succeed Frank R. Coates as president and general manager of the Community Traction Company and in addition has been made vice-president and general manager of the Toledo Edison Company at Toledo, Ohio. Mr. Coates, who was president and general manager of the Edison Company, retains the presidency of that company and will continue on the directorate of the Community Traction Company.

Details of the change will probably be announced later. It does, however, mark the withdrawal of Mr. Coates from most of his active duties with the Toledo properties and the asumption of larger duties with Doherty and the Cities Service Company in New York.

J. Frank Johnson was recently made vice-president and general superintendent of the Community Traction Company. Ferd Derge will remain as vice-president and assistant general manager of the Toledo Edison Company, according to present plans.

Mr. Coates came to Toledo on Dec. 5, 1911. He has been instrumental in putting the Toledo system in such relations with the public that the service-at-cost ordinance was ratified by a large majority more than two years ago. He was head of the company during the fight against 3-cent fares, when the ouster ordinance was adopted, and has a particularly notable record in the handling of labor difficulties.

Mr. Adams is a comparatively young executive and has come up through the Doherty organization, having been in St. Joseph about five years. He has worked on a number of other properties.

More Changes in International Personnel

William J. Whiteside has resigned as traffic agent of the International Railway, Buffalo. Mr. Whiteside had been associated with the International as traffic agent for more than ten years. He has had supervision over ticket sales on all interurban lines.

R. F. Kelsey has been appointed traffic agent to succeed Mr. Whiteside. For several years Mr. Kelsey has been joint agent of the Erie Railroad and the International at the Lockport, N. Y., interurban station.

T. T. Nelson has resigned as comptroller of the International Railway. Mr. Nelson joined the staff of the International about two and a half years ago as comptroller.

R. R. Ray has resigned as employment agent of the International Railway. He joined the staff of the company in the summer of 1920.

George W. Fugitt, who for many years has been associated with the Philadelphia Rapid Transit Company, has been appointed secretary of the International Railway Co-Operative Association and will have supervision over employment, according to an announcement made by President Herbert G. Tulley. Mr. Fugitt will assume some of the duties of R. R. Ray, resigned.

Union Traction Company of Indiana Makes Changes in Division Heads

J. E. Hester, formerly master mechanic of the Union Traction Company of Indiana, recently resigned his position to become associated with the Interstate Public Service Company, Scottsburg, Ind. Mr. Hester will have charge of the motive power maintenance for that company. Mr. Hester became connected with the Union Traction Company twenty-three years ago when he was employed as bridge carpenter. He later became general foreman of the woodworking and carpenter departments at the North Anderson shops. Mr. Hester, however, wanted a bigger promotion and he later won for himself the position of master mechanic, which he held for several years prior to his resignation.

W. O. Smith has been made division engineer of the Anderson division of the Union Traction Company. Prior to his joining the Union Traction forces, which was on Jan. 1, 1917, he was employed by the New York Central lines at Elkhart. On April 15 of this year he was made engineer of the Tipton division, taking the place of A. R. Manifold, who was transferred to the Muncie division.

A. R. Manifold, on May 1, was made division superintendent at Muncie, filling the position made vacant by the resignation of G. M. Rozelle, and George Powell, formerly division engineer for the Anderson division, took the Muncie division as engineer. Mr. Powell became associated with the company in 1917, when he entered the employ as a draftsman. Less than a year later he was made office engineer and on Aug. 7, 1919, was made engineer of the Anderson division.

C. H. Evenson has been appointed superintendent of transportation of the Chicago Surface Lines.

A. S. May has been made treasurer of the Berkshire Street Railway, Pittsfield, Mass., with office in New Haven, Conn.

S. N. Irelan Succeeds Mr. Adams at St. Joseph

S. N. Irelan, Montgomery, Ala., has been appointed manager of the St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo., succeeding B. C. Adams. He will also be vice-president of the company. Mr. Adams, as noted elsewhere in this department, goes to Toledo, Ohio.

Mr. Irelan was graduated from Purdue University at Lafayette, Ind. Following his graduation in 1899 he enrolled in the engineering school of Mr. Doherty at Denver and remained there a year. He then took a position as secretary and treasurer of the Fremont Gas & Electric Company at Fremont, Neb. He remained there two years and then took a position in the engineering and statistical department of the Henry L. Doherty Company in New York City.

From February, 1914, to September, 1915, Mr. Irelan was general manager of the Bartlesville, Okla., plant, going from there to Sedalia, Mo., to become vice-president and general manager of the City Light & Traction Company. He was promoted to the office of vice-president and general manager of the street railway, electric and gas company at Montgomery, Ala., in 1916 and remained there until accepting the St. Joseph position.

W. H. Damon Appointed Engineer in Milwaukee

W. H. Damon of Madison has been appointed resident engineer in Milwaukee for the Wisconsin Railroad Commission. In this capacity he succeeds E. J. Steinberg, who resigned on June 1 to become connected with the Milwaukee Electric Railway & Light Company. Reference to his resignation was made in the ELECTRIC RAILWAY JOURNAL, issue of May 5, 1922.

Mr. Damon, his successor, has been with the Railroad Commission for approximately ten years and has served as resident inspector in both the Eau Claire and Appleton districts prior to his promotion to his present position at Madison.

He is well informed on the commission's methods and policies in the regulation of the service of public utilities. His work in Milwaukee will consist largely of investigations of the service of the street railway, electric, gas and telephone utilities. In addition to this, he will be required to furnish service specifications as a basis for street railway schedules in the city of Milwaukee. Mr. Damon is a graduate of the University of Wisconsin.

L. F. Wiegand, formerly executive in charge of the investment department of the Iowa Railway & Light Company, Cedar Rapids, has been appointed assistant vice-president in charge of investments of the Central Indiana Power Company, Indianapolis, and the Indiana Electric Corporation, which is controlled by the Central Indiana Power Company.

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Leroy J. Clark has succeeded Harry S. Adams as secretary of the Seattle & Rainier Valley Railway, Seattle, Wash.

Walter N. Munroe, formerly manager of the Paris (Tex.) Transit Company, is now vice-president as well as manager.

G. J. Hickman has been made assistant treasurer of the Utah Light & Traction Company. He is located in New York.

George Little has succeeded I. E. Maxwell as master mechanic of the Salt Lake, Garfield & Western Railway, Salt Lake City, Utah.

T. W. Favelie has succeeded T. N. Favelie as engineer of maintenance of way of the Hydro-Electric Railways, Windsor, Canada.

Ralph H. Jewell has been appointed general counsel and assistant to the president of the Salt Lake & Utah Railroad, Salt Lake City, Utah.

W. S. Hill has replaced C. H. Nelson as superintendent, purchasing agent and claim agent of the Grays Harbor Railway & Light Company, Aberdeen, Wash.

H. E. Bailey is acting superintendent of the New York, New Haven & Hartford Railroad, New York, N. Y., at Harlem River in place of F. M. Clark.

R. C. Lightcap has been added as an assistant treasurer of the West Penn Railways and of the controlling company, the West Penn Company, at Pittsburgh, Pa.

F. T. McCann, formerly master mechanic of the New York State Railways at Utica, has been transferred to Syracuse and there succeeds J. F. McInerney. His place at Utica is being filled by F. J. Doyle.

G. R. Loyall has replaced J. H. Young as president of the Norfolk (Va.) Southern Railroad. J. Frank George succeeds M. Manley as treasurer of that property, and W. U. Dabney has succeeded Trainmaster Leach.

Alanson P. Lathrop has been elected president of the Southern Light & Traction Company, New York, N. Y. He is also president of the American Light & Traction Company, which controls the Southern Light & Traction Company.

S. W. Greenland, general manager of the Indiana Service Corporation, has with a number of other leading citizens embarked in a real estate promotion proposition in the southwestern part of Fort Wayne, Ind. It is proposed to establish some large estates for homes.

F. M. Hamilton has been appointed supervisor of insurance of the Chicago Surface Lines. Mr. Hamilton served as claim agent and then as purchasing agent of the railway company in Seattle from 1911 to 1919. After that he went to the Philadelphia Rapid Transit Company and held the positions of freight traffic manager, purchasing agent, superintendent of the department of accident investigation, assistant to general superintendent, assistant to vice-president, and assistant to president. He resigned the last-named position in December of last year.

Young Lady Auditor

Miss Snyder Has Been Made Department Head of Indiana Company Doing Both Railway and Power Business

It is not extraordinary to find a young lady doing essential work around an electric railway office, but it is unusual for a young woman engaged in such work to receive the recognition that accompanies a titled position. Yet that is just what has happened in the case of Florence Snyder, now auditor of the Marion & Bluffton Traction Company, Bluffton, Ind., to which post she was advanced on April 1, this year.

Miss Snyder specialized in commercial subjects in the closing years of her course in the public schools of Bluffton, and in 1913 wandered forth into the world like many another girl before her with her note book and pencil in hand determined to be on her way, but not knowing at the time just where that way might lead. Being well prepared in advance, however, there was no need on Miss Snyder's part for concern as to where that way might lead, and so when it did lead to the office of the local traction company Miss Snyder entered upon her work as clerk with all the assurance that comes from knowing that you know.

Miss Florence Snyder

It is only a step from knowing that you know to having others discover that you know. This was just what James S. Clark, then auditor of the railway, did. Under his direction Miss Snyder developed rapidly her innate qualities for management and the mastery of detail, and so when Mr. Clark was made secretary and general manager of the company Miss Snyder on June 1, 1918, was promoted to bookkeeper and cashier. Any kind of accounting work is exacting in its requirements, but railroad accounting is in some respects even more exacting than ordinary commercial accounting. In the first place, there are the standards to be met which are set down by the industry itself and then on top of this are the exactions of the government, state and local officials.

Besides operating 35 miles of electric railway doing both a freight and passenger business, the road with which Miss Snyder is identified does a lighting and power business so that the work of the accounting department is still further complicated by the need for attention to all the details that go with the billing of such customers and then seeing that they pay their bills. As a consequence of her able handling and direction of all this work Miss Snyder was made auditor. In other words, Miss Synder has advanced through all the various grades from clerk to auditor in less than ten years.

Milo Gipson has succeeded B. A. Bilderback as master mechanic of the Lewiston-Clarkston Transit Company, Clarkston, Wash.

George B. Williams has been relieved of the duties of secretary of the Virginia Railway & Power Company, Richmond, Va. Mr. Williams continues in the capacity of treasurer and E. H. Herrmann is secretary.

Edward J. Peartree, general superintendent of the Trenton & Mercer County Traction Corporation, Trenton, N. J., has been appointed a member of the advisory committee for the drive to secure funds for the Salvation Army.

Obituary

Major Warner of Tennessee

The man who was responsible for the first street railway in the city of Chattanooga, Tenn., died recently at his home in that city, after a brief illness. His name was Major Joseph Henry Warner. He had been retired from active business and participation in public affairs for some time. In 1881 he organized the Chattanooga Street Railway, which took over all the local transportation then existing and composed of a short division of horse railway. Eight years later it was sold to other interests and was followed by the electrification of the system. In 1896 the property again changed hands and Major Warner and associates were in charge, so that almost the entire railway system, up to some twenty years ago, was constructed under his supervision. Although Major Warner was especially identified with the city of Chattanooga, he also was very well known in other industrial, banking and utility sections in East Tennessee.

Peter Rosener, seventy-nine years old, who was the first operator on the Evansville city car lines when mule cars were used, died recently. He was employed by the local company for many years.

A. C. Sharp, Wichita, Kan., one of the oldest electric railway men in Kansas, died recently. Mr. Sharp was a motorman on the city street cars and during his long service had operated cars on every line in Wichita. He was a veteran also of the Spanish-American War.

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Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Safe Walkway Manufacturers to Meet

A meeting of delegates representing the several branches of the safe walkway surface material manufacturing industry will be held at 10 a.m. (daylight saving time) on June 14, 1923, in the board room of the American Society of Mechanical Engineers, New York. After effecting a permanent organization the meeting will consider the preparation of model specifications for the use of materials in such manner that walking safety will be promoted.

The particular points to be considered include: Resistance to slipping, freedom from tripping hazard, durability, flammability, dielectric strength, appearance, and maintenance. Stairs, landings, platforms, ramps, lobbies, door sills, etc., are among the places where special danger exists, and the application of safety devices against slipping in railway stations, and in railway cars, both steam and electric, will receive special attention.

The eight general lines of manufacture to be represented are: Safety treads, abrasive materials, cork, linoleum, etc., lumber, artificial stone, natural stone, metals, and textiles. A national safety code for walkway surfaces is now in process of preparation, and this meeting is called by the manufacturers for discussion of its provisions.

Increased Iron Production in 1922

Figures showing the production and shipments of iron ore, pig iron and ferro-alloys in the United States in 1922 have just been made public by the Interior Department. Considerably more iron ore was mined in 1922 than in 1921. The Chattanooga and Birmingham districts made gains of 126 per cent and 73 per cent, respectively, and the Lake Superior district made a gain of 58 per cent. The Adirondack district was the only one that mined less ore than in 1921. The average value per ton of iron ore at the mines in 1922 was $3.12, which is 25 cents less than in 1921. The stocks of iron ore at the mines in 1922 amounted to 10,524,279 gross tons, a decrease of 24 per cent from those in 1921.

Gains in the shipments of pig iron in 1922 were recorded by every producing state except Virginia, Missouri and Massachusetts. The increases were more pronounced in Kentucky, Tennessee, Michigan, Wisconsin and New York. The general average value for all grades of pig iron at the furnaces in 1922 was $21.98 a ton, a decrease of $2.30 from the value in 1921.

An increase of 70 per cent in the shipments of ferro-alloys is shown for 1922. The shipments of ferro-silicon showed an increase of 181 per cent and those of ferro-manganese an increase of 45 per cent. The shipments of spiegeleisen only slightly exceeded those in 1921. The average value of ferro-manganese at the furnaces in 1922 was $66.04 a ton and of spiegeleisen $30.79 a ton.

Gibbs & Hill Will Oversee Virginian Electrification

The announcement was made this week that Gibbs & Hill, consulting engineers, New York, had been appointed engineers of construction for the entire electrification work of the Virginian Railway. A statement of the electrical equipment to be used in carrying out the construction program in connection with this electrification was published in a recent issue of this paper.

Another Plea for Early Coal Buying

The Joint Fuel Committee, representing the gas, electric light and electric railway associations, has been urged by the Federal Fuel Distributor to cooperate with the government and the railroads to avert a transportation crisis next fall and winter. It is asked that every possible effort be made to store coal during the summer months, so as to stabilize the coal industry and to relieve, so far as possible, the peak demand on the railroads. All member companies are urged to complete their annual contracts for their expected requirements at the earliest possible date, store coal at once to limit of capacity and to unload promptly all coal cars and free the sidings so as to reduce car shortage.

Lumber Prices Are Rapidly Rising

Recent reports of the Department of Commerce indicate that the prices of both hard and soft woods are rapidly rising. Although figures are still below the high average of the year 1920, nevertheless the last few months have shown a steady increase. Speaking generally lumber prices in October, 1922, stood at about the same level as in 1919. The average cost of all woods was very much higher in 1920 than in 1919, but in 1921 came a reaction. Since last fall, however, a steady upward trend has been in evidence, and if the present rate of increase continues lumber prices will soon reach the high peak of three years ago.

Orrin Merry Elected President of Missouri Car Company

Orrin Merry, formerly with the Durant Motors, has been elected president of the Missouri Car Company, St. Louis, Mo., while A. G. Miller becomes treasurer through the change. W. L. McKim, who resigned as treasurer, will continue as a member of the board of directors. The other officers are: Theodore A. Brewster, vice-president; A. H. Palmer, second vice-president; L. J. McKim, secretary, and A. G. Muesenfechter and Dr. W. P. Henrich members of the board. The number of directors of the company has been increased by one.

The company's plant on McCasland Avenue, East St. Louis, is being put into first-class shape and officials anticipate that quantity production will start about June 15. Delay in receiving shipments of important pieces of machinery from Eastern manufacturers has delayed the start of operations more than sixty days. In a measure this delay has been beneficial, for it has been possible to go forward with improvements to the plant. It has also permitted a thorough testing of the machines already received, so that everything will be complete and in tip-top shape when the time arrives to start production.

As has been indicated previously in the ELECTRIC RAILWAY JOURNAL this company plans to make a "non-rollicking" truck for street cars and also to make bus and truck bodies. It is said to possess very valuable patents.

Spanish Electrification to Be Begun This Year

According to *Los Transportes*, published in Madrid, Spain, the electrification of the railroad between Tortosa and La Cava, which has been under consideration for some time, will be begun during the coming summer. The same publication says:

> The construction of the railroad between Santana in Santander, Spain, and the station of Gama in Palencia seems to be an assured fact. Santana is one of the most prosperous towns in Spain. It competes with Vigo in the production of canned products and salted fish, while the oyster-farming industry is very active despite the fact that there has been no railroad communication with the rest of the province, nor with the country in general.

Metal, Coal and Material Prices

Metals—New York	June 6
Copper, electrolytic, cents per lb.	14.962
Copper wire base, cents per lb.	18.00
Lead, cents per lb.	7.25
Zinc, cents per lb.	6.67
Tin, Straits, cents per lb.	42.00
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$6.375
Somerset mine run, Boston, net tons	2.875
Pittsburgh mine run, Pittsburgh, net tons	2.20
Franklin, Ill., screenings, Chicago, net tons	1.825
Central, Ill., screenings, Chicago, net tons	1.875
Kansas screenings, Kansas City, net tons	2.625
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.	$7.75
Weatherproof wire base, N. Y., cents per lb.	19.00
Cement, Chicago net prices, without bags	$2.20
Linseed oil (5-bbl. lots), N. Y., per gal.	$1.15
White lead, in oil (100-lb. keg), N. Y., cents per lb.	13.125
Turpentine, (bbl. lots), N.Y., per gal.	$1.05

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Rolling Stock

Butte Electric Railway is putting safety appliances on twenty-two cars so that they may be operated by one man.

Eureka, Calif.—The City Clerk and City Superintendent of Public Works will soon ask for bids for furnishing approximately 20 tons of car wheels for the Eureka Street Railway.

Birmingham Railway, Light & Power Company, as was announced in the May 26 issue of the ELECTRIC RAILWAY JOURNAL, has placed orders for twenty new cars. The specifications of these cars are as follows:

Date order was placed	May 15
Date of delivery	October
Builder of car body	Cincinnati Car Co.
Type of car	Side entrance motors
Seating capacity	62
Total weight	32,000 lb.
Bolster centers, length	32 ft.
Length over all	49 ft. 5 in.
Truck wheelbase	4 ft. 10 in.
Width over all	8 ft. 5 in.
Height, rail to trolley base	10 ft. 6 in.
Interior trim	Cherry
Headlining	Agasote
Air brakes	Westinghouse
Armature bearings (if ball or roller)	Sleeve
Axles	Steel
Bumpers	Hedley Anti-Climbers
Car signal system	Trolley
Car trimmings	Bronze
Center and side bearings	Brill
Control	K 35 KK
Curtain fixtures	Curtain Supply Co.
Curtain material	Pantasote
Designation signs	Hunter
Door-operating mechanism	Air National
Fenders or wheelguards	H. B.
Gears and pinions	Grade M helical 7½ deg.
Hand brakes	Cincinnati
Heater equipment	Consolidated
Headlights	Golden Glow E.SSCD
Journal bearings (if ball or roller)	M.CB type
Journal boxes	Brill
Lightning arresters	G. E. aluminum
Motors, type and number	G. E. 265A (four)
Paint, varnish or enamel	CO. ST.D
Registers	Int. No. 5
Sanders	O.B.
Sash fixtures	Paytori
Seats	Cincinnati (wood)
Seating material	Wood
Slack adjuster	American
Step treads	Feralun
Trolley base	U. S. 13
Trolley catchers	O. B.
Trolley wheels	More-Jones
Trucks	Brill, 76 E.
Ventilators	Railway utility
Wheels (type and size)	26 in. chilled iron

Track and Roadway

Lincoln Street Railway is planning to extend a number of its tracks in the city this summer.

Clinton (Iowa) Street Railway will spend $50,000 for track construction and for paving during the present year.

Cincinnati, Newport & Covington Railway, Covington, Ky., expects to rebuild 2½ miles of track. The work will be done with the company's own men.

Philadelphia, Pa.—Sealed proposals for constructing about 1,529 ft. of two-track subway in Arch Street between Eighth Street and Thirteenth Street will be received at the director's office, Department of City Transit, until June 26.

Pacific Electric Railway, Los Angeles, Calif., will reconstruct its tracks on Pine Avenue south of Sixth Street and double track Third Street between Pine Avenue and American Avenue in Long Beach, according to a promise made by Chief Engineer E. C. Johnson to A. L. Ferver, director of public service.

Texas Electric Railway, Dallas, Tex., is considering an extension of its lines in Denison, and is negotiating with a committee of business men in Denison. It is proposed to extend local street car service about 2 miles west to include the new terminals of the Missouri-Kansas-Texas Railway.

Houston, Tex.—Bids have been called for on the work of grading the track of the Houston, Beaumont & Orange Interurban from Orange to the Neches River. The track will be of 90-lb. rails. Contract for the section between Houston and the Trinity River will be awarded later.

Power Houses, Shops and Buildings

Denver, Col.—The two 10,000 kw. turbines of the Denver Tramway mentioned in the ELECTRIC RAILWAY JOURNAL of May 19 were purchased from the government and will be installed in its steam plant at Denver. The machines are to be ready for operation by Aug. 15, 1923. The installation of these two new units will bring the company's generating capacity up to 30,000 kw., which is sufficient for its needs and it will no longer be necessary to purchase power from a local power company.

Pacific Electric Railway, Los Angeles, Calif., has announced that work will commence soon to improve materially the power conditions on its Los Angeles-San Bernardino line through the installation of additional equipment in the substations at Ramona and Vineland. The new equipment and the alterations and additions to buildings entail an outlay of approximately $100,000. At the Ramona substation an additional 1,000-kw. motor-generator set will be installed, while at Vineland the present 1,000-kw. set will be replaced with an improved 1,500-kw. automatic rotary converter. Additions to the buildings and alterations will be of concrete with steel, fireproof roofs. The installation of additional power facilities is necessary to take care of the present and increasing load requirements on the San Bernardino line. Vineland will be the first 1,200-volt automatic substation installed on the company's lines, as all previous automatic installations have been made in the 600-volt zone.

Trade Notes

H. R. Sargent, formerly manager of the Wiring Supplies Division of the Bridgeport works of the General Electric Company, has been appointed managing engineer of this division under a development plan which will create several unit divisions at the Bridgeport factory.

Westinghouse Air Brake Company-Westinghouse Traction Brake Company have changed the address of their New England quarters to 35 Congress Street, Boston. The personnel has been increased with E. W. Davis, representative in charge; G. H. Martin, representative; C. H. Larimer, mechanical expert; C. D. Brown, industrial representative, and P. L. Bradford, mechanical expert. Charles R. Ellicott is Eastern manager.

General Electric Company, Schenectady, N. Y., has announced contracts for the equipment of fourteen new trackless trollibuses. Nine equipments are for buses to be operated by the city of New York on City Island. They have two GE-258 25-hp. motors each and K69 control. In Rochester, N. Y., five buses will be equipped with two GE-264 25-hp. motors and non-automatic contractor type control. These will be operated by the New York State Railways and are the first to be used in the state outside New York City. The buses will be made by the Brockway Motor Truck Corporation, Cortland, N. Y.

New Advertising Literature

Crouse-Hinds Company, Syracuse, N. Y., has issued Bulletin No. 2001 on flexible fixture hangers and folder No. 2 on vapor-proof condulets with reflectors.

Detroit Stoker Company has just published a new bulletin, "Cutting the Cost of Producing Steam." The bulletin takes up the dollars and cents value of mechanical stokers, dealing with each of the savings effected, in detail. It deals also with the application of advanced engineering principles and modern stoker design, and concludes with a section on the service of the mechanical stoker. Complimentary copies will be forwarded to interested engineers and executives upon request.

National Pneumatic Company, New York, has issued catalog No. 3, which combines several purposes. In the first place it is an excellent catalog, being well illustrated as regards complete equipments and their parts and with lists in which each piece carries a catalog number. This section of the publication includes not only pneumatic door engines an other pneumatic equipment manufactured by the company, but also its full line of equipment for manually operated door and step control. In addition to the catalog features of the publication, there is a chapter on "Remodeled Cars and Safety Cars" of technical interest to the trade, but particularly to those companies considering the best way of modernizing old rolling stock. Facts are also given on the design and construction of the equipment and method of manufacture, with views of the company's works at Rahway.

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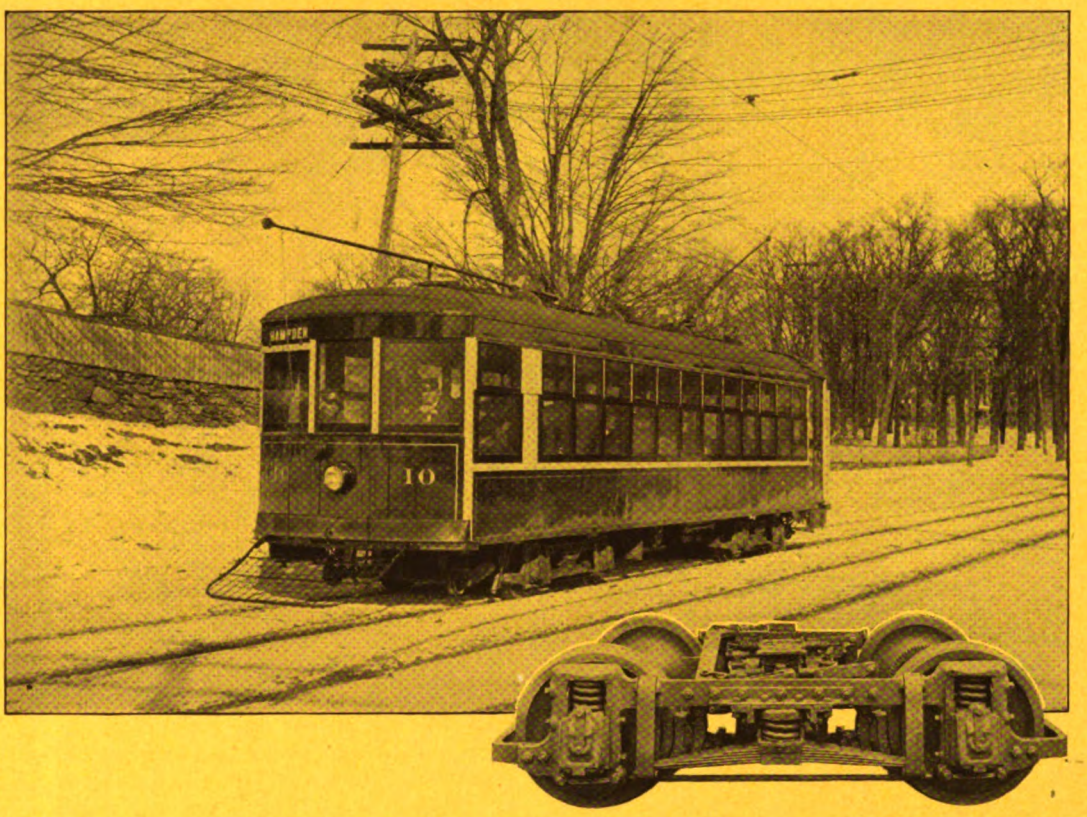

Double-Truck Safety Car

Mounted on Brill Low-Level Trucks No. 77-E

In this double-truck type Safety Car are combined the advantages of light weight and a carrying capacity equal to the requirements of practically any service. It weighs approximately 28,000 lb. complete, and has a seating capacity of 54.

Also, Brill 77-E trucks equipped with 26-in. diameter wheels not only carry the car body very low but operate in a steady and most comfortable manner.

Complete information will be furnished upon request.

THE J. G. BRILL COMPANY
PHILADELPHIA, PA.
AMERICAN CAR CO. ST. LOUIS MO. — G.C. KUHLMAN CAR CO. CLEVELAND OHIO — WASON MANF'G CO. SPRINGFIELD MASS.

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G-E Electric Switching Locomotives

CHICAGO, ILL.

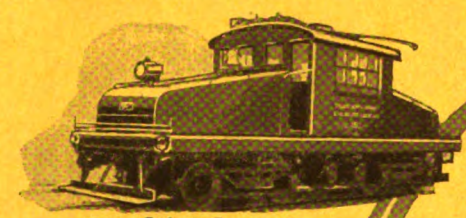
PHILADELPHIA, PA.

CHICAGO, ILL.

DEER LODGE, MONT.

NEW YORK, N.Y.

NEW YORK, N.Y.



CHICAGO, ILL.

DES MOINES, IA.

YOUR guarantee of satisfactory operation from a G-E Switching Locomotive is embodied in the fact that since 1895—the birth year of railway electrification—we have been producing electric locomotives adequate for any service and of well balanced mechanical and electrical design. Operating records are available.

With this experience as a foundation, our ability to furnish switching units which will meet your requirements is unequalled.

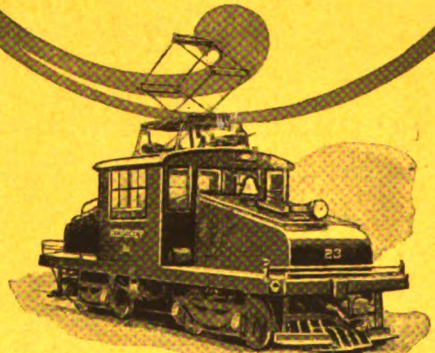
SACRAMENTO, CAL.

STOCKTO

HAVANA, CUBA.

FU SHUN, CHINA.

AKRON, OHIO.



MATANZAS, CUBA.

PORTLAND, ORE.

HOPEDALE, MASS.

ST. LOUIS, MO.

INDIA

MEMBER AMERICAN ELECTRIC RAILWAY ASSOCIATION AERA

General Electric Company

General Office
Schenectady, N.Y.

Sales Offices in all large cities

25-186

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McGraw-Hill Company, Inc. MONTHLY MAINTENANCE ISSUE Twenty Cents Per Copy

ELECTRIC RAILWAY JOURNAL

June 16, 1923

2272 MILES

Track Reconstruction in San Diego

Steel Tie Construction Used as Standard—Weather Conditions Permitted Work to Be Carried on Actively During Recent Months

DURING the past few months several interesting track reconstruction jobs have been done by the San Diego Electric Railway, notably the Adams Avenue and the University Avenue-East San Diego lines.

The Adams Street line is the one on which the track was torn up during the night last summer by the company's track forces as the climax of a long controversy between the city officials and the company over paving and other matters of dispute. After a court battle, a compromise was reached through the mediation of the State Railroad Commission, and reconstruction of the line was begun. The line will be double-tracked throughout its length to the end at Kensington Park, outside the city limits. Service was resumed on the line Dec. 23, 1922, although it was but partially completed at the time. This was a great relief to the patrons, who had been depending upon uncertain bus service, which could not be maintained in rainy weather because the adobe soil, used for roadway in the unpaved streets, is sticky and slippery when wet.

The reconstruction work was carried out in accordance with the standards adopted by the company for all recent construction. The track construction comprises the use of twin steel ties, spaced 6 ft. center to center, with 93-lb. high T-rails for all straight track, 114-lb. rails for curves and 127-lb. guard rails for all special trackwork. All joints are electrically welded and the rails are electrically welded to the ties. All special trackwork is bonded with 350,000 circ.mil cable, and the welded tracks are cross-bonded every 500 ft. with cable of the same size.

(*Continued on page 7 of Advertising Section*)

The carefully weighed decision in this instance was based on data showing economies in first cost and track life.

May we send you any, or all, of the following:—

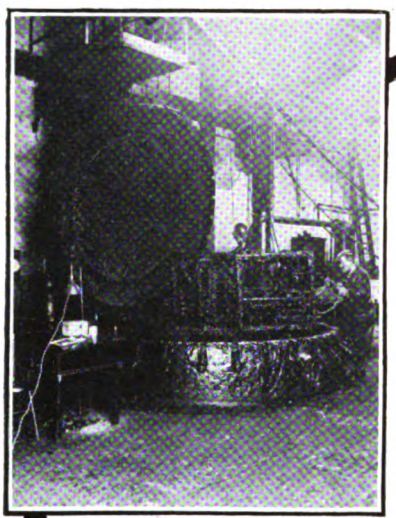
Catalogue, Drawings, List of Users, Delivery Date, Prices on your job, Estimates, Track Cost Data?

The International Steel Tie Co.
Cleveland

This article is reprinted from the Electric Railway Journal, issue of April 28, 1923.

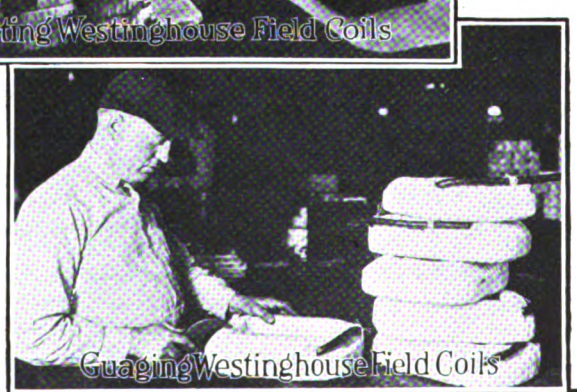
Steel Twin Tie Track

How the Quality of Westinghouse Field Coils is maintained



Impregnating Tank for treatment of Field Coils

Testing Westinghouse Field Coils



Guaging Westinghouse Field Coils

Westinghouse Field Coils, sold for renewals, are made with the same expert workmanship, with the same materials, and under the same processes as the original coils entering into the construction of complete Westinghouse Motors.

Copper conductors of correct size are always used, thus assuring the right current-carrying capacity. The exact number of turns are used, assuring the proper magnetic field strength.

The insulation is reinforced at all bends and cross-overs to give added protection. The cable leads are anchored inside the coils, making the use of heavy brass terminals unnecessary.

The coils are carefully gauged to assure the proper clearance in the frame and a snug fit on the pole. Each coil is tested for short circuits.

After the first taping the coils are impregnated with a gum of high melting point to make the coil one solid mass. This treatment consists of drying out the coils in a vacuum, thereby removing all moisture as well as all air. The hot gum is then admitted to the coils under pressure, which assures that the gum penetrates and fills all intervening spaces between the turns and layers of the coils.

The coils are then given three layers of treated cambric, one-half overlapped, and an additional layer of cotton tape slightly overlapped. After this coils are dipped in a high-grade insulating varnish and baked for a definite period. This treatment is repeated three times. This further seals the coils against the entrance of moisture.

Westinghouse Electric & Manufacturing Co.
East Pittsburgh, Pa.

W WESTINGHOUSE ELECTRIC

MEMBER AMERICAN ELECTRIC RAILWAY ASSOCIATION AERA

Westinghouse

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New York, Saturday, June 16, 1923

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Company, Inc.

HENRY W. BLAKE and HARRY L. BROWN, *Editors*

Volume 61
Number 24

Maintenance Cost Reduced by Reclamation of Parts

ACCORDING to J. T. Porter, one of the speakers at the convention of the street and interurban railway section of the Southwestern Public Service Association, all maintenance is reclamation. The distinction usually made is merely in degree, maintenance being applied to the operating units of the property. Mr. Porter has carried the idea to some of the smaller parts that usually are neglected. On his road a department has been organized to repair parts usually kept in stock, and reissue them when they can be used to advantage. By so doing the costs of maintenance have been cut some 20 per cent for the first quarter of the current year, although more work has been handled in the shops than last year. The details of this were published in this paper June 2, page 931.

Many roads have an accumulation of abandoned parts removed in the process of maintenance that in their usual state are of no value. Yet no one in authority wants to see them thrown out, as they may be useful "some day." In other words, the shop yard is like the old-fashioned housekeeper's attic, full of old furniture, bric-à-brac and clothes that are hauled out periodically but seldom used. But Mr. Porter's plan gets the material used, if it is worth reclamation, or sold to the junk man, if it is beyond economical repair.

In this season of the year, when much attention is being paid to clean-up weeks, it will be well for railways to take the matter up and see if a reclamation department may not be established to utilize those parts that are good and get rid of the remainder, thus conserving time and money.

Remodeling Obsolete Cars of Questionable Economy

A NUMBER of companies have been pulling cars virtually out of the junk heap to remodel them for one-man operation. This is an attractive proposition, they say, because the rehabilitation and equipment with some safety devices, air brakes and platform doors, and rearrangement for one-man operation, can be done for about one-third the cost of a new one-man safety car.

If the result were anything like the equivalent of a new car, then it would be a very sensible way to conserve investment while securing additional rolling stock. But unfortunately such is not the case; and it is feared that such investment may be of questionable value, or even a waste. The reason is that it is impossible to get modern riding qualities, acceleration, and economy of maintenance and energy consumption with the motors and trucks and excessive weight of a date ten to twenty years back.

The old motors are slow and heavy. They consume much more energy than modern ventilated motors of about half their weight per horse-power. They require considerably more expense in maintenance and are the cause of more pull-ins, the cost of which in loss of revenue and increase of ill-will is not readily estimable.

The old trucks gallop and nose if it is attempted to operate at speeds in keeping with the times, particularly when the track is uneven. The large wheels make the steps high, and boarding and alighting are correspondingly slow. The body is heavy and it does not give even the appearance of a new car.

Hence, by the remodeling plan, the attraction which the public attaches to new, modern cars is not gained. Nor are the speed and comfort of the service appreciably improved from the public standpoint. And the operating economies possible in new cars from lower energy consumption and less maintenance and the possibility to get more car-miles per car-hour are not realized. In other words, neither the public nor the company gains much by the further investment in obsolete cars. The public is not fooled much by the fresh paint and the platform doors, even though the railway management may be.

If further investment in rolling stock is justified at all, it would seem that this should be put into truly modern cars, not into the process of camouflaging what ought to be burned, not restored.

Inclosed Car Storage Assists in Giving High-Grade Service

THAT the question of how best to store active surface cars is not settled may be seen from the study made by this paper and published in this week's issue. This study was undertaken upon learning that certain companies were giving serious consideration to the construction of carhouses, although they previously had adopted outdoor storage.

Based alone on the comparison of the cost items as far as they can be definitely estimated, open storage frequently appears attractive. The investment is materially less and the insurance rates are lower. That maintenance costs are increased is not denied, but usually it is estimated that the saving in interest and other charges is more than sufficient to offset this.

Possibly some of the designs employed for carhouses have been more elaborate than necessary, and hence more costly. On the other hand, the fire insurance authorities recommend permanent fire walls to divide open storage space into bays containing, say, three tracks each. If this construction is adopted the additional cost of a roof is not very great, nor is the fire hazard materially increased, as sprinklers can be used to give a high degree of protection.

The fundamental problem, however, is not settled so easily. It is necessary to find which method of storage

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will result in the ability to earn the greatest net revenue over a period of years. So many indeterminate factors enter into this consideration that it is difficult, if not impossible, to formulate an exact statement, and the answer becomes a matter of opinion.

No one can tell in exact figures the money value of clean windows, for instance, or whether it will be enough to justify the expense of washing them. More serious are the delays that may occur when cars have been improperly inspected and maintained due to the natural slighting of such things when men are forced to work under unfavorable conditions, such as are inevitable with open storage.

The accumulative experience with open storage seems to be tending to swing opinion back more decidedly in favor of closed storage. In fact, if equipment and transportation men were free to select the type of storage, it is probably safe to say that it would require a much greater saving in favor of open storage than can be shown, to overcome their preference for inclosed storage from the maintenance, operating and merchandising standpoints.

Since the function of a street railway is to give service first of all, it is worth careful study to determine just how much should be sacrificed in this direction in reducing the costs that can be tangibly figured.

Systematic Space Allotment and Ample Handling Equipment Will Expedite Shop Work

A LARGE amount of the time and labor consumed in repair shop operations is spent in setting up and handling the material. A study of the various operations will often disclose the fact that substantial savings can be made by a rearrangement of certain machine tools. An efficient shop is arranged so that the operations performed most frequently will require the fewest possible movements and so that the route of the material through the shop will be as short as possible.

Care needs also to be taken to prevent interference between different jobs. Crowded conditions are quite common in electric railway shops, largely because the amount of work handled has increased without additional facilities being provided. These crowded conditions can be remedied somewhat by a systematic allotment of definite spaces for different materials and by arranging so that handling operations are not interfered with. Unnecessary accumulation of scrap uses much valuable space and also gives the appearance of neglect and disorder. Miscellaneous parts scattered over the floor while work is being done on other parts interfere with the work and help to increase the congestion.

Where the same operation is being performed constantly, jigs and special fixtures will save much time. There are very few electric railway shops where frequent operations have been specialized. When the same man is used continuously on one class of work he becomes particularly efficient in its performance, and if he is provided with special tools and fixtures for doing the job his interest is aroused to accomplish larger amounts of work in a given time.

The value of ample handling devices in a shop can hardly be overestimated. Auxiliary jib cranes are not expensive to install and a few additional may save much time due to waiting for crane service. It is also very desirable to reduce trucking operations as much as possible, for these consume many man-hours. Sometimes relatively inexpensive changes in shop layout will enable material and equipment to be handled from one machine to the next by a crane or overhead traveler where otherwise trucking is necessary.

It would be well to study present shop arrangements with the idea of reducing delays and labor. It is one of the best sources of maintenance economy.

Railways Should Use Welding Wire Specifications Drawn by Welding Society

A GREAT deal of the success of electric welding depends upon the material of the metal rods used. Yet, in spite of the advances made in the art as to the requirements for satisfactory welding wire, many users still seem to think that almost any kind of metal will do the job. Satisfactory results are sometimes obtained without giving particular attention to the wire used, but it is generally conceded that most careful consideration must be given to both physical and chemical characteristics in order to secure uniform results.

Among the many desirable characteristics sought in welding metal, two qualities are particularly essential: One of these is that the material should be of such a composition that it will be suitable for the particular work being done. The other is that it should possess the qualities for going into the weld and combining with the parent metal without "bubbling" or "sputtering."

With these facts in mind the welding wire specifications committee of the American Welding Society has spent nearly two years in collecting data and formulating specifications. Chemical analyses of welding wire in general use for both gas and electric welding have been studied carefully. Physical properties have been analyzed and tests specified which include microscopic examination of the metal deposited. Various qualities and service results obtained from the use of the wire have been tabulated and analyzed. As a result of this extended research four specifications for welding wire have been issued by the society.

Electric railways seldom possess experimental staffs adequate for a thorough investigation of such a subject as welding rod specifications, and purchasing agents have little knowledge of the requirements and must necessarily work in the dark unless some such specifications as those of the welding society are followed. Of course each manufacturer has some "talking point" about his welding material, for it must possess some advantage not possessed by competitors in order to sell. The result is a great diversity of welding materials on the market, which merely emphasizes the need to be guided by the recommendations of a competent authority.

The American Welding Society committee gave special consideration to arranging the specifications so that inexperienced users as well as purchasing agents would find them a complete guide to their requirements. Furthermore, the specified materials are now available, for the manufacturers have not been slow in taking advantage of the opportunity to provide welding wire which would meet the specifications of the American Welding Society and thus have this society's approval. Many manufacturers are now advertising wire which will meet these specifications.

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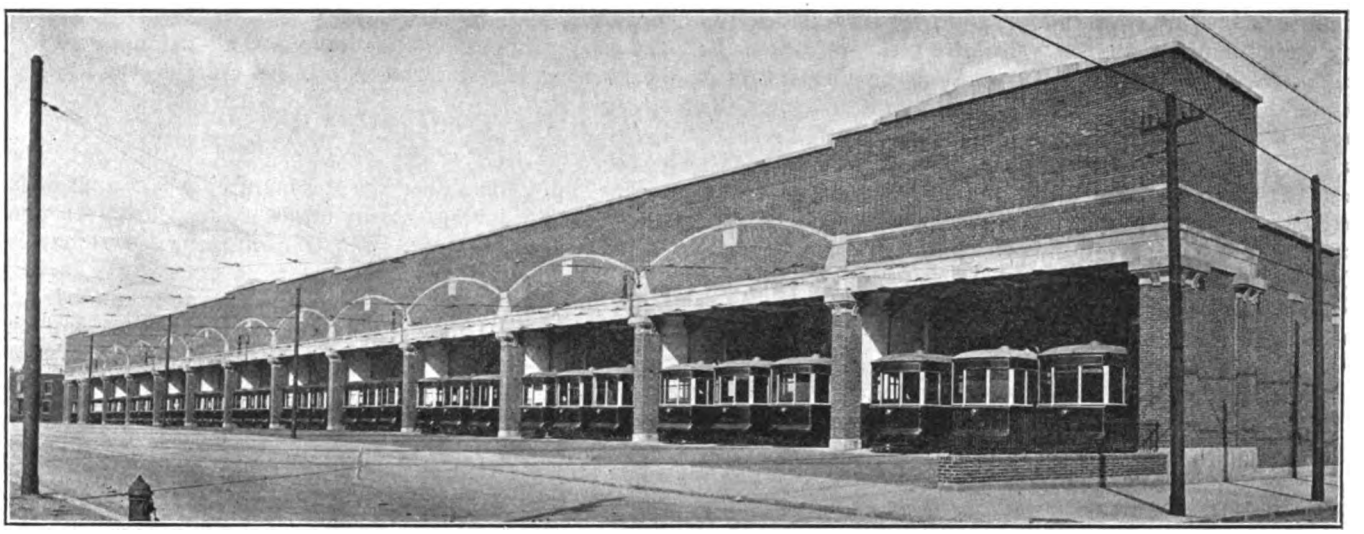

An Example of Recent Closed Storage Construction. Callowhill Carhouse, Philadelphia

Inclosed Storage Favored from Standpoint of Service Reliability

Survey of Experience and Opinion Discloses Apparent Swing Back to Protected Storage, Though It Is Difficult to Justify the Investment on Basis of Tangible Savings—This Explains the Use of Open Type in Practically All Recent Construction

FOR several years the tendency with regard to car storage facilities has been to favor the open type, but more recent developments have indicated that a change of opinion may be bringing a reversion toward closed storage as the more practical plan. Accordingly, the ELECTRIC RAILWAY JOURNAL has made a study to determine whether or not this condition really exists. Information was secured on several definite points from a number of representative railways in various parts of the United States. Answers to certain specific questions are given in the accompanying table.

The first question that comes to mind in the comparison of the two methods of storage is the effect on the exterior painting of the cars. The study made indicates that there is a general agreement that the cost of painting is increased due to open storage. One large company in the East states that the cost of painting is increased materially, particularly the maintenance of roofs and all exterior iron work, and that cars should be shopped on shorter periods in order to maintain an appearance equal to that of cars kept in closed storage. Even in the South the general opinion is that car painting cost is increased. On the Pacific coast it is stated that the life of paint is doubled with closed storage. An interesting commentary is that closed storage of trailers which are used only a few hours a day results in notably longer life of the paint.

MAINTENANCE OF AIR EQUIPMENT

Regarding the maintenance of air brakes and air apparatus, there is not quite the same unanimity of opinion. Some of the large systems throughout the country state that the cost of this item is increased materially in open storage, while others in similar territory do not find any increase in such expense. Proper drainage of the air system as soon as the car is turned in from service will prevent much of the trouble due to freezing of the piping and other parts of the air system. One company states that the installation of cooling coils which remove moisture from the air system has reduced freeze-ups to a minimum. Another does not think that there will be any noticeable increase in the cost of this item until the temperature has reached 10 to 15 deg. below zero (F). At that stage, and colder, an increased amount of friction is bound to result by the time enough heat is given off to start lubrication, even with a special low cold test oil. While this is probably a small feature in the maintenance of the individual car it becomes an important item to consider in the aggregate.

There is very general agreement that other items of maintenance are increased in cost by open storage. One company states that this applies particularly to doors, steps and step control and windows. The continued action of the weather on the windows causes warping and swelling, resulting in an excessive amount of broken glass due to sash and doors sticking. Windows and ventilators are likely to be left open during storms, and the weather beating on the interior of the car is bound to cause considerable damage. Maintenance of electrical equipment, life guards and roof canvas is also said to be greater.

In the South there is much more rapid deterioration of the car bodies due to the woodwork developing rotten spots, steel sheathing becoming pitted with rust, and canvas roofs cracking and leaking badly. In the North, cars are occasionally taken out with brakeshoes frozen to the wheels, which causes flats and increases wheel

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maintenance. Certain motor failures may be caused by snow blowing in the ventilating covers when the cars are stored outdoors, as there is insufficient heat remaining in the motors to vaporize the water as the snow melts. Chilled and frosted metals such as axles, wheel flanges and journal boxes are subject to breakage. If due allowance is made to provide over-sizes for extreme cold climates, then there is a higher cost for hauling the excess weight. One company reports that there is a great deal of trouble with electric couplers on account of moisture getting in the plugs and freezing. This may be caused by drippings from the car roof, due to melting of snow by the heat in the cars, or from condensation, etc. This frequently is the cause of cars being late for service and the cause of delays after they are in service. High snow and ice in the yards causes much trouble from interference with doors and step mechanisms.

Open Storage Has Some Added Problems of Maintenance

There does not seem to be any general agreement on the question whether it is harder to secure proper maintenance with open storage. One company states that many small jobs which are taken care of by inspectors under covered storage are either patched up or neglected entirely during bad weather, thus causing pull-ins. Another reply is that open storage increases the difficulty of keeping clean cars on the road. Comment on this is: "I have on a number of occasions observed in some of our large storage terminals a complete yardfull of clean cars emerge from a dust and rain storm with the appearance of never having been cleaned, and the work of the car cleaners entirely lost for that day." Another company, on the Atlantic seaboard, states that during very cold weather and when it is snowing or raining, it is naturally more difficult to work on cars in the open than when they are under cover. It is believed that this must to a certain extent increase the maintenance costs, as well as make it difficult to obtain proper inspection and maintenance.

A company in the Middle West states that open storage means extra labor to secure proper maintenance. Cars housed under cover in the winter get a chance to free themselves of mud and snow picked up on the runs, and are in better condition to work on and under after they have stood in the carhouse a while. But by laying out a regular inspection schedule so that the cars due for inspection will be placed under cover that night, the storing of cars outdoors or indoors is not of such great consequence in taking proper care of maintenance.

A superintendent of equipment who has had wide experience in different climates says that even based on adequate room and well-equipped, warm inclosures for inspection work, the cars taken in from open storage probably cannot stand a sufficient time to dry out, or thaw out, and inspection will not be as satisfactory as if cars were stored in warm inclosures during their entire period of rest. Another company reports that precipitation, whether of rain, snow, or even of dew, dripping from a car roof is likely to get on the windows and sides of a car, and the money and effort previously expended in cleaning the outside of the car are entirely thrown away, because the results are destroyed before the public can see it. The same company states that since the introduction of the practice of storing cars in the open the number of men employed on car cleaning work has been very materially increased, yet the standard of cleanliness of the outsides of the cars is far below what it was when all covered storage was used.

Maintenance Standard May Fall in Severe Weather

The indications are that the maintenance standard is likely to fall during stormy weather when open storage is used. In this connection the following statement is typical: "Men do not like to work in open yards during stormy weather, and at such times a large number of men report that they are unable to work on account of sickness." Another company states that while abnormal weather conditions are usually accompanied by excessive equipment failures in any case, it is undoubtedly true that the effect of such conditions is worse on cars in open storage than on cars housed under cover, even though in an unheated building. Another comment was this: "During abnormal weather we have more equipment failures, also accidents, both resulting from less thorough inspection and repairs." The human element is also indicated in this answer: "In this day and age, unless men are working under the most favorable conditions, which in bad weather means that cars must stand for several hours before they can dry out or thaw out, it is inevitable that some of the work will be slighted, and car failures usually are the result of the lack of good inspection."

While with open storage there is some additional cost for car heating if the cars are to be sent out on the road in comfortable condition, this is offset largely by additional heat required in the carhouses for a longer period. The extra cost of car heating depends to some extent on the type of heater used. With hot water or hot air, the time required to get a car warmed up is considerably longer than with electric heat. But with any type of heater, cars frequently are put in service while still cold. One observation is that this does not affect the earning power of the car, although it is safe to say that it will not tend to engender kindly feelings on the part of passengers toward the company.

Open Storage May Lower Fire Risk

The fire hazard is an item of considerable moment in the comparison of the two kinds of storage. Several serious fires in the past year have occurred in carhouses. Open storage permits the use of water towers, giving fire control over a large area. On the other hand, a building construction for inclosed storage can be provided which is entirely fireproof. In that case the installation of automatic fire sprinklers reduces the hazard materially. In fact, some companies believe that the installation of sprinklers in a fireproof carhouse makes the protection greater than for open storage with fire towers but without sprinklers. The insurance rates, however, indicate that the insurance authorities believe the hazard is substantially less with open storage.

There does not appear to be a general agreement on the financial results to be obtained by the substitution of open for inclosed storage of cars. An increase in the total cost of maintenance is admitted in practically all cases, but the saving due to open storage may or may not equal this, so that it is doubtful whether one or the other is cheaper, when considered as a general proposition. The answer seems to depend on the individual road, and the methods employed for inspection and repair work.

One reply states: "For cars that are in regular

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REPLIES OF NINETEEN COMPANIES TO SPECIFIC QUESTIONS

Company	Is the Cost of Painting Increased by Open Storage?	Is the Cost of Maintaining Air Equipment Increased?	Are Other Maintenance Costs Increased?	Is It Harder to Secure Proper Maintenance with Open Storage?	If So, Are Abnormal Weather Conditions Accompanied by Excessive Equipment Failures?	Is the Cost of Car Heating Increased?	Does the Saving in Interest Charges More than Offset Any Added Costs of Open Storage?
New England							
1	Not materially	No	Slightly	Very little	No	Short period	Largely
2	Yes	Yes	Yes	Yes	Yes	Yes	No
Eastern							
3	Considerably	No	Greatly	Yes	Yes	Not materially	Probably not
4	Yes	Yes	Yes	Yes	....	Yes	Questionable
5	....	....	Yes	....	....	Yes	Yes
6	Yes	Depends on location	Yes	Yes	Yes	Yes	Depends on construction
7	Yes	Yes	Yes	Yes	Yes	Yes	No
Southeastern							
8	Greatly	Some	Yes	Yes	Yes	Slightly	No
9	Yes	Not if drained	Bodies	No	Yes	Not materially	Questionable
10	Greatly	....	Much	....	....	....	Depends on climate
11	Yes	Yes	Yes	Yes	Yes	Yes	Cannot say
Middle Western							
12	Yes	No	Yes	No	No	Yes	Yes
13	Yes	No	Yes	No	No	Not locally	....
14	Yes	Cannot say	Not much	Yes	No	No	Yes
15	Yes	Yes	Yes	Yes	Yes	Yes	Yes
16	Yes	Yes	Yes	Yes	Yes	Yes	Yes
17	Yes	Yes, at 10 deg. F	Yes	Yes	Yes	Yes	Questionable
Pacific Coast							
18	Yes	Yes	Yes	No	No	No	Yes
19	Double	....	....	Yes	Yes	....	....

service eighteen hours a day or in tripper service for several hours each day, closed storage, in my opinion, is not warranted. For every car so stored there is an expenditure of from $2,000 to $4,000 required, and the savings effected will not warrant such an expenditure. Most of the failures where open storage is used are due to the methods of handling the situation rather than to the open storage."

Closed Storage Preferred by Operating Men

A company in the Middle West states: "We have several outside storage yards. To equip these yards with facilities for inside storage would cost a large sum of money. This question has been gone into, and we are thoroughly satisfied that for a town located as we are as to climatic conditions, inside storage would not be justified. While there is additional expense with open storage the saving on these items would not justify the interest charges for the necessary buildings for inside storage."

Another reply gives the matter a different aspect. "The correct answer to this question is a matter of careful study. I believe that when the cost of the delays and unsatisfactory service rendered by open-storage cars is added to the cost of other increased maintenance, it will be found that the sum is in excess of the interest charges on suitable covered storage." One significant statement from a company operating in New York State is: "We are at present considering covering all our open storage yards."

A company on the Atlantic seaboard writes: "This is a difficult question to answer from our limited experience with open storage, but we believe the increased cost of maintenance in open storage will be greater than the interest charges of capital investments for carhouse buildings."

Another company in the Atlantic region states: "It probably would be more economical to use open storage, but very much harder to keep the cars looking in good condition; and in my opinion this is one of the most important points in city operation. There is no question but that the well-painted, clean, quietly-operating car tends to attract passengers, particularly those who desire to ride a short distance; and the additional cost of keeping this equipment, particularly the paint, in good condition should be considered very strongly and weighed against the saving that might be made due to the use of open storage." This is from a company notable for its success in building up a short-haul business.

The same thought is given in a different way in the following: "Our calculations have always indicated that the saving in interest charges more than offsets any added costs of open storage, although my personal opinion is that we cannot get a true measure of all the factors. In the capacity of superintendent of equipment I would like to see all cars housed every night just the same as we house all of our automobile equipment; but we must concur in what is shown by figures to be the most economical thing to do. With storing cars out in the open yard, we of course have difficulty on winter mornings in getting cars out on time. Unless the tracks are salted carefully the cars will freeze in, or the brakeshoes will freeze to the wheels. The roofs are covered with snow and the cars do not look as well as though they had been in the house all night; but after they have been on the street for a few hours on a stormy day it is hard to tell which was inside or outside the night before."

A superintendent of equipment who has had wide experience in various sections of the country sums the matter up as follows: "I feel that in all Southern climates, up as far as Washington and perhaps Ohio, open storage is the most economical in the end, and logical, but in all cases the inclosed place for inspection work should be ample and well equipped so that the work can be carried on with comfort. All carhouses should be double end, that is, arranged so that the cars will come in one end of the carhouse and out the other. This is also particularly important with open storage. In the extreme eastern and northwestern sections of the country I have always felt that while open storage may prove economical, there is such a demand nowadays for high-class, uninterrupted service that the railways should provide themselves with 100 per cent inclosed storage. In a number of cases in the past I believe more money has been put into the buildings than was absolutely necessary for a street car house."

Some Comparative Costs

It is difficult to obtain concrete figures for comparison of the costs of maintenance in the two cases. According to one company that has used both kinds of storage for several years, the average cost per 100 ton-

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miles for shifting, car cleaning and similar items was 4.7 cents for a covered storage house, while similar costs for an open storage yard handling approximately the same total ton-miles was 6.9 cents per 100 ton-miles. These figures cover a period of two years. Thus these costs are increased 47 per cent with open storage. The cost of repairmen for the same locations are 6.5 cents per 100 ton-miles for the inclosed storage and 8.6 cents per 100 ton-miles for the open storage, or 32 per cent more.

It is stated that the effect of open storage on operation is a serious matter, the cost of which is difficult to determine. It affects the proper maintenance of schedules and the delays attributable to storage conditions come at the very times that the failures due to severe operating conditions are most numerous, thus pyramiding the trouble. For instance, in a sleet storm there is no way to keep the wires in the storage yards clear of sleet, and in order to move the cars it is necessary for men to get on the tops of the cars and pound the wires with clubs.

One company figures that a fireproof cover for a 50-ft. car will cost, at present prices, about $700. Taking interest, taxes, depreciation and maintenance at 15 per cent gives an annual carrying charge of $105 per car. Against this must be set the saving in car cleaning expense and car maintenance expense, amounting to $150 per car per annum. It is also estimated that there is an additional value for the car stored under cover on account of better operation amounting to $50 per annum. Thus in this particular case the annual net value per car due to the inclosed storage is $95, over and above the charges on the structure.

This may be an extreme case, as the location is where the winters are comparatively severe, although there is little weather with temperatures much below zero.

In general, it would appear that while open storage is cheaper and may give lower rates for insurance, the increased cost of maintenance will largely offset this, and there is a distinct advantage in having the cars stored under cover so that work can be done on them under the most favorable conditions. Whether the monetary value of having cars in better condition for early morning service in the winter months is sufficient to throw the scale one way or the other depends largely on the climate, as indicated in one of the answers.

Remodeling Obsolete Cars for One-Man Operation

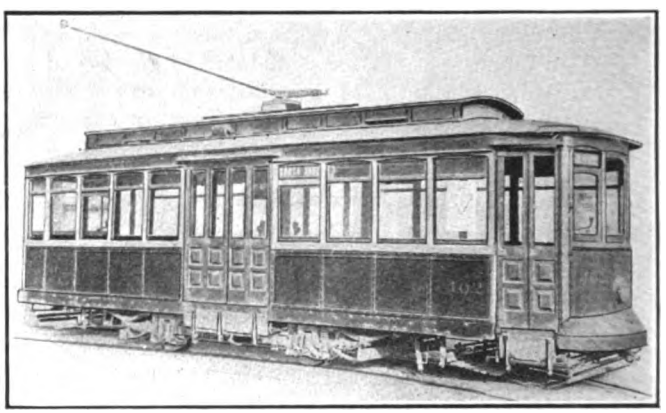
The Lehigh Valley Transit Company Has Converted Several Types of Obsolete Single-Truck Cars for One-Man Operation—Several New Features Have Been Worked Out in Connection with the Control and Fare Collection Systems

THE rehabilitation program of the Lehigh Valley Transit Company, Allentown, Pa., includes the reconstruction and remodeling of a considerable number of the company's old-type cars which are now considered obsolete. The single-truck cars are being converted for one-man operation. Up to April 1, 1923, fifteen cars had been completed and additional cars will be changed over as rapidly as conditions will permit. The cars which have been changed over were originally of three types. Some of these were open cars, some were center entrance and others the usual form of single-truck closed car. The accompanying illustrations show the varying types of construction which were necessary in remodeling the different types. In general, the design and equipment after they are converted for one-man operation are similar, and a description of the conversion of the 400 type will serve as a good example of the work accomplished.

The 400 type cars were originally arranged for center entrance and were purchased in 1908, and served their purpose until they were placed in the storage yard as obsolete. In order to return these cars to service a complete overhauling would have been necessary, and the officials felt that in attempting this they could be changed to one-man operation at a figure of approximately one-fourth the price of the present standard safety car and that under these conditions the expenditure was warranted.

Changes in Car Body Construction Found Necessary

The center-entrance doors and steps were removed and the side panel made continuous. Two windows were added in the place originally occupied by the door.



Single-Truck Center-Entrance Car Before Remodeling

The original bulkhead sliding doors were removed and an open header construction was substituted. By this construction the original strength of the car was retained and at the same time the objectionable sliding doors were eliminated. Two additional side sills were placed under the car body to give greater strength and rigidity, as the original design was weak in this respect and the cars were found to be sagging at both ends. The original folding doors on the front right and rear left sides of the platform were rearranged so as to permit operation by pneumatic door engines. A beveled dash was installed on the exterior over the bumper. This adds considerably to the appearance of the car and also serves to prevent small boys from stealing rides on the rear end of cars.

The seats originally were fitted with a carpet covering. This was removed from the backs and cushions, and after remodeling and considerable scrubbing these were

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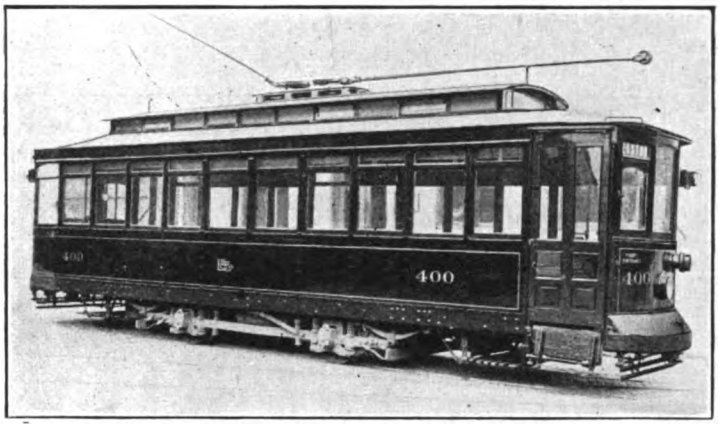
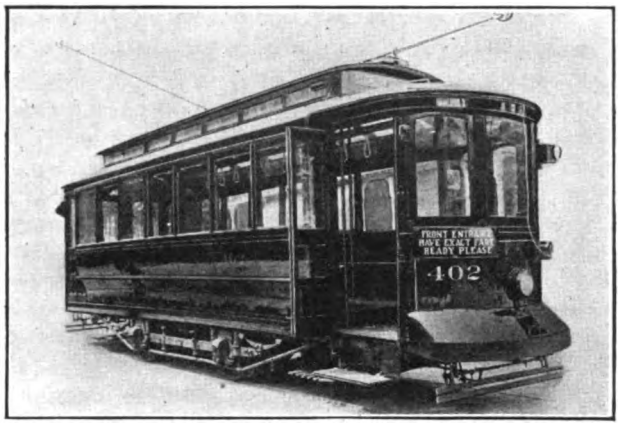
finished in cherry and varnished to give a sanitary construction. Originally the headlining was finished in robin's egg blue. Continued service had turned this to a green. This was refinished in a buff color, which is standard with the company. The leather hand straps were replaced with a sanitary celluloid type furnished by the Railway Improvement Company.

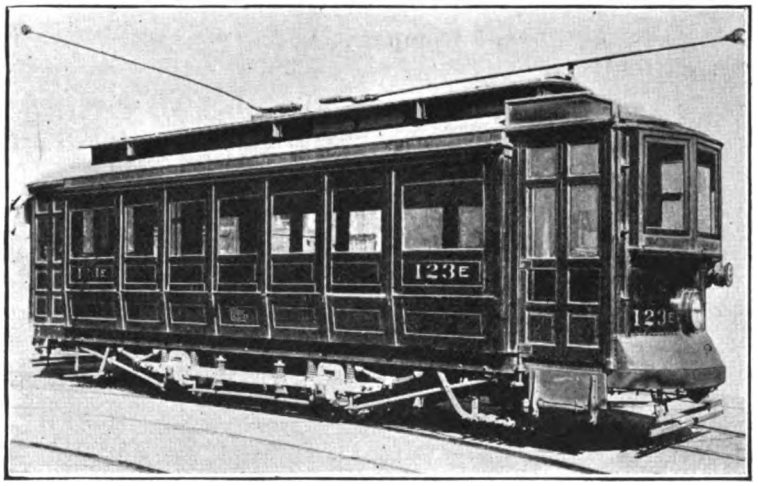
Six stanchions were installed in each platform. Two of these are arranged one each side of the door for the convenience of passengers entering and leaving the car. These also serve as supports for the National Pneumatic door engines, which are installed in a closed compartment over the door entrance. The stanchions also contain the air pipes leading to the door engines and the control rod for operating the door. Two stanchions are placed back of the motorman and serve to support the motorman's seat. One is installed at the motorman's right for supporting the fare box and one is placed at the right of the bulkhead opening to serve as a grip for the passengers who are standing.

The position of the door engines is convenient for inspection and is also so located that there is little danger from freezing during the winter months. The folding step is connected with the main door shaft and operates in synchronism with the door. Two of the panels in each door were fitted with plate glass so as to give the operator a view of the step and also give a view of small children outside the car when the doors are closed. The doors are controlled through a small shaft which extends vertically in front and to the right of the operator. This shaft is provided with a small handle at the top for hand operation and a small lever at the bottom for foot operation. A slight movement of this shaft controls the opening and closing of the door, and no particular care is required in this movement. The engines are equipped with pneumatic cushions to prevent slamming of the doors in either direction.

The original monitor decks of the cars which were fitted with Cathedral glass ventilators have been retained in their original condition, as it was felt that this type of construction was quite satisfactory. The vestibule is arranged with three front observation windows. The left-hand side, which originally contained folding doors, was paneled solid and a comfortable operator's folding seat was installed. Platform equipment was relocated so as to provide for the installation of the air-brake valve, register operating button, fare box, air sanders, hand brake, etc. The piping at the front end is surrounded with a wooden housing. The top of this serves as a sort of desk for the operator, and he uses this for his transfers and other necessary equipment. The original type Brill 21-E trucks have been retained.







Three Types of Cars After Remodeling for One-Man Operation
The car at the left was originally a two-man closed car. The car at the right originally was of center-entrance type, and the one at the bottom an open car.

NEW EQUIPMENT INSTALLED

The original electrical operating equipment was maintained on the car and in addition a General Electric Company's line switch was installed. This removes the making and breaking of the control circuit from the platform controller and prevents carbonizing and short-circuiting troubles. Its use also provides a convenient method for interlocking the operation of the doors and steps with the control equipment.

A complete straight air-brake equipment was installed consisting of a General Electric Company's CP-27 compressor, a G.E. type S form L1 brake valve, type ML form A1 governor and 8-in. x 10-in. brake cylinders. The original brake rigging was retained and the air brakes were connected into this system. The hand-brake equipment consists of a Horne double-acting hand brake which is located at the left-hand side of the operator's seat, in a convenient location so that it can be readily reached at all times.

Since these cars are arranged for double-end operation, special provision is made for cutting off the air supply and locking the various parts of the equipment on the non-operating end. This is accomplished through a locking shaft which is operated by a handle. When

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the operator goes to the other end of the car he takes this handle with him. A 90-deg. turn of the locking shaft closes two air cocks. One of these is for the supply of air for that end of the car and the other for the brake pipe which holds the air in the brake cylinder until released. In addition to these two air cut-outs two mechanical locks are located on the locking shaft underneath the vestibule platform. One of these locks the folding step and pneumatic door and the other locks the main rod of the rear wheel guards. This prevents the rear wheel guard from dropping and dragging along the pavement.

Platform Apparatus Is Locked on Rear End

By means of this locking shaft all apparatus is locked and released at one time and thus it is impossible for the operator to forget some individual parts. Over the top of the motorman's brake valve are two levers which form a part of the Ohio Brass Company's sander equipment. One of these operates the air sander and the other controls a pneumatic gong. These levers are also locked through the movement of the locking shaft.

The fare-box stanchion is located in the center of the platform convenient for both passengers and operator and supports a Johnson fare box which records dimes, nickels and pennies. The totalizer, reading in dollars and cents, affords a double check in conjunction with the register. The stanchion for supporting the fare box is constructed of 1-in. pipe at the top and bottom. The section immediately behind the fare box is made of 1½-in. pipe and contains a 110-volt lamp of the tube type.

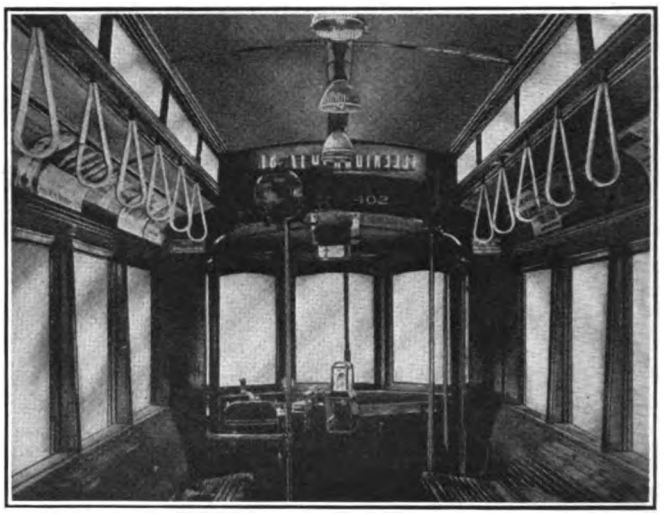
This lamp is approximately 6 in. long and is 1 in. in diameter. Five ⅝-in. holes are drilled in the stanchion to permit light from this lamp to shine into the examination compartment of the fare box. This affords light for the operator to view the coins deposited at night without having the glare of the light on the front windows of the car. The fare box lamp is connected in the same circuit with the headlight and changes from end to end when the headlight switch is thrown. Located on this same stanchion above the fare box is an extended mirror. This can be placed in either a vertical or a horizontal position as desired by the operator so that he can view the main portion of the car body to see that passengers are seated before starting the car and also to see passengers as they approach for exit.

Electro-Pneumatic Fare Register Used

A register of the International R-5 type records cash and transfers and has been rearranged to operate by electro-magnets. The current for these magnets is controlled by a pneumatic switch located in the vestibule convenient to the operator. By using the combined air and electric device a positive contact is insured for the electric circuit, and the locking feature, as already described, is more conveniently taken care of. The turning of the locking shaft, as previously referred to, prevents the register from operating when that end of the car is locked. In regular operation the operator presses buttons marked "Cash" and "Transfers," but when in the locked position these buttons can be pressed, but there will be no response by the register.

Another feature of the equipment is the use of an Electric Service Supply Company's pneumatically operated gong. The operation of this gong is controlled by one of the fingers of the Electric Service Supply Company's double-valve, gong and sanding attachment located over the brake valve. This method of operation is of great convenience to the operator and relieves him from the continual pounding of the pedal.

The lighting of the car has been rearranged and the original cluster design of fixture has been replaced by Electric Service Supply Company's fixtures with shades extending in one line down the center of the car. These cars are provided with electric signals and tail lights. These are of a design made by the Lehigh Valley Transit Company and are arranged to give a red, green, white or dark signal on either end, or on both at the same time, as desired. A description of this lighting fixture, together with the diagram of the connections, will be published in a subsequent article. Under normal



Arrangement of Platform on One of the Remodeled Cars

conditions these lights are operated from the main lighting circuit of the car, but in order to provide for keeping them lighted in case the trolley pole should leave the wire, a storage battery is also used. This is of the Ohio Brass Company's type and a line relay regulates the turning on and off of the storage-battery circuit whenever power from the trolley wire is interrupted.

A passenger signal system has also been installed as a part of the equipment, with push buttons between each pair of windows and additional buttons at the bulkhead for convenience of passengers as they leave the car. Electric Service Supply Company's high-voltage buzzers are used, the current being supplied direct from the trolley circuit. The cars are equipped with electric heaters, which are controlled by thermostats and have automatic regulators. The thermostats are set so as to keep the temperature of the car between 65 and 70 deg.

The original equipment of HB wheelguards were retained on these cars with the exception of the location of the operator's tripping and resetting pins. The cars are equipped with two trolley poles in place of one used originally, and Ohio Brass Company's trolley retrievers are used. The use of two poles for the car relieves the operator of the inconvenience of turning a pole around when changing operating ends.

In order to accelerate passenger movement and to relieve the operator of additional trouble in fare collection, a large sign is located on the right front end of the car reading "Front Entrance—Have Exact Fare Ready."

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Carrying Safety to the Public—VI*

Newspaper Publicity Has Proved a Most Effective Method of Making the Public Realize the Personal Feature of the Safety Campaign—Signed Articles by Prominent Persons, News Items and Cartoons Used Advantageously

By C. W. Price
Vice-President in Charge of Public Safety
Elliott Service Company, New York City

IN ANY organized community effort to promote safety the newspapers constitute one of the three most direct and effective mediums through which to carry the safety message into the homes every day in the year.

Because of the alarming increase of accidents and the aroused public interest, the newspapers in most communities, if properly approached, are willing and glad to sponsor the campaign to promote public safety, just as they sponsor similar campaigns to combat other evils that menace the life of the community.

In order to secure the intelligent and whole-hearted co-operation of the newspapers it first is necessary thoroughly to acquaint their editors with the plan and purpose of the campaign, and to outline with them a definite program of publicity.

Much of the material must be prepared for the press. It goes without saying that items regarding the campaign which have direct news value are the ones most sought after by the papers, and will be given a prominent place each day.

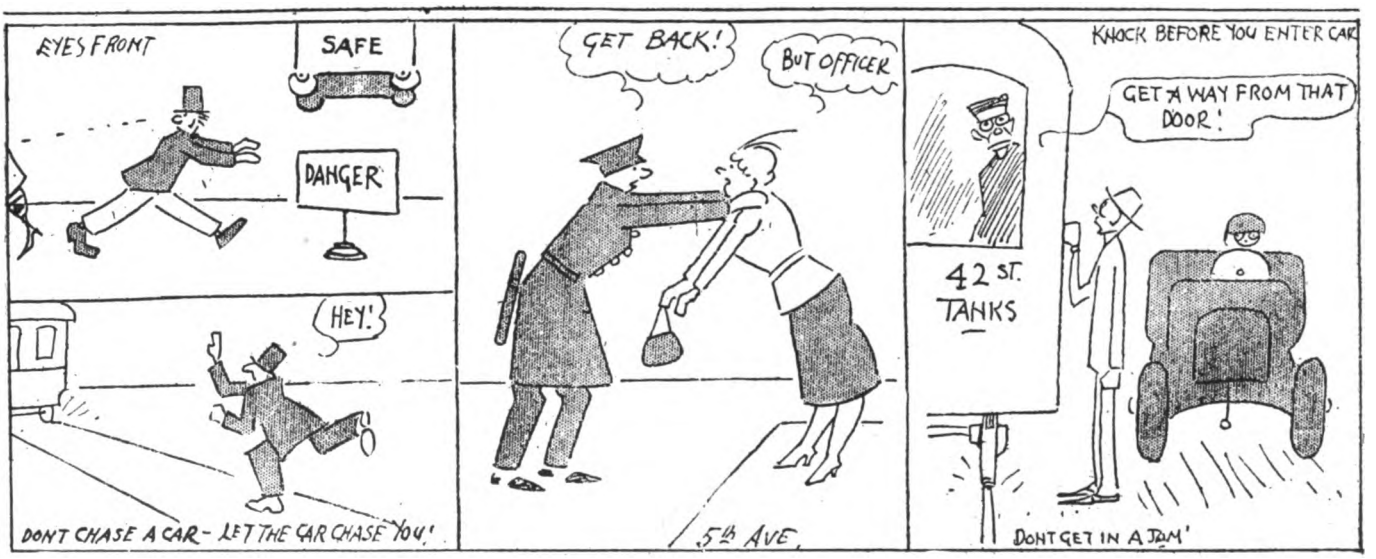
Often a newspaper will assign one reporter to handle all news items on safety. This reporter soon becomes familiar with the various phases of the work and the point of view of those who are promoting the campaign. Thus he can add much to the effectiveness of the publicity.

In the initial stages of developing an organization, it has been found advisable to release to the press a complete story on each feature of the program when it has developed to the point where it can be announced. For instance, when the school authorities have agreed to introduce safety instruction into the schools, a col-

(Cassel in New York Evening World)

Safety Week!

*One of a series of ten articles.



Safety First—This Is Watch-Your-Step Week (Powers in New York Evening Journal)

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(Detroit Free Press)

Pals

umn article should be released announcing this fact. The method of instruction can be outlined in detail, and the far-reaching effect of this instruction in carrying the safety message into the home can be emphasized.

Thus there gradually will be built up in the minds of the more intelligent citizens a comprehensive idea of the scope of the campaign and confidence in its success.

After the campaign is under way, it is advisable to arrange for a series of articles, each of which should present an adequate picture of some important feature of the campaign. These articles should be signed by prominent citizens whose positions render their views authoritative. For instance, in Washington the articles were prepared by the District commissioners, the commissioner of police, the superintendent of schools, the chairman of the women's committee of the Washington safety council, the chairman of the committee representing the federal departments, and others. Each of these writers discussed the safety campaign from a different viewpoint, and urged co-operation.

"Two-Minute Safety Talks to Mothers," signed by the chief of police, and printed in a box each day on the front page of leading newspapers, have proved most popular and effective. Each talk should cover some one hazard to children in the home or on the street. Pictures of children doing hazardous things on the street are good for the illustrated page or Sunday supplement.

If the newspaper cartoonists become interested in the campaign they can exert a powerful influence in ridiculing the people regarding their careless and reckless habits. Under some catchy title such as "Spark Plugs," pointed hints for drivers can be seen, such as these:

Fools used to blow out the gas, now they step on it.

Drive carefully, you may meet a fool.

Drive as if your boss were sitting in the back seat.

Fools rush in where wise men use the brake.

Each month an analysis by causes of the accident experience of the previous month should be published, with editorial comment covering some of the more flagrant cases of violation of safety rules.

At frequent intervals the newspapers should carry articles instructive in character, covering such topics as safety in the home, rules of the road, safety of children and industrial safety. The editors can do much to establish the campaign in the confidence of the people if occasionally, say once a month, they will give recognition in the editorial columns to its importance.

Stories of accidents which occur from day to day, if properly handled, can be made to play an important part in arousing the people to a realization of the seriousness of the situation and the necessity of taking action.

Two-Minute Safety Talk to Mothers

Did you ever think of this?

What is the use of teaching your baby to walk and to talk and then teaching him to read and write and figure, and then training him to be clean, and moral, and industrious; I say what's the use if after all this effort you have not taught him the perfectly simple lesson of keeping from being killed.

The first duty of a mother is to train her child to protect his life and limb.

FORREST BRADEN,
Chief of Police.

Two-Minute Safety Talk to Mothers

A mother who allows her children to play in a street where there are street cars and automobiles is exposing them to great danger. She might almost as well let them play with fire arms.

Why is it so dangerous for children to play in the streets? Because a child at play is utterly unconscious of everything except the game he is playing and will not look out for danger.

If you allow your children to play in the streets you are morally responsible if they are killed or injured.

CHARLES D. GAITHER,
Commissioner of Police.

(Murphy in Louisville Herald)

Drivers We Can Spare

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Revarnishing Preserves Body Paint for Six Years

How Careful Application of Initial Coat and Proper Maintenance on Laurel Line Eliminate Need of Frequent Painting in Spite of Unfavorable Conditions

THE frequency with which it is necessary to repaint cars and keep them looking well is a matter that has received much attention in these days of high costs. In this connection, the achievement of the Lackawanna & Wyoming Valley Railroad (Laurel Line), where the period between two successive paintings of the same car has been prolonged to approximately six years, is of particular interest. And this has been done under circumstances which are in many ways unfavorable.

This line operates between Wilkes-Barre, Pa., and Scranton, Pa., through the anthracite mining country along the Susquehanna River, with a branch line running to Dunmore. Private right-of-way exists for the entire length of the line and power is furnished from a third rail except for a short distance in the city of Wilkes-Barre, where an overhead trolley is used. The third rail is uncovered and on that account the friction of the collecting shoe against the steel rail causes steel oxide dust to be deposited on the lower part of the car body, giving it a very drab appearance. This discoloration is similar to that described in the ELECTRIC RAILWAY JOURNAL for March 31, 1923, in connection with the New York, Westchester & Boston Railway, resulting there from the use of steel trolley wire.

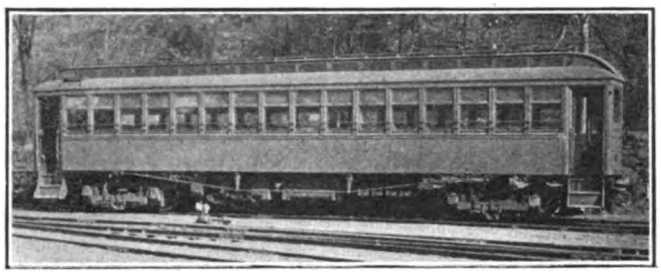
Another feature of the situation which makes it difficult to preserve the attractive appearance of the cars is the presence of mine gas in the air. The continual use of explosives in the mines creates large quantities of sulphurous and nitrous fumes, which have an extremely corrosive effect and soon destroy the luster of the car exterior.

But in spite of these unfavorable conditions, the Laurel Line has fresh, clean-looking cars, Pennsylvania Railroad maroon in color. The equipment is repainted only once in six years. Each car, however, has a very thorough varnishing once every two years. This work is carried on in the company shops at Scranton under the supervision of C. D. Shellabarger, master mechanic. Because it is desired to have all available rolling stock in service on the road during the summer months, painting is done between Nov. 1 and May 30 only. From June to November, therefore, the painters are occupied with outside work along the line, painting stations, bridges, etc.

The program followed in the regular revarnishing which each car receives every second year is as follows: The car is thorougly washed with soap and caustic soda. Then the surface is sandpapered, holes puttied up, and glazing done with Valentine's knifing surfacer where it is needed. All glazed areas are next sandpapered, puttied, and retouched with flat color. A coat of color varnish, HL gloss, is applied. The stripes and letters are then touched up, and finally a coat of Valentine's heavy body finishing varnish is applied.

Once every six years, however, a car is entirely repainted. All the old paint on the outside is burned off down to the wood, which is then closely sandpapered. Next a coat of Du Pont No. 1 surfacer is applied. Holes are puttied up and glazing is done where necessary. The surface is again closely sandpapered, after which comes a coat of Du Pont No. 2 surfacer. A repetition of this operation follows, the surface being reputtied, resandpapered, and another coat of the surfacer applied. It is then sandpapered once more, and dusted off, and painted with Du Pont No. 3 body color. The striping and lettering are done next, and afterward one coat of Valspar outside rubbing varnish is applied. The process ends with a coat of Valspar outside heavy body finish.

The interior of the car is stripped bare of everything which can be removed. Only the fare register rod and its brackets are allowed to remain. All surfaces are thoroughly sandpapered, dusted off and touched up with shellac. A coat of Valspar interior car varnish



Paint Still in Good Condition After Six Years

is then applied and the floor is given a coat of Valspar floor paint.

Doors and sash are removed before the painting job begins. Both sides of the sash are sandpapered and touched up with Du Pont No. 1 surfacer. They are then given a coat of Valspar interior finishing varnish and a coat of Kay & Ess sash color. After this comes a coat of rubbing varnish, and lastly the heavy body finishing varnish. For the doors the same process is followed with some slight additional putty and glazing work, if that is needed.

The vestibule is thorougly sandpapered, and touched up with Du Pont No. 2 surfacer. Next is applied a coat of Valspar color varnish, and finally a coat of one-half rubbing and one-half heavy body finishing varnish. After the roof has been scraped it receives an application of Sherwin-Williams deck paint. The trucks are cleaned and then painted with Valspar iron preserver.

The frequency of revarnishing and repainting depends entirely upon the appearance of the individual car. No attempt is made to place it on either a time or mileage basis. Under average conditions, however, each car is varnished about once in two years and painted once in six years. Considerable economy is effected by lengthening the painting period in this way. for the revarnishing costs only about one-third as much as a repainting job. Moreover, a car can be revarnished in five and one-half days, whereas it takes nine or ten for repainting. This is an important item on a road of moderate size which desires to keep ready for service as many cars as possible.

The Havana Electric Railway formerly indicated the different routes on its cars by colors and the destination signs were painted with these colors and the same color combination was carried in the head end of the monitor deck. The increase in the number of routes, however, made the changes necessary, as all the practicable color combinations have been exhausted. Now the divisions are indicated by a letter, and a figure shows the destination. This numbering permits the separation of the system into as many divisions as are convenient, up to twenty-six, and allows the use of nine lines per division. These route signs are illuminated at night.

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It Pays to Treat Wood Poles and Ties

Experience of Chicago, Lake Shore & South Bend Railway During Fifteen Years Shows Treatment Insures Life of Thirty Years Under Local Conditions

BY HOWARD H. GEORGE*
Engineer Maintenance of Way Public Service Railway, Newark, N. J.

IN VIEW of the recent activities of the American Electric Railway Engineering Association in the field of wood preservation and of the efforts of the special committee on wood preservation this year to recommend definite specifications for treatment of wood poles, it will probably be of interest to a great many to know of the experience of one electric railway with pressure-treated poles. The data and views accompanying this description were collected by W. A. Underwood, electrical engineer of the Chicago, Lake Shore & South Bend Railway, and were furnished the writer through the courtesy of P. R. Hicks, secretary-manager of the service bureau of the American Wood Preservers' Association. They relate to treated pole installations on the line of the Chicago, Lake Shore & South Bend Railway.

The poles were of Southern yellow pine, about 40 per cent loblolly; they were 45 ft. long, and measured at least 29¼ in. in circumference at the top and at least 39½ in. 6 ft. from the butt. The treatment was by the full-cell pressure process, with 12 lb. absorption per cubic foot. They were treated at Pascagoula, Miss., and Slidell, La.

A total of 2,500 poles were set with an average spacing of thirty-two poles per mile. They were installed between Kensington (Chicago), Ill., and South Bend, Ind., a distance of about 75 miles. The line runs through a slightly rolling country. In the section between New Carlisle and South Bend the soil is sandy clay and black loam. Between Kensington and Hammond the soil is black mud, and between Hammond and New Carlisle it is sand.

POLES IN GOOD CONDITION AFTER FIFTEEN YEARS

The poles were set in 1907 and carry an average equipment of two 10-ft. crossarms supporting single-phase and three-phase 33,000-volt circuits, telephone and signal lines, as well as mastarm trolley, etc. The poles were all set in concrete because of ground conditions.

The last official inspection was in November, 1922. At that time sixty poles had been removed, mostly due to the presence of woodpecker holes and consequent decay. A few had been burned by transmission lines, arresters being defective. At that time, the inspection report stated that there were a few more poles that should be renewed, but that the line generally was in fine condition and should easily give fifteen years more service.

Of the poles, 1,290 (about 40 per cent loblolly) were treated at Slidell, La., in the following manner: The poles were first steamed six hours at 30 lb., 274 deg. F. They were next subjected to a vacuum for four hours at 26 in. Oil pressure was then applied for one-half to one hour at 60 to 90 lb. English coal-tar creosote was used, and showed the following analysis:

DISTILLATION	
Temperature, Deg. C.	Per Cent
0 to 170	1.00
170 to 205	5.00
205 to 210	4.50
210 to 235	38.50
235 to 300	26.00
Above 300, residue	24.50
Loss	.50
	100.00
Specific gravity at 38 deg. C.	1.04
Tar acids, per cent	8

The oil used for treating 1,500 poles at Pascagoula, Miss., showed the following analysis:

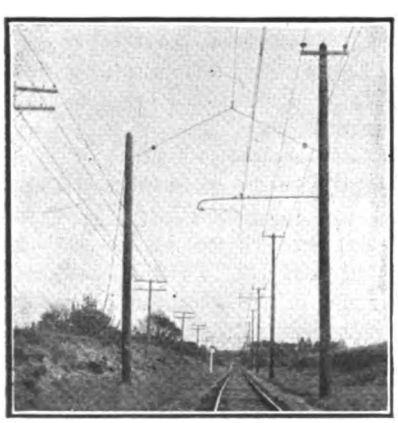
DISTILLATION	
Temperature, Deg. C.	Per Cent
0 to 210	1.50
210 to 235	42.50
235 to 270	24.50
270 to 318	11.50
Above 318, residue	20.00
	100.00
Specific gravity at 35 deg. C.	1.047

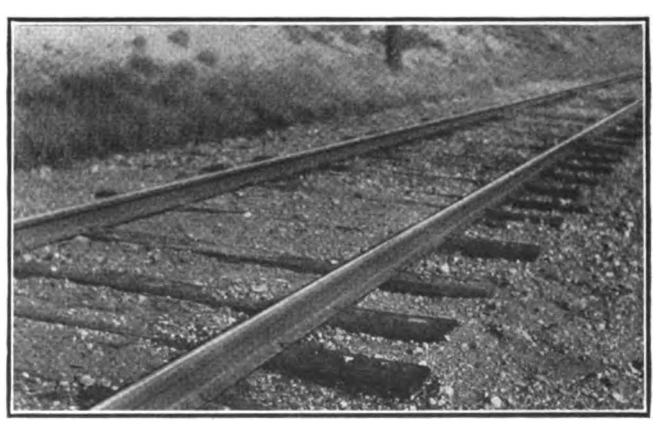
These poles were treated without any preliminary seasoning, that is, some of them had been cut two weeks and some two months. The majority were cut from longleaf yellow pine or second-growth longleaf pine, although about 40 per cent were loblolly. They were steamed twelve hours at 35 lb., followed by a vacuum period of six hours at 23 to 24 in. It required from two to four hours at 100 to 125 lb. pressure to impregnate with 12 lb. oil per cubic foot.

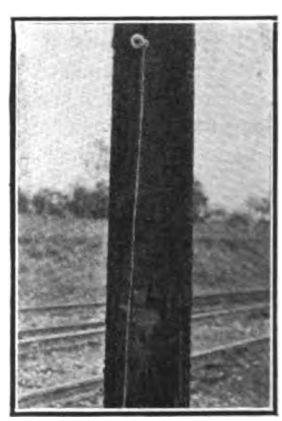
The accompanying illustrations show the pole and track construction used and also the type of overhead. One view also shows the condition of creosoted ties, which were installed about the same time.

This installation of treated poles is extensive, and is a striking example of what can be expected from treat-

*Chairman special committee on wood preservation, A.E.R.E.A.







These Poles and Ties Treated with Wood Preservative Have Given Good Service
At left, part of 2,500 creosoted poles set in 1907. In center, track on C., L. S. & S. B. Ry. with cresoted tiees fifteen years old. At right, fifteen-year-old pole which is good for another fifteen years

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ment of wood poles. When, after fifteen years of service, only sixty poles, or 2.4 per cent, have been removed from all causes out of a total of 2,500 originally installed, and the remainder of the line gives every evidence of another fifteen years of service, this is conclusive evidence of the ultimate economy of using treated poles.

In connection with the claim made that the principal cause of removal was decay, starting from holes made by woodpeckers, it is of interest to quote from a letter written by Roger F. Hosford of the American Telephone & Telegraph Company. Discussing this claim, Mr. Hosford writes:

> The first time I saw any woodpecker attack on a creosoted pine pole was in 1910, when, in a party with Howard Weiss and several others, I looked at several poles near Flanders, N. Y., while we were making an inspection of the Poughkeepsie-Newton Square line. In this case a woodpecker had started to enlarge an unused bolthole but had not gone very far. I think that, if we totaled up our whole experience, we would find many more cases of attack of this kind than of any serious damage. As you probably know, there are several species of woodpecker whose habit is to make their homes in pieces of available timber, such as poles, posts, etc. When a woodpecker has hollowed out a nest for itself in the upper part of a pole it has probably cut away enough of the wood to represent a substantial impairment of strength at that particular section. We have not, however, found many woodpecker nests in creosoted pine poles. I saw one last month in a pole near Fredericksburg, Va., but in this case the top of the original piece had been cut off and decay had run down to about the point where the woodpecker had entered and cut out its nest. The pole must have been more than twenty years old when this happened.
>
> The fairly considerable number of cases where a woodpecker starts at a bolthole or some similar point and cuts away a little wood, as compared with the relatively few cases where it goes so far as to make a nest inside the pole, lead me to believe that whatever woodpecker attack we encounter in creosoted pine holes is due to the woodpecker seeking a nest. For example, a bird notices a bolthole and, needing a home, thinks it can get one by enlarging the opening. In most cases the bird soon gives up the attempt and searches for an easier piece of wood to build a home in. If treatment is thin at the point where the woodpecker starts working, the result might be an opening for decay. Usually, however, the point of attack seems to have been one where there would be no basis for expecting irregularity of treatment, so that nothing important results from the woodpecker's activities.
>
> I have seen occasional articles appearing in periodicals, where reference is made to serious trouble from woodpeckers attacking creosoted poles. I do not know whether the people who report these experiences make the distinction which I do between a woodpecker hole and woodpecker nest, which is very substantial from the structural strength viewpoint, or whether the regions in which the experience has been reported are comparatively devoid of timber suitable for nests so that the woodpecker has to do considerable damage to the pole if it is going to have a nest at all.

Keeping 95 per Cent of the Cars in Service

Complete and Convenient Records Speed Up Inspections and Repairs —The Maintenance Practices of a Small Company Which Keep the Number of Cars Out of Service to a Very Small Percentage

THE weekday schedule of the Binghamton (N. Y.) Railway calls for the operation of forty-two cars in the middle of the day, with twenty-one additional trippers in the evening rush hours, or sixty-three cars in all. Inasmuch as the company possesses altogether only sixty-three closed cars, some of which are always being overhauled and painted, the shop department has a never-ending problem to keep the transportation department supplied with as nearly as possible the full sixty-three cars. If a car is pulled in crippled at any time during the day it must be put back in shape for service again before five o'clock in the afternoon.

A good example of this is furnished by a recent incident. A modern steel car, No. 514, was in collision with a heavy auto truck in the early morning, with the result that the body corner post was stove in, the side sheeting badly crumpled and some glass broken. The car was pulled into the carhouse at about 9:30. Immediately the shopmen set to work. The corner seats were removed and the steel heated in place. Then the blacksmith hammered out the bent steel plates and the seats were replaced. Meanwhile another workman had replaced the broken glass. Next the car was run into the paint shop and a coat of paint applied over the area where the damage had been done. At 4:30 in the afternoon, when the dispatcher called for cars to go out on the road, No. 514 was sent out with scarcely a trace remaining of the morning mishap.

In order to accomplish the quick repairs necessitated by the shortage of cars and to maintain the equipment in the excellent condition for which the Binghamton rolling stock is noted efficient shop methods are required. Two salient points stand out as fundamental principles of policy. In the first place a complete and convenient car index system is used to keep a record of all work done in the shop. Great pains have been taken to make the forms so simple and easy to use that they shall really be time-saving devices. In the second place, an ample number of spare parts for replacement is always on hand. These two factors, each depending upon the other, are the foundation of the maintenance practice.

The primary step in the record system is the "Condition of Car" report, which is made by the car operator whenever he turns in a car at the carhouse. As will be seen in the accompanying illustration, this form provides space to mark any ordinary defect. If no defects exist, the operator signifies that fact by the notation "OK" under remarks. But in any case, whether or not there are defects, a report must be made out when the car is turned in. Severe disciplinary action is taken against a man who fails to turn in a "Condition of Car" card. For that reason, and also because it is so easy to note on them any little defect, these cards are a valuable aid to the mechanical department.

Such a card for each car goes to the night foreman of the shop. He looks through them and at once gets a general idea of the work to be done that night. As a result, he is able to distribute his force of workmen in the most efficient way. But still more important, he knows with reasonable certainty that the job for which he has arranged will be all the work necessary to be done that night. He does not have to fear the discovery just before morning of some defect that was not reported. After all defects have been repaired, the inside of each car is swept and sprayed with West's disinfect-

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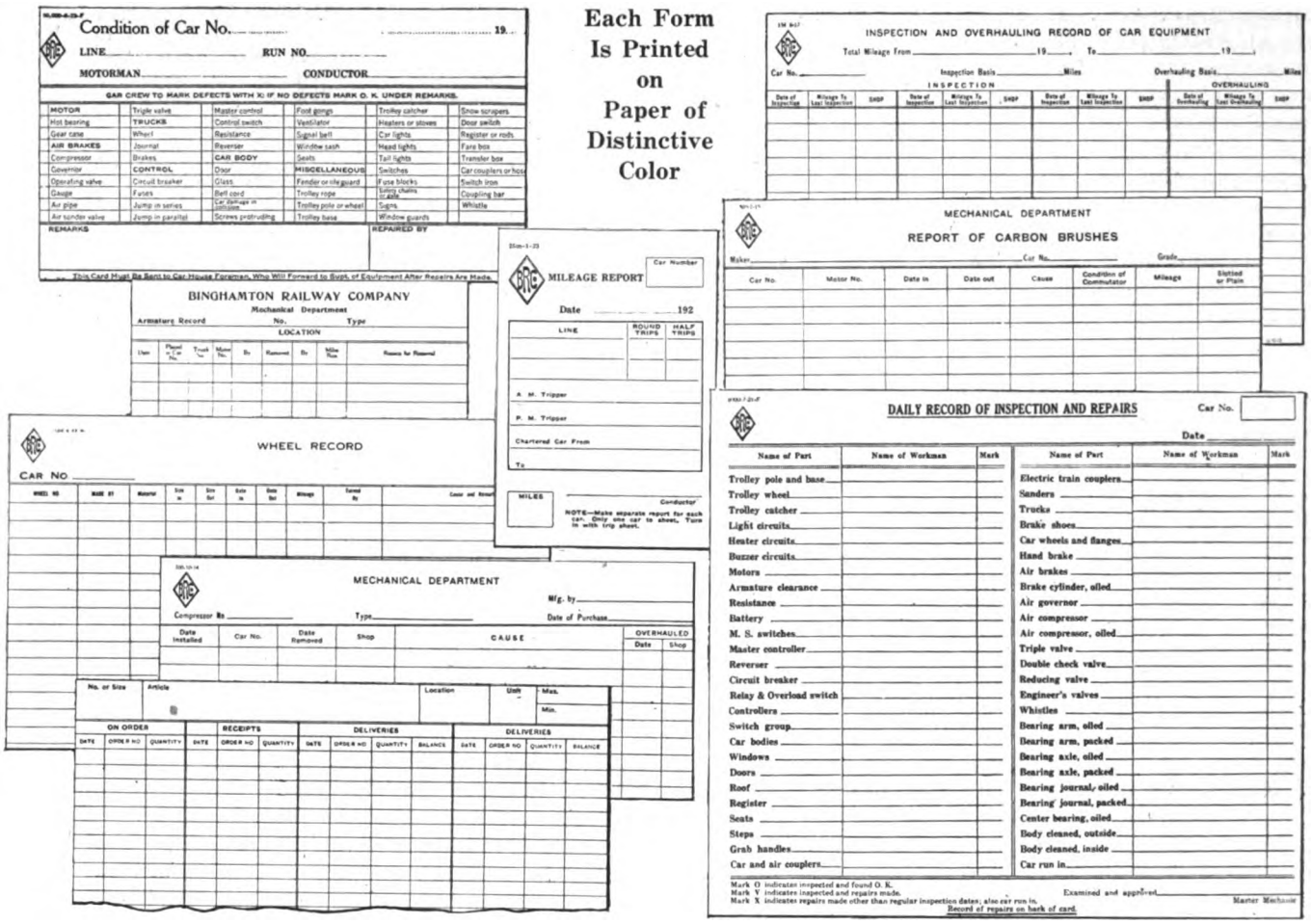

The Forms Are So Simple and Easy to Use that They Really Save Time

ant. The exterior is dry wiped, and every third night the windows are washed. Brook's renovator is used about once in sixty days to brighten up the paint.

Inspection and overhauling are done on a mileage basis, and here again accurate records play an important part. Every time a trainman turns in a car at the carhouse he must fill out a small slip giving the car number, the route on which he is running and the number of trips he made. A clerk at the office converts the latter figure into miles, and the slips are then filed by cars. An inspection of these slips at any time will show the number of miles run since the date of the last inspection. One thousand miles operation is the basis of inspection and 50,000 miles is the basis for general overhauling.

Each car has a yellow card in the master mechanic's file, showing the date of the last inspection and the date of the last overhauling, as well as the mileage prior thereto. A general overhauling requires three or four days, and one car at a time is taken out of service for this work. Painting is done periodically, once in two years, even though the car retains a fairly presentable appearance. Eight days are required for painting and two cars are always in the paint shop.

An experiment which has proved successful in Binghamton is the use of green headlining instead of white on the front platform. This has materially improved the motorman's vision at night.

A "Record of Inspection and Repairs" card, such as shown in the accompanying illustration, is filled out every time a car is inspected. These cards are filed by car number in the shop and the master mechanic can tell at any time from them the name of the shopman who last examined any particular piece of apparatus on a given car, the condition in which he found it and what repairs he made. This record is valuable in case of breakdown of equipment to determine exactly when and by whom it was previously inspected.

The repairs made when a car is inspected or overhauled are carefully noted on the proper card in the file. Different color cards are used for keeping records of the various apparatus. For example, wheel-record cards are orange; compressor cards, red; carbon-brush cards are blue, etc. The wheel record card is perhaps typical. Like most of the other records, these are filed by car number. The card shows the wheel number, the maker's name, the material, the size when installed and the size when removed, the dates of installations and removal, and the mileage run during the period of service. Other records are kept with similar simplicity and accuracy. The records of such equipment as compressors, however, which are frequently transferred from one car to another, are filed by the manufacturer's number.

Keeping Stocked with Spare Parts

Another phase of the maintenance practice of this company, just as important as that of keeping accurate records, is that of having always on hand an ample supply of spare parts for replacement. These two fundamentals of shop practice are closely linked together because it is the comprehensive record system of past repairs that enables the master mechanic to forecast his future needs. Except for such material as is ob-

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tainable locally, it is the general policy to keep on hand in the storeroom a sixty-day supply of parts for replacement.

The value of having this rather unusually large stock of spare parts on hand was well illustrated during the past winter, when five journal boxes were broken in one week. Normally such a number would not be broken in six months, and only the unusually large supply of extras in stock prevented the laying up of several cars. It is claimed also that this practice is economical in several ways. In the first place it permits the immediate substitution of a new part for a damaged one, and thereby forestalls a more serious and more expensive repair job later. In the second place, it permits the storekeeper to make many of his purchases when the market is favorable. The card index plays its part in this end of the business also, as a complete record is kept of all orders, receipts and expenditures for material. For this purpose the ordinary stock card furnished by the Library Bureau is used.

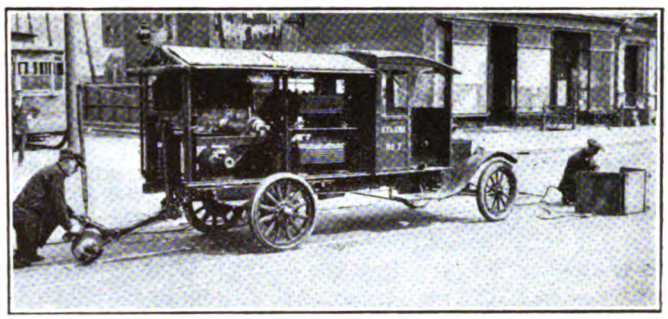
Actual experience has convinced the Binghamton Railway that systematic maintenance is worth much more than it costs. The comprehensive card records really save time and money as well as make easier the task of keeping the rolling stock in first class condition. The high standard of maintenance has helped materially to produce increased patronage and a generally friendly attitude of the public toward the company, as told in the ELECTRIC RAILWAY JOURNAL for May 5, 1923.

Combined Electric Welder and Grinder

Welding and Grinding Equipment Mounted on a Ford Chassis Can Be Moved Rapidly—Both Operations Are Done Simultaneously by Two Men Without Interference

THE welding and grinding of rail joints now constitutes a considerable portion of the track maintenance work of electric railways. The tendency is to provide equipment designed to insure quick transport from point to point and economical handling by few operators. Among the essential requirements for a satisfactory welding and grinding machine are: Easy portability to prevent interference with normal car operation; rapid transportation to and from the job, and operation with a minimum amount of labor.

The mounting of welders and grinders on wheels so that they may be handled to and from the job easily is quite common. Where the welder and grinder are



Welding and Grinding Operations Performed at the Same Time

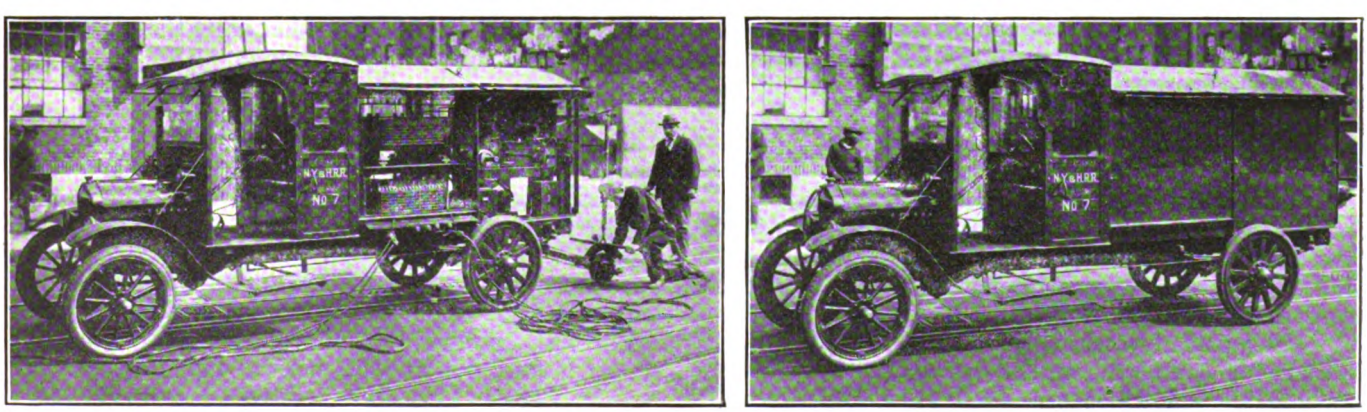
separate units, two men are usually employed for each unit, and when they are hauled by trucks an additional driver is necessary. By mounting both welder and grinder on a 2-ton Ford chassis, Walter Uffert, master mechanic New York & Harlem Railroad, New York, N. Y., has provided for many of the most essential features and has produced a unit that can be handled by two men.

Accompanying illustrations show the equipment at work on a job. Both welding and grinding operations can be carried on simultaneously. Welding leads of 100 ft. in length are provided, so that the welder can work on joints for this distance ahead of the truck. The grinding operation is performed at the rear of the truck so that this can follow the welding without interference.

The welding and grinding equipment is mounted on a substantial angle-iron framework in the rear of the driver's cab. Six frames of grid resistance are mounted in two tiers immediately behind the cab. Circuit breakers are placed in the welding circuit ahead of the equipment and the current graduations are obtained by knife switches.

The New York & Harlem Railroad uses the underground conduit contact system, and current for welding is obtained directly from the contact rails by use of a plow. Four receptacles are provided on the left-hand side of the truck. Two of these are for the plow leads and the other two for the welding leads. Plugs with substantial wooden handles are used for plugging in to obtain the necessary connections. Copper rods with substantial porcelain insulators are used for all connections to the resistor grids and to the switches and circuit breakers. There is thus no danger of charring insulation from too much heat and at the same time this method of construction is neat and compact.

In mounting the grinding wheel, special attention was given to flexibility so that the grinding wheel can



At Left—Receptacles for the Contact and Welding Leads Are Provided at the Lower Edge of the Chassis. At Right—Sheet Iron Curtains Close in the Equipment During Bad Weather and While Being Transported to and from the Job

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be removed from one rail to the other and can be pushed backward and forward without the necessity of shifting the truck. A 3-hp. 600-volt General Electric motor is used for driving. This is belted to a countershaft mounted just behind the grid resistors. This countershaft is made of a 7-in. solid axle and has ball bearings. Another countershaft at the rear of the chassis has a loose pulley which slides from side to side. By this arrangement the grinder can be thrown from one rail to the other for grinding as desired without shifting the position of the truck. The grinding wheel is mounted at the rear of an extension arm, which is pivoted at the lower end of a support fastened to the countershaft on which the loose pulley slides. The grinding wheel can thus be shoved ahead or pulled back a distance of 24 in. either side of its neutral position.

The grinding wheel is supported in its normal position a few inches above the rail by a chain and spring attached to a swinging arm. This supporting arm pivots about an upright in the upper center part at the rear of the truck and has a brace running from the outside end to the bottom of the fulcrum. The use of a spring in connection with the suspension of the grinding wheel permits this to be pushed down so as to perform the grinding operation, and when it is necessary to shift the truck the operator needs only to let go of the wheel and it automatically clears itself. The arm on which the grinding wheel is mounted has a bent portion extending over the top of the wheel. This acts as a safety guard for the workman and also provides for attaching a handle to facilitate the grinding operation. All bearings except those on the main driving shaft are equipped with grease cups.

The principal members of the framework are of 5-in. channels. The supports for the grid resistors and for the driving axle are two 3-in. x 3½-in. angles. The smaller members which constitute the side frames are 1¼-in. x 1¼-in. angles. All parts were forged in the railway company's shops.

The sides are of sheet iron arranged to fold up and lie on top of the roof. These give protection to the equipment during stormy weather or when it is being transported to and from the job. The arm with the grinding wheel folds up and is held firmly in position by a hook connection, and the swinging arm supports can be reversed so as to extend inside the covered portion of the truck. A curtain at the rear can be lowered as a protection to the equipment. A circuit of five lights is provided. This not only affords illumination to the equipment during dark periods, but also serves as a warning that the contact shoe is in place so that the operator will not attempt to drive away without removing his plow from the contact slot.

Electrification in Japan

ELECTRIC railroad construction is a live subject now in Japan and the prospects are that by the end of the summer there will be a considerable addition to the miles of electric track in the Japanese Empire. According to the *Japan Times and Mail* of April 28, 1923, during 1922 thirty-three new companies were licensed to construct electric railways that have a total length of 436 miles and nineteen of these companies have begun construction on 83 miles. The same paper publishes a list of railways which electrified 116 miles of line in 1922 and eight other companies licensed to build or electrify 66.8 miles of line.

Devices to Prevent Lamp Theft

A Base that Does Not Fit the Ordinary Fixture May Be Used—Lock Sockets Have Given Satisfaction on Several Railways

THE problem of preventing the theft of lamps from railway cars, stations, etc., is today largely a matter of discouraging those who supply their own homes by stealing the company's lamps. At one time serious losses were suffered because boys unscrewed lamps and threw them in the street for amusement. Occasionally stealing has been done on a regular money-making basis, large numbers of the stolen lamps being resold at a low price to unscrupulous second-hand dealers. Neither of the latter two factors now appears to be of such importance as the theft by people who take lamps for their own use.

Four general remedies for the situation have been tried. The simplest consists in marking lamps in some conspicuous and ineradicable manner. A second plan is to use a base that will not fit a standard fixture. Under these circumstances the lamp is useless to the thief. Lock sockets are a third means of preventing theft. A fourth is the installation of lamps of unusual voltage or wattage, not suitable for ordinary use.

Etching the name of the railway in the glass of the lamp is a long-established custom on some properties. It is no doubt the cheapest of the numerous methods of preventing the theft of lamps. These railways claim that the mere presence of the company's name on the glass keeps people from stealing their lamps. The Bamberger Electric Railroad, Salt Lake City, uses an interesting variation of this idea by marking its lamps "Stolen from B.E.R.R." It must be admitted, however, that etching the name on the glass is not always efficient to prevent serious loss of lamps, and a number of companies favor more elaborate remedies.

Next in point of simplicity is the plan of equipping lamps with an unusual base, so that they cannot be put into the ordinary commercial socket. This may be accomplished by use of a left-hand thread or by other means. Several serious objections exist, however, to the use of a left-hand thread. Such a lamp is used in the New York subway for the 40-volt emergency lighting system to prevent the regular 130-volt lamps from being put into the emergency sockets and vice versa. The experience of the Interborough Rapid Transit Company shows the additional cost to be about 3¼ cents for each lamp. This would be a continuing charge, and if added to the price of all lamps used by the railway would be a formidable annual expense. It is doubtful, therefore, whether the value of the left-hand thread would equal the original cost of altering the sockets plus the increased cost of manufacture.

To change the thread on only a portion of the lamps used by a railway would not be a feasible arrangement. The difference in appearance between the two types would be scarcely noticeable and confusion would be the inevitable result if a stock of each kind was kept on hand. This similarity of appearance would to some extent spoil the plan as a preventive of stealing, for many left-hand thread lamps would undoubtedly be taken under the impression that they were the ordinary type.

There is, however, a similar expedient which is distinctly more promising. American manufacturers are now making for signal purposes on the railroads lamps with a medium bayonet base, such as is used in Europe. So far as is known, there is no socket for these lamps

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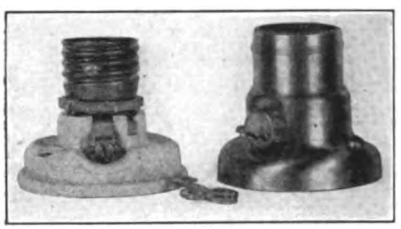
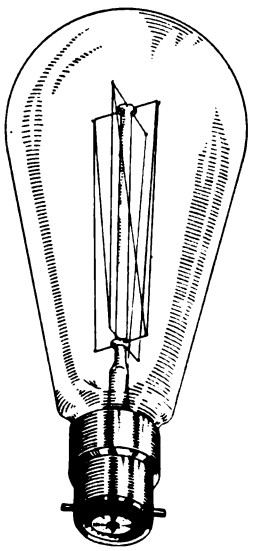
now on the market in this country, as the signal manufacturers make a special design for their own work. It is safe to say, however, that the socket makers would be glad to supply the demand if it existed.

The fact that these lamps are actually being manufactured at the present time is a point in favor of the bayonet base plan. From a railway point of view the change from a right-hand thread base to the medium bayonet base would be no more complicated than the change to the left-hand thread. The bayonet base would have the advantage of being readily distinguishable from an ordinary base. No confusion would be caused in the supply and a thief would see at once the folly of stealing such a lamp as it would be of no use.

There are two protective features common to all lock sockets. The first is that it is always difficult, although not altogether impossible, to remove a lamp without using the key. Second, the mere fact that an article is locked fast acts as a deterrent to persons who would not hesitate to grab a loose article. A disadvantage common to all lock sockets is the time required to change lamps. Various types of lock sockets are in use.





G.E. Lock Socket Used in Brooklyn. At Right, Bayonet Base Lamp.

One of these, made by the Benjamin Electric Company, has a slot cut in the side of the shell through which a pointed steel dog is pressed against the lamp base. The dog is so pivoted that it permits a lamp to be inserted without interference, but bites when an attempt is made to unscrew it. A key releases the dog. In the "Arrowlock" socket, the lamp is held fast by a clamp which has to be screwed up by a key after the lamp has been inserted, and must be loosened in the same way before it can be withdrawn.

A General Electric Company lock socket which works on an entirely different principle has been used for several years by the Brooklyn Rapid Transit Company. The feature of this device is that the interior shell of the socket turns freely within the outer casing. Hence a lamp cannot be screwed in or out until a key is inserted to engage the slotted base of the interior shell and prevent its rotation. Because the socket shell simply turns with the lamp, a would-be thief is not tempted to force the lamp and thereby break it. The experience of the B.R.T. shows that the saving of lamps pays for the installation of this lock socket.

Brief consideration of the matter shows that it would not be feasible for railways to use lamps of higher than standard voltage, nor those of lower voltage. The former would be too fragile and the use of the latter with the ordinary 550-volt current would necessitate the connection of altogether too many lamps in a single series. The failure of one lamp would put out half the lights in the car. Moreover, the difference between such lamps and the standard 110-volt lamp would not be very noticeable and many would probably be stolen in spite of their different voltage.

The use of high-wattage lamps, however, is entirely feasible and serves nearly the same end. Many electric railways now use a lighting scheme first tried several years ago by the Cleveland Railway. Five 94-watt Mazda "B" lamps are arranged along the center line of the ceiling of a typical center-entrance car, and a spare lamp is located over the well which can be cut in if one of the other lamps fails. Theft is much reduced because the size of the lamp at once proclaims it to be something different from the ordinary.

Local conditions which affect the theft of lamps must determine the most effective remedy. In general, it may be said that the least expensive of these plans, that of etching on the lamps the name of the company, is likely to be also the least satisfactory. It has, in fact, been given up by many companies that formerly used it. The bayonet base is regarded favorably by the manufacturers, because it is already a standard product, although not largely used in the United States. Its effectiveness to prevent the theft of lamps has not been demonstrated, but expert opinion seems to approve it as the most promising of the less expensive plans.

The other two remedies that have been tried are more expensive. The installation of lock sockets would cost more than the installation of bayonet sockets because the former are a more complicated article. They are, however, effective, and experience shows that on a city property where many chances exist for lamps to be stolen, this plan more than pays for itself. Still more expensive is the scheme of center lighting with large lamps. This, of course, necessitates rewiring the lighting circuits throughout the car, and few railways are likely to favor so ambitious an undertaking for old cars. On new cars, however, it is an excellent device for preventing theft, and affording other advantages.

Track Costs Reduced to Units of Work

In Cleveland the Plan of Basing Costs on Units Done per Man-Hour Has Assisted in Keeping Down Total Expenditures for Maintenance

IN DETERMINING costs of construction and maintenance, it is very desirable to have available some simple basis by means of which a comparison of different methods may be made. With rates for labor and prices of materials changing as rapidly as they are at the present time, total costs do not necessarily reveal the true relative value of different methods unless a new calculation is made for each job to bring them to the same conditions of cost.

In order to simplify such comparisons, and get a true picture of the various methods in use, Charles H. Clark, engineer maintenance of way Cleveland Railway, has studied the various classes of work done by employees in the track department. As a mean of eliminating the various elements subject to fluctuation, all comparisons have been made on the basis of the number of units of any specified operation performed per man-hour expended. To obtain this information an analysis was made of forty-four separate operations. His results, which have been collected and tabulated, are presented in the data given on page 1008.

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An examination of these unit figures shows that there are wide divergencies due to the employment of different methods. For instance, operation No. 1, tearing up old pavement, is done in Cleveland by two methods, the first one being by hand, and the second by the use of a special paving plow. The figures show that one man, working by the usual hand method, will be able to tear up 17.3 ft. of stone paving per hour, whereas with the special plow developed for this purpose he can tear up 113.2 ft. of the same paving. The economy resulting from the use of the machine method is so obvious that it is easy to see why the company now does little of this work by hand.

The result of careful study in this manner of methods of construction and maintenance has eliminated many wasteful and inefficient methods. In Cleveland the general application of machinery and labor-saving methods has prevented the cost of the work from rising anything like so high as it would have done had the old methods been retained. The total cost of way maintenance, with labor at 50 cents per hour, is only some 58 per cent greater than the total cost was for doing the same work with the old methods, when 19 cents was the current rate for labor. In other words, wages have increased 163 per cent, but track costs only 58 per cent, in Cleveland.

The Cleveland Railway, Units of Work per Man-Hour, 1922

	Operation	Part of Roadbed	Material	Type of Construction	Units per Man-Hour
1.	Tearing pavement with plow	Track	Stone		113.2368 ft. of track
	Tearing pavement with plow	Track	Brick		143.0674 ft. of track
2.	Clearing pavement	Track	Stone		17.2911 ft. of track
	Clearing pavement	Track	Brick		20.6388 ft. of track
3.	Tearing and clearing pavement by hand	One-half devil strip, track and outside	Stone		2.1267 ft. of track
	Tearing and clearing pavement by hand	One-half devil strip, track and outside	Brick		4.4984 ft. of track
	Tearing and clearing pavement by hand	One-half devil strip and outside	Stone		4.9031 ft. of track
	Tearing and clearing pavement by hand	One-half devil strip and outside	Brick		4.4390 ft. of track
	Tearing and clearing pavement by hand	One-half devil strip, track and outside	Concrete		2.1291 ft. of track
	Tearing and clearing pavement by hand	Outside	Asphalt		2.1672 ft. of track
4.	Tearing and clearing curb		Concrete		18.0761 ft. of track
5.	Excavating; paving charge	One-half devil strip, track and outside	Sand		7.7112 ft. of track
6.	Breaking concrete by hand	One-half devil strip, track and outside	Concrete	Oak ties and sand base	3.4850 ft. of track
	Breaking concrete with pounder	One-half devil strip, track and outside	Concrete	Oak ties and sand base	45.8084 ft. of track
	Helping pounders	One-half devil strip, track and outside	Concrete	Oak ties and sand base	115.2619 ft. of track
7.	Cutting rail with burner				3.4936 cuts
	Cutting rail; helping burner				11.4428 cuts
8.	Digging jack holes		Sand	Oak ties and sand base	1.9851 holes
	Digging jack holes		Concrete	Oak ties and sand base	1.8322 holes
9.	Tearing up rail and ties		Sand	Oak ties and sand base	7.1570 ft. of track
	Tearing up rail and ties		Concrete	Oak ties and sand base	6.9267 ft. of track
10.	Excavating by hand	One-half devil strip, track and outside	Sand	Oak ties and sand base	3.3270 ft. of track
	Excavating by hand	One-half devil strip, track and outside	Sand and concrete	Oak ties and sand base	2.6856 ft. of track
11.	Dapping ties for joint plates		Oak ties	Oak ties and sand base	5.2382 ties
12.	Laying rail			Oak ties and sand base	4.7522 ft. of track
	Laying rail			Steel ties and concrete base	4.2014 ft. of track
13.	Reaming holes with electric drill				9.6711 holes
14.	Aligning track			Oak ties and sand base	45.6980 ft. of track
	Aligning track			Steel ties and concrete base	51.1615 ft. of track
15.	Surfacing track			Oak ties and sand base	17.8755 ft. of track
	Surfacing track			Steel ties and concrete base	8.8081 ft. of track
16.	Filling sand for tamping		Sand	Oak ties and sand base	14.9408 ft. of track
17.	Tamping by hand			Oak ties and sand base	5.0345 ft. of track
	Tamping with electric tool			Oak ties and sand base	6.5781 ft. of track
18.	Finishing sand base for concreting	One-half devil strip, track and outside		Oak ties and sand base	13.0947 ft. of track
	Finishing sand base for concreting	One-half devil strip, track and outside		Steel ties and concrete base	5.0506 ft. of track
19.	Concreting with machine—crossovers	One-half devil strip, track and outside		Oak ties and sand base	4.0302 ft. of track
	Concreting with machine—crossovers	One-half devil strip, track and outside		Steel ties and concrete base	2.5560 ft. of track
	Concreting with machine—side track	One-half devil strip, track and outside		Oak ties and sand base	3.1982 ft. of track
	Concreting with machine—side track	One-half devil strip, track and outside		Steel ties and concrete base	1.9252 ft. of track
	Concreting by hand	One-half devil strip, track and outside		Oak ties and sand base	1.3790 ft. of track
20.	Unloading rail, splices, bolts, etc.		62-ft. rail		79.2255 ft. of track
	Unloading and piling ties		Oak ties		25.9169 ties
	Unloading rail, ties, bolts, etc.		62-ft. rail, oak ties		31.1514 ft. of track
	Unloading rail, ties, bolts, etc.		62-ft. rail, steel ties		39.3192 ft. of track
21	Unloading cement				37.8351 bags
22.	Unloading and shoveling gravel—crossovers				1.7936 cu.yd.
	Unloading and shoveling gravel—side track				1.6073 cu.yd.
23.	Loading dirt by hand—crossovers		Dirt		1.3628 cu.yd.
	Loading dirt and concrete—crossovers		Dirt and concrete		1.5889 cu.yd.
	Loading dirt and concrete—side track		Dirt and concrete		1.1244 cu.yd.
24.	Loading paving blocks—crossovers		Stone		1.9008 cu.yd.
	Loading paving blocks—crossovers		Brick		1.6502 cu.yd.
	Loading paving blocks—side track		Stone		1.8687 cu.yd.
	Loading paving blocks—side track		Brick		1.9313 cu.yd.
25.	Loading old rail, splices, etc.		30-ft. pieces		2.3012 pieces
26.	Loading old ties		Oak ties		11.6839 ties
27.	Laying end rail (for crossover or turnout)			Oak ties and sand base	0.2317 ft. of track
28.	Rolling sand base				52.0027 ft. of track
	Rolling sand base—helping rollers				81.0864 ft. of track
29.	Cutting rail by hand				0.4722 cuts
30.	Repairing tile drain				33.4653 ft. of track
31.	Drip drains				0.3732 drip
32.	Riveting				0.9910 joints
	Helping riveters				5.9269 joints
33.	Welding				0.7576 joints
	Helping welders				3.1850 joints
34.	Laying and maintaining-crossovers				0.0165 crossovers
					13.9382 ft. of track
35.	Laying and maintaining—side track				3.7941 ft. of track
36.	Maintenance of temporary crossings—crossovers				19.1148 ft. of track
					0.1638 crossings
	Maintenance of temporary crossings—side track				17.3028 ft. of track
					0.1185 crossings
37.	Moving tools				38.9246 ft. of track
					0.0222 moves
38.	Laying temporary pavement				3.1912 ft. of track
39.	Cleaning brick				4.0881 ft. of track
40.	Toothing pavement		Stone		34.2417 ft. of track
41.	Cleaning up street (does not include tearing of crossover or side track)				10.0198 ft. of track
42.	Idle time				33.3572 ft. of track
43.	Indirect labor (foremen, bosses, watchmen, etc.)				0.8304 ft. of track
44.	Miscellaneous operations				64.9868 ft. of track

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Equipment Maintenance Notes

Boosting Rail Joints

THE plan of placing a length of rail underneath the joint and connecting it at the ends of the angle bars by clips, so as to permit the driving of steel bars underneath the joint to boost it, has been used with some modifications by the Lehigh Valley Transit Company, Allentown, Pa.

This plan was used with an inverted rail, without supporting ties, the old ties having been cut out at approximately the center line of the track and the bracing rail, clips, etc., imbedded in a dry concrete to a depth of some 6 in. below the bracing rail. Good results have thus been secured for individual joint repairs where extensive rehabilitation of tracks was not made.

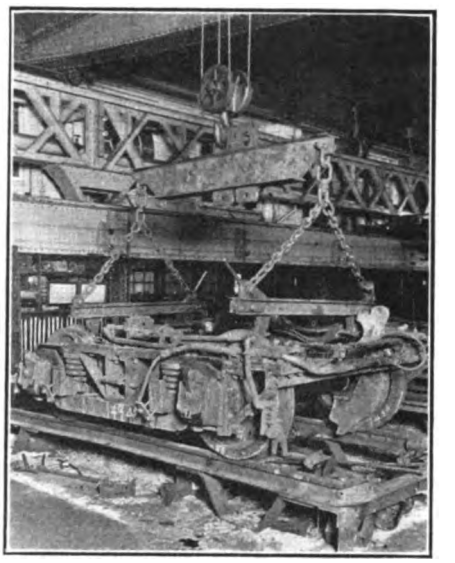
Where an extensive stretch of track was entirely rehabilitated, a supporting tie construction was preferred. Where the rail was found to promise from five to six years longer life, the expense of installing new crossties and a filler block under the rail opposite the joint was thus considered advisable. The accompanying line cut shows this type of construction. The bracing rail is placed with the head side uppermost, of such a length that the repair clips can be placed just outside the end of the angle bar.

A 6-in. x 10-in. filler block, long enough to span two joint ties, is used on the opposite rail, and crossties are installed underneath the entire construction. Stone ballast to a depth of 6 in. is used underneath these crossties. After the joint had been boosted by driving in the supporting steel bars, these are spot welded to prevent shifting. The bolts of the angle bars are renewed and the nuts, together with those on the clips, are spot welded. No lock washers are used. Cupped rail heads are welded and ground off to complete the joint.

Lifting Trucks by the Wheels Prevents Hot Bearings

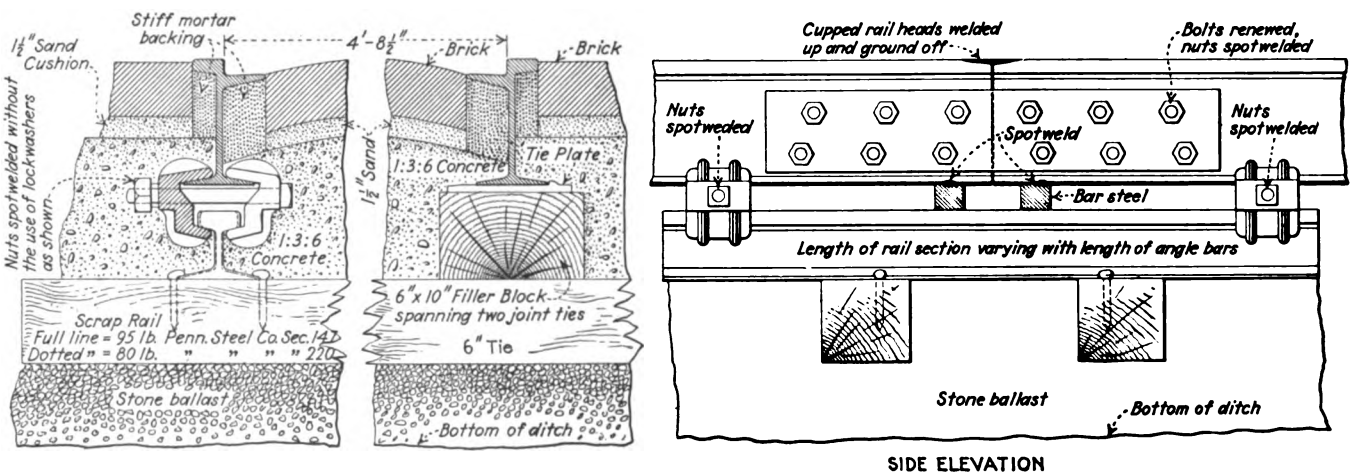
WHEN trucks are overhauled it is the general practice to repack the axle bearings before they are reinstalled under cars. Where the work of overhauling is done by placing the truck on stands or horses, it is necessary to lift the trucks and place them on the track for moving under the car bodies. If this lifting is done by attaching the crane rigging to the truck frame, the weight of the wheels and axles causes the waste to be compressed and may result in hot axle bearings soon after the car is returned to service. With heavy wheels the trucks are also likely to be given excessive strains as a result of the lifting where the rigging is attached to the framework.

In order to do away with the danger of such troubles, the New York Consolidated Railroad, in its Thirty-ninth Street shop, Brooklyn, N. Y., uses a rigging which permits lifting the truck by the wheels. An



Rigging Used for Lifting Trucks by the Wheels

accompanying illustration shows this rigging in place. Two hooked levers fit into the grooves under the treads of the wheels. These have handles projecting outward so that they can be readily adjusted, and their cam-like surface holds them firmly in position when once installed. The two end supports are held together by channels. Chains run from the end supports to links fastened to a supporting beam which has provision for attaching the hooks from the overhead crane. In addition to preventing troubles which may later occur from lifting, this rigging is attached to the trucks much more quickly than if individual chains were used, as in the latter case time



Joint Repairs with Bracing Rail Supported on Ties and Fastened to Operating Rail by Cast Steel Clips

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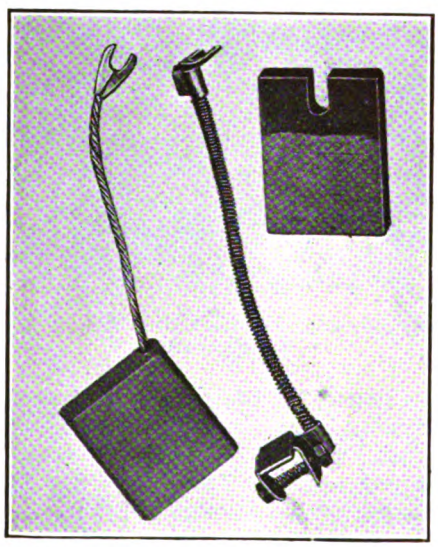
would be consumed in hooking the chains to the trucks, and frequently in order to obtain uniform lifting it is necessary to hook the chains in different positions after a trial lift.

Shunts for Carbon Brushes

BY JOHN S. DEAN
Renewal Parts Engineering, Westinghouse Electric & Manufacturing Company

PRESENT-DAY practice in regard to carbon brushes for modern railway motors is to use a plain carbon without any copper plating and without shunts or pigtails. On some of the older types of motors shunted carbons were originally applied, and



At Left, Imbedded Type of Shunt. Center and Right, Clamped Type

on many properties carbons with shunts are still being used in connection with these old motors.

The most common shunt connection used on the carbons of these old motors is a clamped type which grips the top of the carbon and is held in place by a bolt as shown in the accompanying illustration. With this construction it is a simple operation to replace an old worn-out carbon by a new one; however, there is the likelihood of the clamping bolt not being drawn up tightly by the workman and thus the clamp will make a poor contact with the carbon. A further possible danger which might cause trouble with this type of shunt is that even when the clamp is made tight at the start there is a tendency for it to work loose due to vibration and arcing and thus the shunt soon becomes of little value to help carry the working current to the carbon.

An improved type of shunt which is being used quite extensively in connection with modern industrial motors and generators is also shown in the illustration. This shunt is commonly known as the imbedded type as the end of the braided cable forming the pigtail is imbedded in the carbon. The end of the cable is placed in a hole drilled in the top of the carbon, and a good mechanical and electrical contact is obtained by tamping or ramming a prepared copper compound in the hole between the cable and the carbon to fill the intervening space.

For motors operating with the original type of brush-holders designed for the use of carbons with pigtails, the use of carbon brushes fitted with the imbedded type of shunt in preference to the clamped type is favored. In this connection, admitting that the clamped type may be replaced more readily, operators will find that by using the imbedded connection fewer replacements will be repaired due to a more permanent contact between the pigtail and the carbon brush.

Experience has shown that the detachable or clamped type of shunts are quite often found to be loose in service, thus making a poor contact. Operating under these conditions the shunt might just as well be left off entirely and results in service would not be noticeably changed. In fact, some operators have discarded shunted carbons entirely for their older motors and operating results are very satisfactory. For some of these motors a new brush-holder has been designed to use carbons without shunts. These new brush-holders are fitted with a type of flexible braided shunt connecting the contact tip on the pressure finger with the main body of the brush-holder.

Flat Wire Increases Motor Capacity

THE West Penn Railways, Connellsville, Pa., uses Westinghouse No. 56 motors on its interurban cars. The armatures of these motors were originally wound with round wire, two wires being placed in parallel and connected to the same commutator bar. In rewinding these armatures the company has replaced this round wire with a flat strap, having approximately the same outside dimensions as the two round wires it replaces. This change increases the section of copper 20 per cent. It also cuts the time of winding to but little more than one-half, and produces an armature mechanically stronger and more rigid.

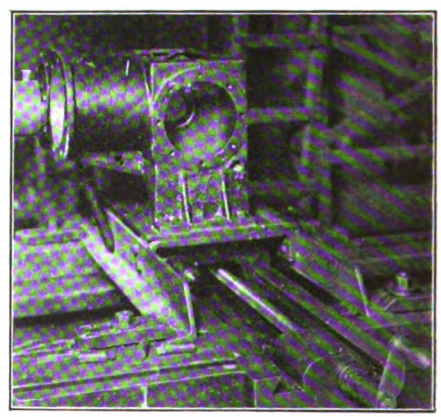
The coils are wound with the strap on edge in a former, which produces a flat coil. After winding and insulating, the coils are pulled out on a machine puller, which opens the sides to give the correct throw and curves them to provide the necessary clearance on the ends. They are then dipped in benolite and baked, which impregnates the inner insulation thoroughly, after which they are insulated with fish paper, dipped and baked again.

The method of pulling the coils makes the loops at the ends parallel with the shaft in a radial direction. These loops are left open, so that a fan action is provided which circulates the air within the motor case. While this is not the equivalent of modern ventilated construction, it is of material advantage in cooling the motor over the original design with the coil ends entirely inclosed. The additional copper, due to the flat wire, also adds to the capacity, so that the motors are able to handle materially heavier loads than they originally were designed to carry.

Reboring Air Compressors

A JIG has been devised in the shops of the Metropolitan West Side Elevated, Chicago, to hold the D-3-E-G Westinghouse air compressor casting for reboring. The simplicity of the jig in construction and the ease with which it is mounted on the carriage of the lathe are the outstanding features of this apparatus.

As will be seen from the accompanying illustration, two angle irons



Mounting of Compressor on Lathe for Reboring

2½ in. x 5 in. form the main support of the jig upon the carriage. Cross members constructed out of 3-in. x ¾-in. flat iron support a bedplate upon which the air compressor frame is bolted. Through bolts connect this bedplate to the compound of the lathe in such a manner that tight-

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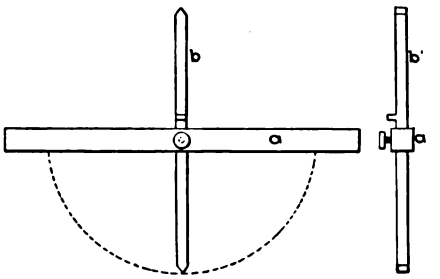
ening them up locks everything. Four small dogs hold the main parts of the jig to the carriage. An adjustable prop, also shown, is located directly beneath the cylinders in order to steady them while boring.

In setting up the apparatus for operation the cylinder of the air compressor is brought up flush against the faceplate of the lathe, thus squaring the jig in that direction, while shims are placed under the front bolts in order to square the casting in a vertical direction. Loosening the dogs previously referred to allows the crossfeed of the lathe to be used and the casting can be moved so that the boring bar will align with either cylinder.

Gage for Boring Motor Bearing Housings

WHEN the bearing housings of railway motors become badly worn after considerable use, it frequently is necessary to build up by electric welding and rebore the motor shell to make an exact fit, since the wear, being uneven, usually gets the housing out of true. The West Penn Railways, Connellsville, Pa., has found that the upper half of the frame is usually worn but little, the major portion of the wear coming on the lower portion. All bearings are, therefore, realigned to the upper half of the frame. The parting line is taken as a reference, and all measurements are referred to it.



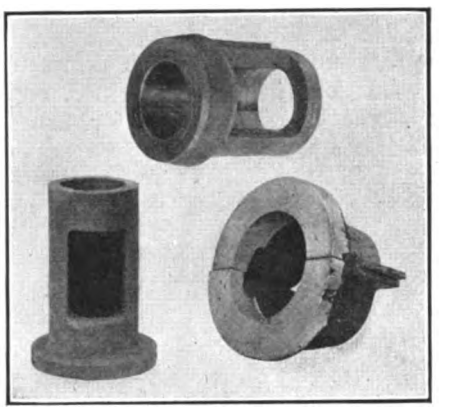
This Gage Shows the Necessary Clearance and Cut in Reboring Motor Bearing Housings

To facilitate lining up the bearings, a gage is used, as shown in the accompanying drawing. This consists of a bar of steel, *a*, ½ in. square. A square hole is cut in this at its center, and the gage *b* is inserted at right angles. This is of the ¼-in. section, with a small projection near its center. To line up the motor frame for boring, this gage is placed on the frame as shown. The end of the gage, resting on the bearing fit, leaves a clearance between the lug and the crossbar of the gage. This shows at once the amount of the cut that must be taken to bore to the standard diameter, and the tool may be set to approximate this as closely as may be desirable for the roughing cut.

The boring is done with a solid boring bar, having two tools at each end. The first tool gives the roughing cut, and the second, which is placed opposite and slightly behind it, makes the finishing cut. This bar is mounted in a jig which is bolted to the half of the motor frame, so that when the amount of the cut has been determined by the gage the two ends of the frame may be bored out simultaneously. The boring is done on an engine lathe, the boring jig being clamped to the frame and the frame to the lathe carriage. The boring bar is then held to the headstock, and the feed accomplished by means of the carriage, which can be adjusted for any desired feed.

Bronze Linings for Armature Bearings

THE accompanying illustration shows a satisfactory method of relining armature bearings by forcing bronze sleeves into position, as used by the Easton division of the Lehigh Valley Transit Company. The sleeve before finishing is shown



Armature Bearings and Collars

Top, armature bearing with bronze lining. Left, bronze sleeve before finishing. Right, Axle collar with welded steel face.

You Have to Convince the G. M.

STROLLING down the nicely marked aisle of the machine shop of the Jinxville Electric Railway one morning recently, Bill Jones, the foreman, noticed that "Whistling Dick" Singer, the veteran lathe hand, was not looking as spry as usual. "What's wrong, Dick," he said, "you're all bent up this morning."

"Got a crick in my back yesterday helpin' to lift an armature into place in my lathe. Ole Olson's got a bad hand today, too. Pinched it settin' a motor shell on the bedplate of his radial drill yesterday afternoon."

"Sorry, Dick, that's hard luck!"

"Sorrow ain't enough, Bill. You ought to do something to make it easier to handle things around this here shop. You thought you did a great thing gettin' that radial drill, and it's all right, but there are more labor-savers we ought to have and they wouldn't cost much, either. You ought to get around more to see what they're doin' in other shops, Bill."

"I guess there's something in that."

Approaching Olson, the foreman greeted him: "Hello, Ole, what you been doing to your hand?"

"Dot hand, Mr. Yones, I got caught behind a motor and I yust got one bad smash yet."

"Too bad, Ole. Dick's kind o' laid up today, too, lifting something too heavy for him. You fellows ought to be more careful. It don't pay to get hurt."

"You're right, Mr. Yones, but dem motors' blame heavy. Yes?"

Jones had a thoughtful look on his face as he slipped into the office of William Redfield, the general manager, who greeted him with the query: "Something on your mind, Bill? You look worrried."

"There is that, Mr. Redfield. Two of our good machinists are out of shape today partly because there's too much hand moving of heavy pieces to do around the shop. Ever since I went over to Norfolk and saw the simple and cheap, but practical, jib cranes and trolley hoists in the machine shop there, it has seemed to me we ought to do more of our liftin' and carryin' by machinery. Our shop work is altogether too slow, anyway, and it's mainly because we're doing too much of the horse work by main strength and awkwardness. Ole and Dick might easily have got a serious injury and cost us more than a whole outfit of hoists. They're men I'd hate to lose, too. Dick was talking of quitting the other day because he said he was tired of goin' along 'forever' without any decent tools to work with."

"Well, what do you want me to do about it?" said Mr. Redfield.

"If you would O.K. that purchase order for some new hoists and cranes, it would put us in good spirits again. You see it's pretty hard trying to make a showing for you on low shop costs when we have to do so much heavy work by hand—and run the risk of killin' the men in the bargain."

"Well, Bill, maybe we *had* better do something about it. You send that order over to me again and I'll see if we can't buy the stuff you want."

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at the left and the finished bearing at the top. Of course, this method can only be used on bearings where the wall is of sufficient thickness to permit reboring to the extent necessary for inserting the sleeve.

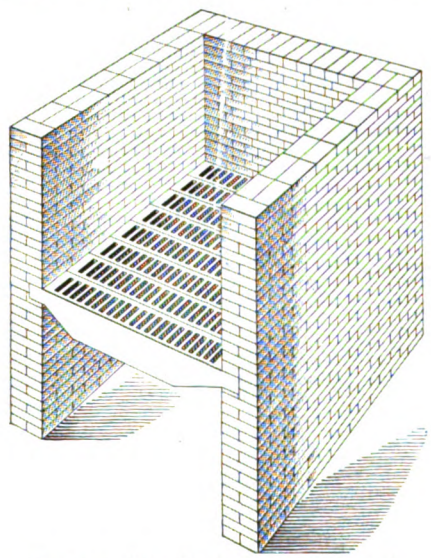
A Westinghouse-306 axle collar is shown at the right in the illustration. This has a steel face welded to it. Originally this type of bearing was provided with a fiber collar.

These methods were developed by C. A. Doud, master mechanic.

Good Combustion for Burning Rubbish

MANY railways burn rubbish, insulation of wires, etc., by placing it in a pile and making a bonfire of it. This method is more or less unsatisfactory, as complete combustion is seldom obtained, and a slight breeze will scatter ashes about the premises.

The Beaver Valley Traction Company, New Brighton, Pa., has developed a very convenient furnace for this purpose that has been found of considerable advantage in getting good combustion and confining the ashes.



Furnace Gets Good Combustion and Confines Ashes

The furnace is built of brick to a height of about 4 ft. above the ground, being open at the top and on one side. At some 2 ft. above the base a grate is inserted in the brick work. This is made of old furnace grates, and while it has openings large enough to permit a good draft, very little ash sifts through.

One use of the furnace that has shown its value is in burning insulation from scrap wire in order that the copper may be reclaimed.

Convenient Type of Welding Room

THE welding room in the Madison Street shops of the Lehigh Valley Transit Company, Allentown, Pa., is in the middle of the shop and is served by an overhead traveling hoist.

Tracks also lead to the opening which, in the accompanying illustration, is shown curtained at the left so that heavy parts can be brought alongside the welding room and handled directly from cars into position for welding. This welding room has openings on three sides for convenience in handling material. These openings are closed with sliding curtains which can be readily folded back to permit bringing in material.

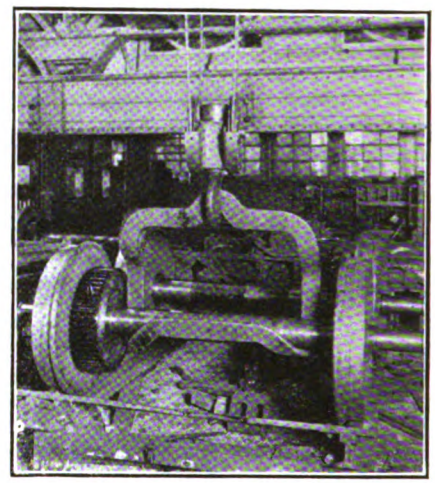
The floor of the welding room is provided with trap doors, through which irregular parts of unwieldy pieces can be allowed to project, so as to facilitate the placing of work for welding.

A closet in the left-hand corner of the welding room is used by the operator for his clothing and also for locking up the various welding tools used. A small rack at the side of this small room has shelves for various types of welding rods. Portable tables and stands are used for the convenience of the welder to hold his tools in position so that they can be reached without inconvenience while he is working.

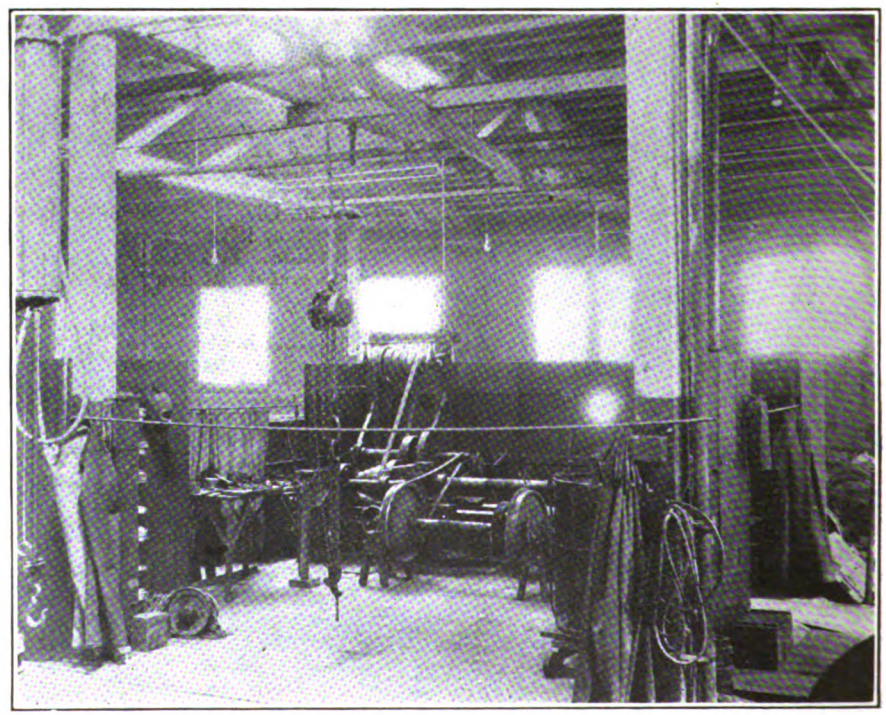
The back of the room is occupied by a lathe with gearing and belting used for building up axles and flanges of wheels, as described in a separate article. (See issue of ELECTRIC RAILWAY JOURNAL for June 9, page 974.

Safety Attachment for Lifting Wheels

WHERE wheels are lifted by attaching a chain to the crane hooks, there is danger of this chain slipping and causing accidents. The accompanying illustration shows a device used in the Thirty-ninth Street shop of the New York Consolidated Railroad for lifting wheels which has proved a great time saver and also eliminated danger of accidents. The lifting rigging is made of ½-in. x 6-in. flat iron and is shaped



Equipment Used for Lifting Pairs of Wheels in Brooklyn



Welding Room in Shop of Lehigh Valley Transit Company

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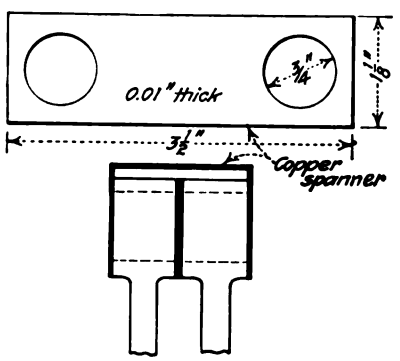
so as to provide a sling to go underneath the center part of the axle. The upper section has a notched portion in which the hook from the overhead crane fits to keep the crane block centered.

Insuring Proper Contact Between Resistor Grids

TROUBLE is frequently experienced from improper contact between the various grids of car resistors. A common method is to use several copper gauze washers between



Copper Spanner Used for Joining Grids

the grids which are to be connected. The accompanying illustration shows a form of copper spanner which is placed on the outside of two adjoining grids and has been used with considerable success by the Cleveland Railway. It is supplementary to the copper washers.

These spanners are punched out of thin copper and are 1¼ in. wide by 3½ in. long and 0.01 in. thick. Two holes of sufficient diameter to fit over the insulated rods supporting the grids are punched at either end of the spanner.

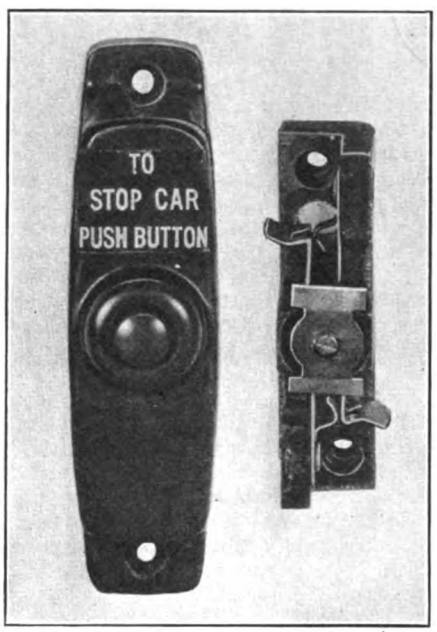
Painting Machine Tools to Improve Lighting

IN THE machine shop of the West Penn Railways at Connellsville, Pa., the plan has been adopted of painting all machine tools and other fixtures about the shop with a white gloss paint, in addition to painting walls and ceilings the same color. The use of the white paint on the machines has an important effect in assisting to light up the shop. This not only gives it a more cheerful appearance, but it encourages a higher grade of work on account of the ability of the workmen to see close work better. There is less danger of accidents, as the darker metal parts being worked on are more conspicuous against the general light tone of the shop.

New Equipment Available

Convenient Car Signal Push Button

AN ACCOMPANYING illustration shows the type of car signal push button being marketed by the Fahnestock Electric Company, Long Island City, N. Y. These are designed for high-voltage signal systems using the trolley circuit and are arranged for installation on the window posts. The casing is of insulation composition with no metal parts exposed. The well-known Fahnestock



High-Voltage Push Button Switch

connectors are used, which enables quick disconnecting of leads without the use of tools. This feature is considered of value for the push button switch, so it can be removed readily for painting or repairing purposes.

New Type of Lantern

THE V. & N. Lantern Company, Inc., New York, N. Y., has recently brought out a new type of lantern for safeguarding building or railway construction work where a red light is needed as a danger signal. A solid ruby globe is used inside the clear glass globe, this colored globe being screwed tightly into a collar so that it can be raised and lowered by means of a lever and spring. The releasing of the lever causes the red globe to rise by the spring action. The movement is slow so as to minimize the danger of breaking. If a white light is desired, the lever is pulled all the way down and latched.

The lantern frame is made of cold rolled steel, tinned or galvanized, or of solid brass or gun metal, as desired. Particular attention has been given to the construction of the fuel tank and burner. Either signal oil or kerosene can be used, according to the burner desired. The construction is such that it is impossible for the light to be blown out by the wind. The lantern burns for more than twenty hours with one filling.

No Weak Spots in Seamless Tape

A SEAMLESS bias tape recently put on the market by the Irvington Varnish & Insulator Company has several advantages for use in wrapping armature coils. It is a varnished cambric tape cut by a special process from a continuous woven roll of fabric, and it is therefore of uniform thickness throughout. The inconvenient bulkiness of the ordinary seam is thus eliminated and there are no weak spots where two pieces are sewn together.

Device for Chucking Irregular Shapes

A NEW universal vise for chucking irregular shapes in lathes has just been placed on the market by Bruce, Dawson & Co., London, England. This is of Swiss manufacture and will grip irregular shapes in the lathe with a single movement.

The vise contains a number of jaws which are operated by the turning of the handle. These jaws have an individual spring action and can be tightened until they touch all over the piece to be held. Two large nuts on the sides are then used to tighten the chuck so that the relative position of the jaws is fixed.

The vise is designed so that it can be bolted directly to the bed plate, table or slide of any standard machine tool in the same manner as is used with an ordinary vise.

It is supplied in three different types, one with a rectangular base for various machine tools, a second for use on lathes and a third for attachment to a bench vise.

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Association News & Discussions

Utility Advertising Given New Impetus

Publicity and Advertising Men Hold First Meeting of New Organization Independent of the Utility Associations and Under the Auspices of Organized Advertising Men

THE first annual convention of the Public Utilities Advertising Association, held at Atlantic City, N. J., last week, in conjunction with the annual convention of the Associated Advertising Clubs of the World, with which the former is affiliated, represented the initial definite and concerted action toward bringing the major public utilities of the country under the banner of organized and systematic advertising.

Specific plans were outlined by the directors of the new association for presenting the needs and advantages of the use of the printed word in gaining the sympathetic understanding and support of the people. The principal feature of the plan is to secure the co-operative support of the various utility associations, state committees on public utility information and individual public service corporations which are now using advertising regularly, with a view of convincing the non-advertising utilities of the practical and economical value of paid advertising in making their own problems easier of solution.

The various speakers appearing on the convention program laid emphasis on the extraordinary value of regular and persistent advertising for all kinds of utility corporations for the same reasons that have made advertising the greatest motive power in modern business of all kinds. Considerable attention was also given by the speakers to the need on the part of electric railways, gas companies, light and power enterprises and telephone companies of devoting more thought and energy to the business of developing good will on the part of the customers of these utilities through the medium of truthfully told advertisements.

Veteran advertising experts and publicists contributed valuable papers on the four definite kinds of advertising that are of particular interest to the public utility industry at the present time, these four being as follows:

1. Service advertising to gain volume by exploiting advantages and uses of the service.

2. Merchandise and appliance advertising, in the case of electric and gas companies, to sell goods at retail.

3. Financial advertising to sell the securities that must be disposed of to provide the necessary extensions and additions to plant and equipment.

4. Institutional advertising to lend background and support to the other three.

It was pointed out that the youth of the public utility industry is probably one reason why its advertising methods and practices are not farther advanced, when its field is so inviting. No branch of the industry except gas service is more than forty to forty-five years old, and the gas service, as we have it today, primarily for domestic and heating purposes, is no older. This business has grown amazingly fast. Companies have had to concentrate upon providing the physical facilities required to satisfy public demand for their service. Hence, the need or desirability for advertising has not been acutely felt as it would be in manufacturing, and especially in a young merchandising business.

Another reason presented for the backwardness in utility advertising was that the advertising fraternity itself had been blind to the opportunities offered for promoting and developing business among the utilities. Consequently, public utility advertising has lacked the stimulus of contact with promoters of advertising.

The possibilities of development of systematic advertising among the public service corporations was shown by one of the speakers who called attention to the fact that if the individual companies embraced in the four major utilities expended only one-half of 1 per cent of their annual gross for advertising, it would represent the impressive sum of nearly $20,000,000 a year.

In outlining the origin and development of the present movement, W. P. Strandborg, president of the association, prefaced his report by stating:

"For practically seven years the advertising fraternity in the public utility industry has been nothing more nor less than a bunch of maverick steers roaming the range and milling around trying to horn into the regular herd. We have finally stampeded into the corral and have been branded by the eagerly sought identifying monacker 'O A,' meaning 'Organized Advertising.'"

One of the most impressive features of the convention was the splendid display of utility advertising material. It was assembled and installed under the joint auspices of the three great national utility organizations — the American Electric Railway Association, American Gas Association and the National Electric Light Association, with a number of individual telephone exhibits. The display was unquestionably the most comprehensive and representative utility advertising exhibit ever assembled. It embraced a total of 720 sq.ft. of space, making it one of the largest and most attractive units in the international exhibit. Principal credit for this remarkable presentation of the work of the utility industry is due to E. J. Cooney of Lowell, Mass., who was chairman of the exhibit committee.

At the business session of the convention the following directors were re-elected to serve for three years:

Labert St. Clair, director advertising section, American Electric Railway Association; George F. Oxley, publicity director National Electric Light Association; Charles W. Person, secretary publicity and advertising section, American Gas Association.

W. P. Strandborg, Portland Railway, Light & Power Company, Portland, Ore., was re-elected president; J. C. McQuiston, Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., was re-elected vice-president, and B. J. Mullaney, Peoples Gas Light & Coke Company, Chicago, was continued as treasurer.

Frank LeRoy Blanchard, J. C. McQuiston and B. J. Mullaney were re-elected delegates to the National Advertising Commission, and Mr. Blanchard was chosen to represent the utility industry on the joint assembly of the Associated Advertising Clubs of the World.

The report of the secretary showed that in less than six months the association had secured a membership of 169 men engaged in the publicity, advertising or public relations work of the utilities, representing thirty-three states of the Union and three Canadian provinces. Plans are now under way to increase the membership to 1,000 by the end of the year.

PAPERS AND DISCUSSIONS DIGESTED

James O'Shaughnessy, executive secretary of the American Association of Advertising Agencies, gave an informal talk in which he outlined the economic advantages to be derived from co-operation between a reputable, well-organized agency on the one hand and a public utility company which has no established advertising department on the other. Mr. O'Shaughnessy contended that the company which desires to start its advertising activities on a sound business basis can not only save money but can also accomplish very

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much more effective results through consultation with an agency which has made a specialty of analyzing public utility organizations and their problems than to "go it alone." He advocated persistency in advertising, also the use of the various recognized media, and called attention to several effective campaigns that had been handled through co-operation with agency people.

The necessity for advertising during prosperous times in order to cultivate the public good will, which may be greatly needed in time of trouble, was the thought running through speeches made at the session. The public utilities field offers an invitation to the best brains in advertising according to Bernard J. Mullaney, who presided, but up to the the present the advertising profession has muffed this opportunity.

The old attitude in the public utility business was, "Here is the service, come and get it." This, he said, has changed, and advertising should rank as a major item of utility company activity and of legitimate operating expense, recognizable as such, along with cost of material and labor, by state commission or other regulatory authority.

Even uniformly good service in time ceases to cry out in its own behalf in the opinion of G. C. Maxwell, former secretary of the Ohio Public Service Commission, and it follows that a public utility company should continually remind the people that the service is good and tell them why it is good. Tell the story of the men with faith who invested of their means, he said; tell the story of the men with vision who struggled for the achievement of an ideal; tell of the army of men and women who daily go about tasks to make the giving of service possible; tell of plans for future development and even further perfection of service. If, on the other hand, there are difficulties which make the attainment of the ideal of service impossible, frankly tell the public so. Tell them what the difficulties are. If further patience and co-operation from them are necessary, boldly ask for it.

The best way for a public utility to advertise is to start with a public safety campaign, according to W. H. Boyce, general manager Beaver Valley Traction Company. That will get the public accustomed to seeing the name of the utility in print, and will not excite suspicion. Afterward good-will and public relations copy may be added advising patrons of the cost of the cars, cost of special work, and cause of delays. Wherever an opportunity exists for criticism on account of shortage of power or uneven track conditions, or shabbily appearing cars, the force may be taken out of the blow by self-criticism, at the same time giving an explanation of why such conditions exist.

The great mistake made by a number of companies, he said, is that they do not start to advertise soon enough. They wait until a fight is on in regard to their franchise, an increase in fare, or some other important problem, at which time a large portion of their riders have formed unfavorable conclusions before the company had presented any part of its side of the case.

A public utility company often neglects to adopt publicity methods, thinking it is saving money, said P. H. Gadsden, vice-president of the United Gas Improvement Company. Then some crisis in the company's affairs arises and immediately there is a frenzied resort to newspaper advertising in the futile effort to reach the public ear—in the vain hope that having neglected to cultivate the public all along, they will listen sympathetically at such a late date to the company's case. This kind of publicity under such circumstances is of little benefit. It is almost a waste of money. Publicity to be really effective must be continuous, sustained, day in and day out.

There is much to tell the public about the service of the utility in the opinion of J. C. McQuiston of the Westinghouse Electric & Manufacturing Company. Each message should carry one specific thought, and the messages should be continuous and not spasmodic. If a utility company uses paid space in the newspapers only when agitation is on foot for a new franchise or when rates must be advanced or when for some other reason that which smacks of a favor asked of the public, then, quite naturally, the public becomes suspicious. Carry the message to the public continuously with a definiteness of purpose. Constant pounding wears away any obstacle in time. If we can so educate the people that they will understand us and support us, he said, we need have no fear of unscrupulous politicians who delight in using the public utility as a political football.

Speeches were made at the same meeting by W. S. Vivian, Middle West Utilities Company; F. H. Sisson, Guaranty Trust Company, and W. H. Hodge, Byllesby Engineering & Management Corporation.

Speaking on "What Advertising Has Done and Can Do for the Public Utilities" at the general session of the advertising convention Floyd W. Parsons, the writer, said that:

"During the war, when the government was obliged to classify the nation's businesses in the order of their indispensability, the people in Washington made the remarkable discovery that practically all of our industries believed they were vitally essential, and were able to produce pages of proof to support their claims. The motion-picture people said that recreation was necessary to keep up morale. The cement people insisted we must go on with our road building. Thousands of manufacturers, running all the way from the makers of motor cars to the producers of toys, showed how life would never be the same, and our fighting efficiency would be materially lowered, if they were compelled to curtail their activities.

"But the utilities did not have to prove their case, and, in keeping with what was up to that time their established policy, they did not try. Of course, a few utility men went to Washington and co-operated with Federal officials, but the fact remains that arguments were unnecessary to show the necessity of keeping utility operations normal. However, the average citizen has become so accustomed to the services the utilities render that now he merely takes them for granted, and the gravest mistake that has been made by our public service executives has been their long submission to this state of public indifference."

Program of the Canadian Association

A TENTATIVE program for the Canadian Electric Railway Association convention in Toronto, June 27 to 30, has been announced. The meetings will be held in the Phonograph and Press Buildings at the Toronto exposition grounds. The headquarters of the association will be the King Edward Hotel.

At a luncheon on Wednesday the president of the association will make his address and the report of the secretary, treasurer and committees will be heard in the morning. The afternoon will be devoted to an examination of exhibits.

On Thursday morning a paper entitled "Deciding on the Proper Motor for a Given Cycle of Duty," by W. G. Gordon, railway engineer Canadian General Electric Company, will be presented. Mayor McGuire of Toronto will address the members at luncheon. The afternoon will be devoted to exhibits again, and in the evening there will be a banquet in the King Edward Hotel.

On Friday morning a paper will be presented by Alexander Jackson, Public Service Railway, Newark, N. J., on "Operation of a Scientific Survey of Traffic Movement for Urban Railways." In the afternon attention will be devoted to exhibits, and in the evening there will be a dinner-dance at the Yacht Club. The election of officers will take place Saturday morning.

Missouri Operators Discuss Railway's Future

THE outlook for street railways was considered at the seventeenth annual convention of the Missouri Association of Public Utilities, held on the river boat *Harry G. Drees* May 23 to 25, 1923. A comprehensive paper by F. G. Buffe, general manager, Kansas City Railways, was read in his absence by H. H. Kuhne. After reviewing the past troubles of railway operations, Mr. Buffe listed the favorable elements in the future development of railways, namely, the fact that service-at-cost is here to stay; the improvement in relations among management, employees and the public; the conviction that street railways are necessary for mass transportation; the need of securing relief from indirect taxation; the realization that although speculative returns are gone, a fair interest return on

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capital actually invested will be not only permitted but encouraged, and, finally, that operating methods have advanced and will continue to advance.

B. W. Frauenthal, St. Louis, expressed the feeling that the best way to work out the problems of the future is by continually bringing these problems to the public's attention, since the utilities' most serious obstacle is public ignorance of these problems. E. A. Hart, Cape Girardeau, spoke of his troubles in maintaining local service with poor equipment until a refinancing two years ago warranted the purchase of new equipment, and a right to operate with a 7-cent fare insured greater income. He considered such a service as an important part in the economic development of small towns, but felt that unremunerative service could not be furnished indefinitely without becoming a detriment to the entire community. E. J. Walsh, United Railways of St. Louis, said that he considered unjust the requirement that a railway assume the expense of paving between the rails. He also made a strong plea to the executives, urging them to serve as jurymen rather than "pass the buck" to men of lower caliber. He argued that unless the individual citizen gives more thought to his duties as an American, there will be an increasing danger of drifting away from the principles laid down by the authors of the constitution.

California Electric Railway Association Elects Officers

AT THE annual meeting of the California Electric Railway Association, held in San Francisco on June 4, officers elected for the ensuing fiscal year were: President, Charles N. Black, Market Street Railway; vice-president, H. A. Mitchell, San Francisco-Sacramento Railroad; manager, W. V. Hill. The executive board was increased from five to seven members, the new board consisting of C. N. Black, W. A. Alberger, John A. Britton, Paul Shoup, W. E. Dunn, H. A. Mitchell and Claus Spreckels.

Program of New York Meeting

FOR the annual meeting of the New York State Electric Railway Association at Hotel Champlain, Bluff Point, Lake Champlain, New York, June 23, the program has been arranged as follows:

Annual report of President Benjamin E. Tilton.

"Industrial Relations, Unemployment Compensation and Old Age Pensions," by James E. Kavanaugh, vice-president Metropolitan Life Insurance Company.

"What the Outsider Wants to Know," by Edward Hungerford.

"Telling the Electric Railway Story to Bill Jones," by W. Dwight Burroughs, purchasing agent United Railways & Electric Company, Baltimore, and president Advertising Club of Baltimore.

"Co-ordinating Bus and Trackless Trolley Transportation with Electric Railway Service," by W. B. Potter, chief engineer railway and traction department, General Electric Company.

Election of officers.

The speaker for the evening banquet will be J. Herbert Case, deputy governor Federal Reserve Bank of New York.

Public Ownership Conference in Toronto in September

THE proposed program has been announced for the Public Ownership Conference to be held at King Edward Hotel, Toronto, Ont., Sept. 10-13. The addresses to be made will cover practically all phases of public ownership. On the afternoon of Sept. 12 Delos F. Wilcox will discuss the question "Why Cities Should Own Their Own Utilities." He will be followed by representatives of the cities of Toronto, San Francisco and Detroit, who will talk on the question "Municipal Street Car Lines." It is hoped that all of the thirty cities in the United States and Canada which now run their own railways will have representatives present who will engage in the discussion. Edward F. Dunne, former Governor of Illinois, is expected to talk on the subject "Prospects for Public Ownership in Illinois, with Special Reference to Chicago Street Car Lines." Cornelius Sheehan, commissioner of gas, water and electricity in New York City, has been asked to discuss "The Failure of Regulation in New York City." Charles P. Steinmetz of the General Electric Company will talk on "The Possibilities of Hydro-Electric and Superpower Development."

American Association News

Buildings and Structures

THE committee on buildings and structures of the Engineering Association met on June 8 in New York. Consideration was given to replies to a questionnnaire received from 106 companies on prepayment and post payment inclosures. This includes the consideration of various types of passimeters, turnstiles, fare booths and cashier systems.

The report on the design of small bridges, culverts and trestles was considered with a view to presenting good current practice.

The meeting was attended by N. E. Drexler, chairman, Hampton, Va.; and C. W. Burke, Brooklyn, N. Y. R. C. Cram, sponsor of the committee on way matters, was also present.

Special Reports Available

THE following special reports have been prepared by the Bureau of Information and Service, American Electric Railway Association, and are available to member companies in good standing upon request:

Motor Vehicle Legislation Enacted in 1923.—Copies of all legislation affecting the operation of motor vehicle common carriers passed by the various state Legislatures in session in 1923, with an analytical summary of their principal provisions.

Trend of Electric Railway Operations.—A month by month statement of the combined revenues, expenses, net revenue, taxes, car-miles and revenue passengers of eighty-one companies reporting to the American Electric Railway Association, beginning with the month of January, 1922, and giving a comparison of each month's operations with the operations of the same month of the previous year.

Motor Truck Operating Costs.—Operating figures derived from various sources showing the costs of operating different types and sizes of trucks in a number of different lines of business.

Valuation Decisions.—Abstracts from recent commission decisions in cases in which the valuation of an electric railway's property was an important factor, bringing out the principles which the commission followed in determining the valuation.

Revised List of Companies Operating One-Man Cars.—A new edition of the list issued April 1, showing the number of cars operated by each company, checked and revised in the light of later information, together with a complete income statement and detailed statement of operating expenses per car-mile of a group of companies operating one-man cars exclusively.

In addition to the above compilations, supplements to the Wage Bulletin, Fare Bulletin and Cost of Living Studies have been prepared, bringing them up to date.

Valuation Committee

A MEETING of the valuation committee of the American Association was held in New York on June 4. Tentative reports of the sub-committees on price trends and on the relative weight to be given various methods of valuing properties were presented. In the study made by the latter sub-committee of decisions by various commissions and of communications from the commissions discussing their methods it appears that there is a leaning toward giving very substantial weight to reproduction costs on the basis of present prices. The sub-committee on price trends had included in its work since the last meeting a curve showing the trend of prices of the electric railway materials and equipment.

Those present were L. R. Nash, J. A. Emery, W. H. Maltbie, Prof. A. S. Richey, J. F. Hamilton, C. S. Klumpp, Frank Silliman, Jr., H. A. Clarke and C. W. Young, representing W. V. Tuttle.

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The News of the Industry

Board Hears Plans

High-Speed Development in Philadelphia Estimated at $200,000,000—Mitten Discusses City's Subway Needs

The second meeting of the Councilmanic Transit Commission of Philadelphia was held in the City Council chamber on June 12. The members of the commission were present, as well as Ralph T. Senter, vice-president of the Philadelphia Rapid Transit Company, and S. M. Swaab, who, with Mr. Twining, are the conferees on the proposed high-speed lines.

The proposals submitted indicated that conferences between Mr. Senter and the city Transit Director were leading toward a solution of the traction difficulties. One new proposal of the transit company's engineers and regarded by the city engineers as practicable was for a surface subway on Locust Street to carry into the business center the three West Philadelphia lines. The adoption of this plan would mean the relief of present surface congestion in the center of the city.

The principal feature of Mr. Twining's proposal was four tracks in Broad Street to Arch Street, instead of a diversion into Ridge Avenue with two tracks. That would do away with the Ridge Avenue loop and promote express service as far as Arch Street, he said.

Near the close of the session there was some talk about costs, and Mr. Senter estimated that the cost of the high-speed development would be from $200,000,000 to $225,000,000, according to the transit company plans. Mr. Twining's estimate for his plan, including the extension to Darby, was $100,000,000.

The Councilmanic meeting came the day following a session before the Public Service Commission, where Thomas E. Mitten, chairman of the board of directors of the Philadelphia Rapid Transit Company, told the commission that Philadelphia needed not less than $100,000,000 as the first move to meet the subway requirements and that the city's borrowing capacity was insufficient to obtain the money without a pledge from the operating company to pay the rental. The commission, sitting as a whole all day, considered the argument on the rate of fare and the value of the company's property.

Samuel Rosenbaum, assistant city solicitor, attempted to show that the company was making excess earnings of $5,400,000, which should be turned back to the car riders in the form of a reduced fare. Mr. Mitten declared that upon the credit engendered by the 7-cent cash fare and four tickets for 25 cents, the Philadelphia Rapid Transit Company had undertaken a $10,000,000 program of improvements, which included new cars, crosstown feeders, trackless trolleys and motor buses, and that the company was planning further improvements which would make the surface system a credit to, as well as a feeder of, the city-built subway to come. Further, he argued that subways were the immediate need of the city and company, since the city could not develop its home-building outskirts without city-built subways, nor could the Philadelphia Rapid Transit accommodate its 50,000 000 added passengers per annum without subways to provide uninterrupted service throughout the delivery district. In his talk to the Commission Mr. Mitten said:

> P. R. T. economies, resulting from cooperation of men and management, approximate $16,000,000 per annum, which is the reason why the cash fare is but 7 cents in Philadelphia, as against 10 cents in Pittsburgh.
>
> P. R. T. has proved to its own satisfaction that the present cost of reproducing its property exceeds $300,000,000, which, at only 7 per cent, would entitle it to $21,000,000 of return per annum. If P. R. T. received in reward but one-fourth of its proved economies, then $4,000,000, thus added, would make P. R. T. entitled to $25,000,000 of annual return, or more than double the amount which it now distributes by way of interest, rentals and dividends on P. R. T. stock.
>
> The city, in its most extreme claim, attempts to show the company is being entitled to but little more than $9,000,000 per annum as a return on original cost. If we add to this unduly shrunken amount but one-fourth of our proved economies, $4,000,000, the total annual return to which P. R. T. is entitled would be $13,000,000, which is more than the company at present receives as a return upon the capital invested, and, in fact, is all that the present 7-cent cash—four tickets for 25 cents—fare can now be made to produce.

Coleman J. Joyce, counsel for the transit company, then gave some facts on the cost of reproducing the company's property and fixed the value of the property at $316,423,557. For the city, Mr. Rosenbaum contended that the value of the property, based on the original cost, should be $130,000,000. Mr. Joyce argued for an 8 per cent return and Mr. Rosenbaum thought 7 per cent sufficient.

Wage Agreement Being Negotiated by Interborough

Preliminary discussions have begun between the officials of the Interborough Rapid Transit Company, New York City, and representatives of the employees with a view to extending or modifying the existing wage agreement which expires June 30. Present wage schedules were accepted by the employees in July, 1921, to be effective for one year. The period of the agreement was extended in July, 1922, for twelve months to June 30, 1923.

Arbitration to Decide

Dispute of Tri-City Railway Demanding Seventy-five Cents an Hour Must Go Before Three Boards

Boards of arbitration will shortly consider the wage demands of the trainmen employed by the Tri-City Railway. Negotiations covering both the Iowa and Illinois lines of the company and the Clinton, Davenport & Muscatine interurban as well have been in progress for the past six weeks and have resulted in an impassé which arbitration has been called on to remove.

The men, now drawing a top scale of 55 cents an hour, have asked for a wage of 75 cents an hour. The company has declared its inability to pay this increase and, following various proposals, among which was the offer of a slight increase to the Iowa trainmen, arbitration has been invoked.

The company recognizes the union locals, but does not recognize the International Association, with which the unions are affiliated. The International has had an official in Davenport for several days advising with the union locals, but this official has not attended any of the conferences between the men and the traction line officials.

For the companies, R. J. Smith, general manager of the Tri-City Railway of Iowa; T. C. Roderick, general manager of the Tri-City Railway of Illinois, and Clarke Anderson, head of the Clinton, Davenport & Muscatine interurban, have been conducting the wage negotiations. These negotiations have now extended longer than the period covered by the old contract, which expired June 1. An agreement has been made between the men and the company, however, by which the finding of the arbitrators will be retroactive to that date.

The wage scale is to be settled by three separate boards, one to fix the wage on the Illinois lines, one to decide the scale for the Davenport city lines and one to determine the rate of pay for the interurban trainmen.

No strings are tied on this arbitration agreement, the finding to be binding on each party and evidence of any pertinent nature to be considered. The men at first asked that 55 cents be established as a minimum wage, below which the board of arbitration would not go in its consideration of the scale. This attitude, however, was later abandoned.

Last year the men voted to accept a company offer and the scale was settled in a short time. Two years ago the wage went to a single board of arbitrators for the three lines.

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Pittsburgh Railway Report Expected by Sept. 1

As a result of the termination of the argument on the reorganization of the Pittsburgh Railways on June 11, Special Master Henry G. Wasson will submit his recommendation to the court prior to Sept. 1. This is the final date set by the State Public Service Commission for the completion of the reorganization.

Attorney A. W. Robertson, counsel for and vice-president of the Philadelphia Company; City Counsel C. K. Robinson, and Attorney E. W. Smith presented the arguments in behalf of the proposed organization, to which there was no opposing argument. The attorney for Receivers Fagan, George and Tone said that they had placed all records at the disposal of the investigation.

At the meeting before Special Master Wasson at his office in the Frick Building, Attorney Robertson reviewed the progress of the railway company during the five years it has been in the hands of the receivers. Attorney Smith called attention to the fact that if a reorganization is not effected now, it may be some time before circumstances for such a plan are so favorable. If the master's report is contrary, the agreement with the city will be abrogated and the plan of deferred payment will fail. Attorney Robinson in behalf of the city urged a speedy reorganization.

In connection with the company's reorganization it was brought out by Arthur W. Thompson at a previous meeting that two modifications of the present carfare of 8½ cents now being charged by the railway were being considered by officials of the company. These changes were a slight reduction of fare at times other than rush hours and a reduced fare for school children. He said further that it was the plan of the company to expend $5,000,000 more for better equipment, $3,000,000 for 300 new cars and $2,000,000 for the improvement of lines, carhouses and other parts of the service. He took occasion to praise the work of the receivers and said that they were naturally handicapped by the conditions of the receivership which restricted expenditures for improvements.

Working Agreement Signed—Wages to Be Arbitrated

A new working agreement between the Connecticut Company and the Union was signed on June 7 while the question of an increase in wages on which there was a split was sent to arbitration. President Lucius S. Storrs and General Manager John K. Punderford signed the working agreement on behalf of the company while the state conference committee of the local unions signed on behalf of the men. The action came at the conclusion of a joint conference.

The men rejected by a large vote several days ago the offer of the company for an increase of 4 cents an hour. The company at the conference on June 7 declared that its financial burdens would not permit a greater increase than 4 cents an hour while the union representatives maintained the company was financially able to increase its offer.

When it became evident that agreement was impossible at this time both sides decided to turn the matter over to a board of arbitration to be selected later.

Let the Daily Din Deafen

The louder the noise, the greater the impression. So thinks Special Deputy Police Commissioner Barron Collier, who is not satisfied with the daily din at 3 o'clock. He has asked all factories to blow their sirens for one minute beginning at 2.59 as the pupils start home from school. The observance of "Safety Hour" began on May 25. Since that date automobiles have tooted their horns and large buildings have blown their whistles as a safety reminder to both school children and automobile drivers. The din, however, is not deafening enough. Mr. Collier says there are only a few more school days left and that he wants to finish the school year with the least possible number of accidents.

Last year 477 children were killed in the streets and many more were seriously injured. The greater part of these accidents occurred during what is now termed "Safety Hour." Reference to the "Safety Hour" idea and Miss Aunty Walker's activity has been made previously in the ELECTRIC RAILWAY JOURNAL.

Increased Service in Schenectady —Injunctions Against City Made Permanent

The strike situation on the Schenectady Railway remains unchanged, with both the union and the company deadlocked. The trolley company is gradually increasing its service and has been able on one or two nights to maintain service until 10 o'clock. The police have been successful in preventing much disorder, although one or two cars have been stoned. Partial interurban service is being maintained.

Two temporary injunctions obtained by the railway company against the city were made permanent by Supreme Court Justice Edward M. Angell at Fonda. One forbids interference with the operation of cars, while the other restrains the city from enforcing an ordinance requiring operators to have fifteen days' experience under the guidance of experienced operators. Justice Angell held that the city's order holding all cars in the carhouse during the strike was clearly in violation of state railroad laws.

The Schenectady County Board of Supervisors by resolution have called upon the county judge to revoke the revolver permits of all strike breakers. Judge McMullen, when informed of the Supervisors' action, said he would revoke licenses only after specific complaint had been lodged and it had been shown that there was a reasonable cause for revocation.

Discussions Held on Beeler Recommendations for New Orleans

Conferences have been taking place since June 4 in New Orleans over the Beeler organization plan for the traction lines of the city. At the initial conference on June 4 in the Council chamber there were present members of the Commission Council, property holders interested and Major H. R. Copper, representing the Beeler survey bureau. At this meeting the 125 or more changes in the trolley system recommended by the experts were divided into five groups.

The greater part of the time occupied at the conference was taken up by Major Cooper, who had his subject well in hand and pointed out clearly and distinctly the reasons which had prompted the Beeler people to recommend the changes submitted. He said the survey had disclosed that there were two sections of the city that were rapidly developing and to which sufficient and quick street car service would be imperative in the near future. One was the section in the lower part of the city from Lafayette Street to the Industrial Canal and the other in the upper end of the town from Carrollton Avenue to the water filtration plant.

At a later conference he brought out the fact that the city of New Orleans had a tremendous mileage of track and ample equipment to meet its present transportation needs after the elimination of certain lines, the extension of others and the straightening out of others.

In the opinion of Commissioner Paul Maloney, it may be a week or ten days before the Commission Council will be able to take action on the recommendations following the public hearings.

Dismisses Appeals Against New York Railways

An order was entered by the United States Supreme Court on June 11 dismissing for lack of jurisdiction appeals by the Eighth Avenue Railroad and the Ninth Avenue Railroad in suits against Job E. Hedges as receiver of the New York Railways. No written opinion was given in either case. The suits were parallel in nature and were considered as one.

Both companies leased their lines to the New York Railways. When a receiver for the latter was appointed, they filed bills for return of their properties, and several months after the receivership the two properties were returned. The companies then sued for rental during the period the receiver controlled their lines. The District Court declined to order immediate payment of the rents and the complainants asserted that the decree gave no assurance of ultimate payment. The Court of Appeals affirmed the District Court and the two companies appealed to the Supreme Court. In defense, it was pleaded that as both companies are New York corporations, no Federal question was involved. The Supreme Court upheld this plea.

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Los Angeles Voters Approve Subway Terminal

The proposed subway terminal franchise was carried by the voters of Los Angeles by a large majority at the city's general election held on June 5. The proposition, which was reviewed in the ELECTRIC RAILWAY JOURNAL, May 26, page 899, was to grant permission to the Pacific Electric Railway to establish under Pershing Square the central station of its $20,000,000 subway system, the first unit of which will be the tubes to give rapid transit service between Los Angeles and the Hollywood district.

At the same election the voters decided in favor of a $2,000,000 bond issue, representing the city's share of the proposed expenditure of $10,000,000 for constructing six new viaducts over the Los Angeles River at Macy, Aliso, First, Fourth, Seventh and Ninth Streets. In addition to bridging the river these viaducts will also cross the numerous steam railroad tracks on each side of the river, thus eliminating the grade crossing hazards and costly traffic and transportation delays at these important industrial district grade crossings. Street car lines are operated over the river on these streets and the delay to street car traffic has been growing greater year by year. The remaining four-fifths of the cost of the new viaduct is to be borne by the street railway companies, the steam railroads and the county of Los Angeles. The work of constructing these viaducts will be commenced shortly, the plans providing for building one at a time to reduce the necessary traffic detours.

The voters also approved of a bond issue of $15,000,000 for improvements at Los Angeles Harbor, which bond issue just equals the amount already authorized and expended for the development of the city's investment on its waterfront. This means the enlargement and construction of more docks, wharves, more dredging and additional switching and storage tracks. The city now owns more than 21 miles of switching and storage tracks serving its municipally owned docks and wharves. More than two-thirds of this circuit is electrified, the switching being performed by the Pacific Electric Railway for the city by means of electric locomotives.

Wage Decision for Scranton Railway Employees Awaited

The arbitration proceedings between the Scranton Railway and Division 168 closed on June 6. The board is composed of James H. Vahey, chief counsel for the Amalgamated Association; Lawrence F. Hart, business agent of Division 168 of the Amalgamated, for the men, and Joseph O'Brien, of the law firm of O'Brien & Kelly, and Ralph W. Rymer, prominent attorney of Scranton, arbitrators for the company, and the fifth arbitrator, or referee, is the Right Rev. Bishop M. J. Hoban of this diocese.

The only issue between the company and the men is one of wages. The company is paying its platform men 50, 55 and 60 cents an hour, and the men contended for 60, 65 and 70 cents, with a corresponding increase for shopmen and trackmen. There was very little oral testimony submitted by the men or the company, all the evidence by the above parties being explained in exhibits. Arguments were made by P. J. Shea, international representative of the union, and James J. Powell, attorney for the men, while Charles P. O'Malley, of the law firm of Knapp, O'Malley, Hill & Harris, made the argument for the company.

The board adjourned until June 23, when it will reconvene, and it is expected that a verdict will be handed down by Bishop Hoban by June 25.

Fares Increased — Increased Wages Sought in Seattle

By a vote of 7 to 2, the Seattle City Council passed over Mayor E. J. Brown's veto the carfare ordinance increasing fares on the Seattle Municipal Railway lines from 5 to 10 cents, with three fare tokens for 25 cents. The increased carfare ordinance becomes effective July 4. Several plans for further increasing street railway revenues are under consideration by the Councilmen, including consideration of the weekly pass system.

Under the present outlook, it is likely that railway trainmen will be compelled to wait for ten days or two weeks before receiving pay due on June 10, when pay warrants amounting to $125,000 became due, but for which there is no balance to the credit of the railway. The Seattle banks, through the Bank Clearing House Association, have refused to cash the street railway warrants.

To complicate the situation further, a general demand for increase in wages has been made by all shopmen, linemen and laborers of the Municipal Railway, and by the conductors, motormen, one-man car operators and cable car employees. The increased wage is asked to become effective Jan. 1, 1924, and is asked at this time to permit of its being included in the railway budget.

Under the schedule demanded, conductors and motormen would receive a minimum of $180 a month instead of the present scale of $135 for the first year, $145 for the second year, $150 for the third year, and $155 thereafter. One-man car operators are asking for 20 cents an hour over the scale for other platform men, which would bring their wages to $228 for a thirty-day month. They are now receiving $164.60. There are 1,450 platform men employed. Shopmen, numbering about 200 at present, are asking for increases ranging from 50 cents to $1 a day and track workers are asking for an increase of approximately 25 per cent. If such increases and others sought were granted it would mean that $650,000 annually would be added to the street railway payroll.

Large Improvements in Richmond Planned

Elaborate improvements to the service of the Virginia Railway & Power Company in Richmond are planned under the new franchise which now is before the City Council, according to a map which has just been drawn up by the company for the information of the Councilmen. The map shows a number of new street car lines in every section of the city, proposed under the new franchise, a number of extensions of existing lines, and the removal of a great deal of track conflicting with lines now in successful operation.

One of the provisions includes important changes in the heart of the city. They include the construction of a block of track on Grace Street between Seventh and Eighth Streets, and of track on three sides of a block between Marshall and Clay Streets. The first move would allow the company another loop in the downtown district, as it has tracks on Broad, one block north, and on Seventh and Eighth Streets at the present time. The second provision would give the Highland Park line a terminus two blocks away from the present congested district at Seventh and Broad Streets. The cars now must stand at this point until trolleys can be changed and the only cars available are those which can be operated from both ends.

This program would call for a huge expenditure of funds and would eliminate a great deal of trackage not essential, adding a great deal of much needed trackage. Councilmen are much pleased with the proposed improvements, and are believed to be in favor of the proposal.

Double Tracking Arranged Without Any Paving Obligation

The Common Council of Beloit, Wis., has confirmed an agreement with the Beloit Traction Company and the Rockford & Interurban Railway, joint users of the track, calling for the construction of a double track on South State Street. The city will not require either of the companies to pay any part of the repaving of the street, which is to be done simultaneously with the laying of the new tracks.

The Rockford & Interurban Railway holds a franchise giving it the right to maintain a single track in the center of the street, such as is now in use. From the point of view of that company this track is ample for its needs. The city, however, needs the double track. To obtain it the three-cornered agreement was worked out. The interurban company assumes the expense of moving its track to one side in exchange for the city's waiving the cost of paving between the rails as called for in the franchises. The Beloit Traction Company agrees to lay the second track as part of its future loop around Broad and Pleasant Streets. The city bears the expense of paving between the rails of this track.

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Strike Averted in Chicago—Arbitration Will Decide Wage Issue

There will be no strike in Chicago. The wage controversy will be settled by arbitration.

The agreement to submit the wage dispute in Chicago to arbitration came on June 12 after a series of conferences between officials of the companies and representatives of the unions held in the office of Mayor Dever in the City Hall. Shortly after 1 o'clock on that day it was unanimously agreed that there should be no strike and that the wage dispute be submitted to a board of arbitration. The wage scale fixed will be for two years, from June 1.

Mayor Dever, who was successful in his negotiations to bring about arbitration without a tie-up of the city's elevated and surface lines, will appoint the umpire, or third member of the arbitration board. The Mayor suggested that he would prefer to name all three members of the arbitration board, but the union representatives refused to consider this proposal. Members of the board will be selected in a few days.

The only question to be considered by the board of arbitration will be that of the 10 cents an hour increase demanded by the men. Officials of the company insisted that the whole question of working conditions should be opened in the event an arbitration board passed upon the merits of the controversy. The union representatives, led by William D. Mahon, international president, who came from Detroit to be present at the negotiations, agreed to leave the question of the wage increase to arbitration, but refused to permit the question of working conditions to be considered.

The union officials will not go back to their locals for approval of the arbitration plan, as the unions in their resolution adopted last week voted authority to the leaders to negotiate "any reasonable settlement."

Farewell Dinner by Englishmen

Messrs. J. C. Mitchell, Ivor Frazer, Albert Rozier and E. Boyes, the four Englishmen connected with the London railway and bus operations, who have been studying transportation conditions and methods in the United States during the past six weeks, on June 11 gave a farewell dinner at the Lotus Club, New York City, for a few of their acquaintances within easy reach. They sailed on the Aquitania June 12. During their stay in this country they visited New York, Albany, Montreal, Toronto, Buffalo, Cleveland, Detroit, Chicago, Pittsburgh, Washington, Philadelphia, Atlantic City and Boston.

The four men were exceedingly enthusiastic over the cordiality and hospitality they had been extended everywhere. They praised our railway people in highest terms, not only for the reception they had been given, but for the manner in which everything in the way of information had been opened up to them. They said that they now saw traction matters in an entirely new light. They were reluctant to express any views of their impressions of American railway work until they had had time to think over all of the things they had seen and heard. As Mr. Frazer, who is responsible for the famous London underground posters, put it, his mind was a "mass of mental pulp," because of all the things he had tried to absorb from American practice.

In other informal talks made at the dinner there were many complimentary references to the work of the English railways and to the success attained by Lord Ashfield. Frank Hedley, who lived in England the first nineteen years of his life, said he had attended the dinner to Albert H. Stanley, now Lord Ashfield, when the latter went to London to manage the railways, and he said that knowing the British people, he knew that the promotion and elevation of Mr. Stanley was because he had "made good."

The guests at the dinner were: N. A. Bolen, E. F. Gaynor, E. C. Faber, R. H. Montgomery, Fred H. Gallagher, H. H. Vreeland, John L. O'Toole, W. C. Burton, Frank Hedley, B. A. Hegeman, H. C. Clarke, F. O. Wood, Fred Sargent, C. E. Morgan, Charles Castle, H. C. Donnecker, C. P. Norcross, M. R. Boylan, H. A. Hegeman and H. L. Brown.

News Notes

Increase in Wages of Five Cents.—Trainmen employed by the Lake Shore Electric Railway Company, Cleveland, will receive an increase in pay of 5 cents an hour. This will bring their wages to a maximum of 55 cents an hour for the fifth year of service. The trainmen on this line now start for 50 cents an hour and get 1 cent an hour increase for each year of service

Line to Be Rehabilitated.—The Arkansas City-Winfield Northern Railway, Wichita Kan., will be rehabilitated and shortly put into first-class shape. The property, formerly known as the Southwestern Interurban Railway, was purchased early in 1923 by a group of Wichita capitalists. The line consists of 15 miles of interurban and 5 miles of city lines in Winfield and Arkansas City, Kan. The president of the company is George Theis, Jr., who is president of the Arkansas Valley Interurban Railway.

City Club Behind Railway Program.—The City Club of Atlanta, Ga., has joined with numerous citizens in expressing the hope that the Georgia Railway & Power Company "will receive every reasonable opportunity and encouragement in the development of its service, which means so much to the present and future of the city." It has adopted resolutions embodying these sentiments. The improvement program of the company was reviewed previously in the ELECTRIC RAILWAY JOURNAL.

Foreign News

Freedom from Accidents

The number of drivers who have entered for the drivers' freedom from accident competition for 1923 of the London Safety First Council is no fewer than 10,908, or about 50 per cent more than last year. The competition is open to drivers of all classes of road vehicles, including tramcars and buses. Each competitor free from accidents during the year receives a prize in money, or a badge, medallion or diploma.

Difficulties of Tramway Extension in London

At a recent meeting of the London County Council, C. W. Matthews, chairman of the highways committee, referred to the proposals for the extension of the London Underground Railways. These railway companies, he pointed out, were in a different position from the Council. They were able to secure without difficulty full consideration by the committees of Parliament of any proposals for extensions which they might bring forward. But the Council could not introduce a bill into Parliament for tramway extensions unless it first obtained the consent of the local road authorities. That was provided by Parliamentary standing orders, and Parliament had consistently refused to relax these orders. The highways committee had for some time been in communication with the local road authorities concerned with regard to the possibility of seeking powers for the construction of certain new tramways. When they knew to what extent the authorities affected would be prepared to give the necessary consent, they might proceed with a Parliamentary bill.

London Tramway Finance

Although the traffic receipts of the London County Council tramways, like those of a good many others in England, continue to show a decrease, it was mentioned at a recent meeting of the Council that the accounts for the past fiscal year would show a surplus. This can only arise from a reduction in expenditure. The cost of materials has, of course, fallen and wages continue to come down. Early in May another 1s. per week came off wages under the sliding scale arrangement, which will mean a saving on the London undertaking of £31,000 a year. The official index figure of the cost of living at May 1 was 70 per cent above that of July, 1914, as compared with 74 per cent on April 1. As the index figure falls, so do wages. It may be recalled that the deficiency on the working of the London County Council tramways for the year 1920-21 was £590,000 and for the year 1921-22 it was £88,000.

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Financial and Corporate

$1,917,044 Net in Atlanta

Georgia Railway & Power Company Reports This Amount for 1922 Before Depreciation and Dividends

After payment of operating expenses, taxes, rentals and interest, the balance of the year's operations of the Georgia Railway & Power Company, Atlanta, Ga., for 1922 amounted to $1,917,044, and after the payment of sinking funds to $1,666,253. Reserves for maintenance, damages and contingencies are charged to operating expenses. In 1921 the actual expenditure on these accounts was $9,556 less than the amount charged in operating expenses and credited to reserves. In 1922 the expenditure on these accounts was $364,066 less than the amount charged in operating expenses and credited to reserves. It is thus explained that in order to make a true comparison on the basis of actual expenditures for operations between the "net income" of 1921 and the "net income" of 1922 there should be added to "net income" for the year 1922 the sum of $354,510.

Pursuant to the provisions of the general mortgage of Georgia Railway & Power Company dated Nov. 1, 1921, and to an order of the Railroad Commission of Georgia dated June 7, 1922, the company issued during the year $3,500,000 of twenty-five year 6 per cent general mortgage gold bonds, series of 1922, secured by a general mortgage on the property, subject to the first and refunding mortgage dated April 1, 1914, and the mortgage of the Atlanta Water & Electric Power Company, and also secured by a deposit with the trustee of $3,500,000 par value first and refunding mortgage 5 per cent bonds, which latter, owing to the low interest rate, were unsalable under current market conditions at a price the company could afford to take. Inasmuch as bonds can only be issued under the general mortgage to the extent that first and refunding mortgage bonds are deposited with the trustee of the general mortgage as collateral, the issuance and sale of this $3,500,000 general mortgage gold bonds, series of 1922, did not increase the bonded debt of the company.

Of this issue of $3,500,000 of general mortgage gold bonds $631,700 of the proceeds were used in paying off the balance due on account of the purchase price of the Tugalo power plant equipment and machinery. The balance of proceeds, namely, $2,553,300, was deposited with the trustee to be used exclusively for the purpose of completing the Tugalo Development, increasing the capacity of the Morgan Falls plant, and other items of new construction necessary for the transmission, distribution and delivery of electrical energy, all as authorized by the Public Service Commission of Georgia.

The company issued during the year $2,500,000 first preferred 8 per cent cumulative stock, series of 1922. The sum of $2,000,000 par value of this new stock was used in retiring the $2,000,000 first preferred 6 per cent cumulative stock of the company together with the accrued and unpaid dividends thereon aggregating $30.50 per share. The remainder of $500,000 par value of the new first preferred 8 per cent cumulative stock, series of 1922, was sold for cash at par, and the proceeds placed in the treasury of the company to be used or applied only for the acquisition or construction of new and additional property, or reimbursing the company for expenditures already made for new construction.

GEORGIA RAILWAY & POWER COMPANY AND LEASED AND SUBSIDIARY COMPANIES

Income Statement

	1921		1922	
Operating revenues	$14,080,903		$14,449,497	
Operating expenses	8,476,795		9,130,345	
Net operating revenue		$5,604,108		$5,319,152
Less taxes		916,765		952,188
		$4,687,343		$4,366,964
Other income		350,921		417,190
Gross income		$5,038,264		$4,784,154
Bond interest and rental dividends of leased and subsidiary companies		1,679,228		1,694,311
		$3,359,036		$3,089,843
Other interest of leased and subsidiary companies	$158,126		$185,869	
Extinguishment of discount on securities of leased and subsidiary companies	9,287	$167,413	9,661	195,530
		$3,191,623		$2,894,313
Bond interest Georgia Railway & Power Company		655,017		888,350
		$2,536,606		$2,005,963
Interest on notes Georgia Railway & Power Company	$221,239		$26,744	
Extinguishment of discount on securities Georgia Railway & Power Company	88,903	310,142	62,175	88,919
Net income for the year before depreciation and dividends		$2,226,464		$1,917,044

NOTE: As stated in the text of the report $354,510 must be added to the "Net Income" for 1922, as shown above, to make a true comparison with 1921, resulting in "Net Income" for 1922 on the basis of actual expenditures for operations of $2,271,553 compared to $2,226,464 for 1921.

Under the terms of sinking fund provisions of the respective mortgages, the total sinking fund requirements for the year were $253,042.

On Dec. 31, 1922, the total mileage of railroad tracks (on a single-track basis) owned or leased and controlled and operated by this company, including the mileage in Gainesville, Ga., was 247.303.

During the year 1922 the company placed an order for twenty city-type electric railway double-end pre-payment passenger cars with a seating capacity of forty-eight passengers each at an aggregate cost of $256,000. These cars have all been delivered and are now in service.

During 1922 the company transported 94,208,490 passengers, as against 93,557,131 in 1921.

Alabama Company Revalued at $29,000,000

The valuation of the Alabama Power Company properties was recently fixed by the Public Service Commission for rate-making purposes at $29,000,000. This order supersedes the order issued by a majority of the commission on Dec. 13, 1922, which fixed the valuation at $33,843,252. The order of last December never became effective, having been suspended pending application by the Alabama Mining Institute for a rehearing.

The revaluation places the properties at $4,943,252 less than the original valuation as made by Associate Commissioners Cooper and Gaillard before leaving office. In reaching the new valuation the commission considered the evidence submitted in the original hearing and made new investigations into the various phases of the case.

The new valuation, which covers all property of the company as of June 30, 1920, plus property acquired since that time, including the utilities of Montgomery, is $15,000,000 less than the final valuation placed by Hagenah & Erickson, engineers, who made an inventory and appraisal of the property for the commission after the valuation case was docketed in 1920. Their original report placed the valuation at approximately $47,000,000. Later, conferences between them and I. F. McDonnell, engineer for the commission, caused a reduction of the valuation to approximately $44,000,444. A check was then made by Mr. McDonnell of the valuation recommended by Hagenah & Erickson and of the valuation of Morris Knowles, who was employed by large consumers of power, and his recommendation was the establishment of the $29,000,000 valuation. The order states that the above valuation included the sum of $1,500,000 working capital and $3,750,000 as going concern value.

Before the valuation can become final sixty days must elapse for protest. Upon the expiration of sixty days, unless protest is filed, the valuation fixed becomes final. Governor William W. Brandon stated the valuation arrived at had his full approval and was in line with his own ideas as to the fair value.

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Receivership Ends

Brooklyn-Manhattan Transit Corporation Starts Operation—Menden Heads New Company

The receivership of the Brooklyn Rapid Transit Company, with the exception of certain formalities affecting the surface lines, was terminated on June 14, when Judge Mayer of the Federal District Court ordered turning over the properties to the newly organized Brooklyn-Manhattan Transit Corporation. The new company began operation at midnight, but the receiver will operate the surface lines for a few days.

The officers of the new company are: Gerhard M. Dahl, chairman of the executive committee; Albert H. Wiggin, chairman of the finance committee; William S. Menden, president; George D. Yeomans, vice-president and general counsel; Howard Abel, comptroller. The offices of secretary and treasurer have not as yet been filled. J. H. Bennington, who has been in charge of the department of real estate and taxes under the receiver, will be continued in the same capacity with the new company.

The board of directors includes three members named by the Transit Commission to represent the public. This is in accordance with the reorganization plan. These men are: Travis H. Whitney, former Public Service Commissioner; Alfred E. Marling, former president Chamber of Commerce, New York, and Robert A. Shaw, formerly chairman transit committee, Brooklyn Chamber of Commerce. The other directors are: Arthur S. Somers, president Brooklyn Chamber of Commerce; Charles A. Boody, president People's Trust Company; J. Sherlock Davis, president Cross, Austin & Ireland and former president Brooklyn Chamber of Commerce; James H. Post of B. H. Howell Sons & Company; William H. Johns, president George Batten Company and former president of Queens Chamber of Commerce; William H. English, director Brooklyn Trust Company; William S. Menden, president Brooklyn-Manhattan Transit Corporation; Albert H. Wiggin, president Chase National Bank; Frederick Strauss of J. & W. Seligman & Company; Matthew C. Brush, president American International Corporation; Charles S. Sargent, Jr., of Kidder, Peabody & Company; Gerhard M. Dahl, of Hayden, Stone & Company and George S. Franklin of Cotton & Franklin.

Prior to Judge Mayer's action dissolving the receivership, Lindley M. Garrison, receiver of the Brooklyn Rapid Transit Company, presented his final report on the transactions of the receivership. Mr. Garrison took occasion to thank the court for its splendid co-operation, which was reflected in the comparatively short time within which the intricate matter was brought to a conclusion. Further, that only those matters which absolutely necessitated it were brought before a master and so the seven receiverships involved had only incurred a relatively small expense for master's fees. He also thanked the able counsel and then acknowledged the help which General Manager William S. Menden and heads of the different departments gave to the work.

The salient facts brought out in the report included the following:

Approximately $26,000,000 has been spent on the rapid transit lines for new construction and the purchase of equipment.

Approximately $1,600,000 has been expended on the surface lines for track reconstruction, car reconstruction and new cars.

The Brooklyn Rapid Transit receiver has spent out of earnings upward of $3,700,000 on the construction of the Williamsburg power plant.

Power bills in arrears owing by the surface companies in receivership in the total amount of $1,710,799 have been paid.

Taxes in arrears in the amount of upward of $3,000,000, as of Nov. 30, 1920, have been paid and all current taxes levied have been paid, except for contested items.

4.40 miles of company owned rapid transit lines under construction at the beginning of the receivership have been completed and placed in operation. 30.095 miles of city owned trackage has been completed during the receivership and the company has equipped and placed the same in operation. Arrangement has also recently been made for joint operation over 12.20 miles of track on the Corona and Astoria elevated extensions in Queens, and this operation has been commenced.

The total number of revenue passengers carried by the rapid transit lines has shown a constant and substantial increase as shown by the following yearly totals: 1918, 280,295,281; 1919, 330,256,192; 1920, 393,778,883; 1921, 431,108,837; 1922, 459,049,609.

The total number of revenue passengers carried on the surface lines (including the Brooklyn City Railroad) has likewise shown a substantial increase as shown by the following yearly totals: 1918, 320,370,317; 1919, 398,199,316; 1920, 402,647,343; 1921, 449,795,980; 1922, 465,865,137.

The receivership surface lines purchased ninety-two new safety cars and forty-six new trail cars during the receivership.

150 old type surface cars have been reconstructed into cars of the safety type so they can be operated by one man.

During the year 1922 approximately 17 miles of surface trackage of the receivership lines was reconstructed at a cost of $650,000, and approximately an equal amount of reconstruction work is under way during the present year.

400 new cars for the rapid transit lines have been purchased and placed in operation during the receivership at an approximate cost of $10,000,000.

Increase in Service. In 1919, 140,000 car-miles were operated on the rapid transit lines daily. At the present time approximately 200,000 car-miles are operated daily, an increased service of approximately 43 per cent during receivership. If seat-miles are taken, it shows a still greater increase of service. The total number of seat-miles for 1918 was 2,945,480,124, as compared in 1922 with 4,528,515,520, approximately a 50 per cent increase in the number of seats furnished for passengers to ride 1 mile.

The increased service furnished by the system has been made possible largely through improved operating methods and labor-saving economies and without any marked increase in the number of employees.

At the outset of the receivership, there were 4,532 suits and claims against the companies for tort damage, with respect to which 3,106 claims were filed with the receiver for an aggregate amount claimed of $21,013,328. Of these claims 2,950 have been liquidated either by trial or by agreement for a total liability of $2,030,775. Only 124 remain undisposed of, for an estimated liability of $65,295.

A total of 1,034 claims for money due upon contract, prior to receivership, were filed with the receiver for an aggregate amount claimed of $6,184,822. With the exception of fifty-nine claims, all of these have been satisfactorily disposed of by litigation or by agreement.

Net Income $451,000

The Springfield, Mass., Street Railway's annual report shows operating revenue of $3,409,436 in 1922, as against $3,428,334 in 1921; operating expenses of $2,685,586 in 1922, as against $2,957,404 in 1921. The decrease in the first instance was $18,898, and the decrease in the second instance was $271,818. After payment of taxes and interest on funded and unfunded debt, the net income was $451,000, out of which a 5 per cent dividend was paid, against a net income of $264,766 in 1921.

During 1922, the report shows $169,000 was spent on additions and renewals in the roadway, tracks, structures and car equipment. The amount spent for track and maintenance is shown to be $26,000 more in 1922 than in 1921. The number of passengers carried in 1922 was 49,544,902, an increase of 208,980 over 1921. Car-miles operated in 1922 totaled 6,939,524, a decrease of 88,168 from 1921.

The fact that operating revenue was less, although the number of passengers was greater in 1922 than in 1921, is explained on the ground that a greater number rode on special rate tickets in 1922.

$2,261,340 Increase in Toledo Tax Protested

The State Tax Commission has raised the valuation of the properties of the Community Traction Company, Toledo, to $7,252,940, or $2,261,340 more than last year. This is an increase of 45.8 per cent in one year and brings the total up to 94.25 per cent of the valuation as fixed under the franchise ordinance.

The car riders are now paying a tax equivalent to 0.36 cent per fare. If the increase stands it will boost it to approximately a half cent per fare.

The sinking fund presents another tax problem. Money in the fund is really the property of the city as it goes to retire bonds, after which equivalent common stock is issued in the name of the city. The company has no control over the funds. However, they are taxed as company funds. The cash in the fund is taxed in Ohio as an operating fund, then the bonds to be retired are taxed, and under the New York laws the money actually in the hands of the trustee is taxed by that state. Cash in the fund is taxed three times and bonds retired and property owned by the city are taxed once. There are now $364,000 of the bonds retired and equal amount of common stock issued to the city and $120,761 in cash in the fund on May 1. The state tax commission has refused to make any concession on this item.

The boost in valuation is believed to be a discrimination against utilities. All property in the state is by law supposed to be taxed "according to its true value in money and at a uniform rate." However, real estate in Toledo is assessed at about 60 per cent of its full value. Other counties vary from this ratio. To tax a public utility on an assessed valuation of 95 per cent and other property only 60 or 75 per cent is discrimination in the view of the street railway board and commissioner.

Commissioner Cann and Assistant City Law Director Dodd appeared before the State Tax Commission recently to protest the valuation.

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Report on Traction Fund

Chicago Fund Totaled $28,438,295 on Jan. 1—May Accept the Payments Refused by Mayor Thompson

The status of the city of Chicago's traction fund, accumulated by the collection of 55 per cent of the net earnings of the Chicago Surface Lines by the municipality under the terms of the 1907 ordinance, is outlined in a recent report by City Comptroller Martin J. O'Brien. This fund was created to be used ultimately for subway construction.

The report shows that the traction fund totaled $28,438,295 on Jan. 1, 1923, and that payments aggregating $8,189,128 had been offered to the city by the companies during the last four years of Mayor Thompson's administration, but were refused by Former Mayor Thompson on the theory that these would impair his efforts to have the companies' franchises declared void by the courts. By this refusal it is estimated that the city sacrificed $640,000 in interest.

Comptroller O'Brien's report shows that the Chicago City Railway paid $8,745,716 into the traction fund, while the Chicago Railways paid $13,665,812. The total deposits are $22,411,528, while $6,772,163 in interest has been earned on the fund. Expenses of investigations of the local transportation problem, reports on subway plans and litigation over fares used up $745,396 of the fund. Of this amount $600,683 was spent by the Thompson administration, chiefly in connection with litigation.

Mayor Dever now has under consideration the question of acceptance of the payments refused by former Mayor Thompson. If these are accepted, the city's fund will total $36,627,424.

The traction fund is now a part of the city's consolidated investment fund. Interest earnings last year totaled $1,000,000. The report shows that the fund is distributed as follows at present:

Cash	$11,788,779
Invested in anticipation tax warrants	34,155,000
Invested in city of Chicago bonds	3,063,000
Invested in U. S. Liberty bonds	8,860,800

Detailed information regarding the fund will be found in the accompanying table.

Dividends Declared.—The directors of the Twin City Rapid Transit Company, Minneapolis, Minn., have declared a semi-annual dividend of 3 per cent on the common stock, payable July 2, to holders of record on June 15. Semi-annual dividends of 2 per cent were paid on the common stock on July 1 and Dec. 30, 1922.

Issue Authorized.—The Board of Public Utility Commissioners of New Jersey has authorized the Cumberland Traction Company, Bridgeton, N. J., to issue $24,800 in preferred stock and $17,200 in common stock. The proceeds of these issues will be used for the acquisition of certain property formerly owned by the Bridgeton & Millville Traction Company.

Auction Sales in New York.—At the public auction rooms in New York on June 13 the following electric railway securities were sold: $4,000 Second Avenue Railroad first consolidated 5 per cent bonds, due 1948, certificates of deposit, $36 lot; $84,000 Washington-Virginia Railway 6 per cent secured gold notes, series A, due Jan. 1, 1922, January, 1922, coupon attached, $85 lot.

Sale Date Announced. — Albert Swartz, Harry A. Dunn and Joseph A. Yager, special masters, will sell at public auction to the highest bidder on June 19, 1923, the property of the Toledo & Western Railroad. The sale will take place at the railroad station of the property in the village of Sylvania, Ohio. The sale will be carried out in pursuance of the provisions of a decree entered in the District Court of the United States for the Northern District of Ohio, in Toledo, on May 7, 1923.

Gold Bonds Being Offered.—Baker, Young & Company, Blodget & Company and Arthur Perry & Company are offering at 98½ and interest to net about 6.15 per cent $3,000,000 of first mortgage 6 per cent gold bonds of the Dubuque Electric Company. The bonds are dated April 2, 1923, and are due April 1, 1942. The purpose of the issue will be to discharge all present funded debt and for other corporate purposes. The company has at present outstanding $2,445,000 first mortgage 5 per cent bonds due June 1, 1925, and $111,000 8 per cent notes due Sept. 1, 1923.

Taylor, Engineer, on Norfolk Valuation. — In the issue of the ELECTRIC RAILWAY JOURNAL for May 28, page 902, Edwin Wortham was credited as being author of a valuation report of the Norfolk Street Railway property of the Virginia Railway & Power Company. This information was received from a correspondent whose work is dependable. In this instance the information given him seems to have been incorrect. Credit for preparation of the report should have been given to Walter H. Taylor, 3d, City Engineer of Norfolk, while Mr. Wortham acted as assistant.

Sale Decreed by Court.—All the tangible assets, charters, leases and rights of the Portsmouth, Dover & York Street Railway, Portsmouth, N. H., which ceased operation several weeks ago, will be sold at Alfred on June 30. The sale was decreed by Judge Clarence Hale in the United States District Court. Philip G. Clifford has been appointed special master. For the past six years the property has been operated by Willis G. Meloon, as receiver. Recent efforts to reorganize and rehabilitate the road failed and nothing was left but to petition the court to terminate the affairs of the company.

Enters Order for Sale.—Judge Evan Evans of the United States Circuit Court, sitting in Chicago, has entered an order for the sale of the Aurora, Elgin & Chicago Railroad properties, consisting of the Aurora and Elgin city lines and interurban lines operating in the Fox River valley. The order was issued on application of holders of $1,546,000 bonds of the Elgin, Aurora & Southern Traction Company, from which the Aurora, Elgin & Chicago company developed. Holders of the bonds are three Cleveland banks. The sale, it is expected, will result in a refinancing of the lines, which have just been voted new twenty-year franchises in Aurora and Elgin.

Must Pay to Manhattan Stockholders.—Frank Hedley, president Interborough Rapid Transit Company, recently announced that the Interborough board had determined that the net earnings applicable to the Manhattan rental for the quarter ending June 30, 1923, amounted to 60 cents a share and the rental was ordered paid to Manhattan stockholders at that rate on July 1, 1923. The Interborough failed to earn the full 3 per cent for Manhattan rental as reduced from 7 per cent by approximately $90,000 for the year, hence the payment of 60 cents a share instead of 75 cents which would be the amount payable at 3 per cent if earned. The deficit, however, Mr. Hedley said was cumulative and would have to be paid in the future if and when earned.

STATUS OF CHICAGO'S TRACTION FUND

Year	Deposits of Chicago City Railway Paid on April 1	Deposits of Chicago Railways 10 of each year	Total Deposits	Interest Earnings	Expenses Paid
1908	$675,702	$881,106	$1,556,809	$30,054	.....
1909	521,666	862,782	1,384,449	53,361	.....
1910	473,942	811,320	1,285,262	79,747	.....
1911	960,075	744,110	1,704,185	99,542	24,462
1912	1,048,361	821,376	1,869,738	133,415	66,201
1913	1,116,163	1,412,870	2,529,033	292,103	51,418
1914	842,587	1,855,205	2,697,792	293,866	2,450
1915	872,845	1,684,197	2,557,042	479,809	.....
1916	547,680	1,116,744	1,664,424	397,234	203,882
1917	976,995	1,768,659	2,745,654	434,220	76,820
1918	704,411	1,330,940	2,035,352	765,681	14,764
1919	5,284	376,498	381,782	837,444	22,331
1920	.....	.....	.....	891,827	181,221
1921	.....	.....	.....	983,847	43,872
1922	.....	.....	.....	1,000,005	57,790
	$8,745,716	$13,665,812	$22,411,528	$6,772,162	$745,396
Total fund balance as of Jan. 1, 1923					$28,438,295
These amounts tendered and not accepted:					
1920	$442,990	$1,004,362	$1,447,352	.....	.....
1921	737,989	1,406,626	2,144,616	.....	.....
1922	1,075,744	1,858,367	2,934,112	.....	.....
1923	552,654	1,110,392	1,663,046	.....	.....
Total unaccepted			8,189,12		

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Traffic and Transportation

Eight-Cent Fare in Jersey

Judge Haight Reports on Controversy Between the Railway and Commissioners—Will Appeal

Another chapter in a fight lasting almost five years was terminated on June 9 when former Judge Thomas G. Haight, as special master, affirmed the 8-cent fare with 1 cent for transfers on the lines of the Public Service Railway, Newark, N. J. Judge Haight also recommended that the fare be authoritatively declared effective. Since the fall of 1921 this has been the rate charged by the company in various parts of the state, although it has been opposed by the Board of Public Utility Commissioners. The fight of the Jersey City Commission will be carried to the Supreme Court of the United States following a resolution offered by Frank Hague, Mayor, and adopted by the commission on June 12.

First Application for Increase in 1918

The controversy between the Public Service Railway and its subsidiary traction companies on the one side and the Board of Public Utility Commissioners with several New Jersey cities on the other side dates back to 1918, when the company, owing to the increased costs of operation, brought about by war conditions, applied to the commission for permission to charge 1 cent for transfers in addition to the 5-cent fare then in effect. This was approved, as was a second application, a year later, for further increases to a 7-cent fare and a 2-cent transfer charge.

On July 15, 1921, the commission denied a third request for an increase by the company to a 10-cent fare without charge for transfers. The commission held that the increase was not justified by the costs of operation and decreed that the "seven-two" rate be continued.

The company appealed to the Federal Court, alleging that the continuance of the 7-cent fare with a 2-cent transfer rate was confiscatory and invaded its property rights, and sought to obtain an injunction to restrain the commission from preventing it from putting its proposed 10-cent fare into effect. The commission was restrained temporarily by the court, on condition that the company would charge a fare not exceeding 8 cents and 1 cent for initial transfers. The appointment of Judge Haight as special master followed.

Differences Over Valuation

The chief point of difference in the testimony before Judge Haight was on the question of the valuation of the company's properties. The commission had fixed it at approximately $82,000,000, while the company contended that the true value was in the neighborhood of $200,000,000.

Experts testifying for both sides estimated the value of the property at from $65,000,000 to $135,000,000. In his report Judge Haight fixed about $110,000,000 as a fair valuation of the company's holding. He based this upon an estimate of the cost of reproduction, new, at present prices, less depreciation of $98,291,563 for the company's physical property, $8,000,000 for the power lease or contract and $5,500,000 for going value, or a total of $111,791,563.

In his report Judge Haight said:

> As I have found that the rate of fare fixed by the Board of Public Utility Commissioners is confiscatory, I am constrained, of course, to recommend that a decree be entered restraining the board from putting it into effect or from enforcing or attempting to enforce the orders or the rate. If the effect of such a decree will be, as suggested in Judge Woolley's opinion, to reestablish a prior and lower rate of fare, then, of course, the decree should also prevent the putting into effect or enforcement of any such lower rate.
>
> The plaintiff has also prayed in its bill of complaint for an injunction restraining the board from preventing the plaintiff from putting into effect and collecting a rate of fare of 10 cents for adult passengers, without charge for transfers. I do not think that the court should attempt to pass on that question, or attempt to decide what rate of fare in excess of that prescribed by the before-mentioned orders of the board would produce the necessary fair return, for to do so would be in effect to indulge in rate-making.
>
> If it is eventually determined by this court or the Supreme Court, on appeal, that the rate fixed by the Board of Public Utility Commissioners is confiscatory, it will be necessary for the board to prescribe a new rate of fare. It is, of course, not to be doubted that the board will fix a proper rate of fare based upon the valuation and rate of return which this court or the Supreme Court, on appeal, may eventually determine is proper in order to avoid confiscation.

Copies of the report were forwarded to Trenton to the three Federal judges comprising the special tribunal selected to adjudicate the fight and who appointed Judge Haight to take testimony.

New Employees in Dallas Will Have Trained Instructors

According to new plans being worked out by the employment and training department of the Dallas Railway, instructors in that department will take a standardized course in methods of teaching new employees. Supervision over this department has been given to C. J. Crampton, superintendent of the efficiency department. Mr. Crampton will be assisted by Inspector A. E. Harris, who has been loop inspector. Mr. Harris will retain his rank and title as inspector and assume the duties of chief instructor for the present.

Several students are now taking the course and it is likely that no new men will be employed by the railway for some time to come. Just at present there is a large number of applicants for employment, and due to this condition the employment department advises that men be not encouraged to seek employment.

Seven Cents in Norfolk

Corporation Commission Fixes Higher Fare Temporarily—Jitney Competition Figures Largely in Order

Without deciding the value of the property of the Virginia Railway & Power Company in the city of Norfolk, South Norfolk and Norfolk County, the Virginia State Corporation Commission has issued an order increasing the fare on the company's Norfolk division from 6 to 7 cents, four tokens for a quarter. Major Alexander Forward, the commissioner in charge of public utility work, increased the fare on noting that under either the valuation claimed by the city of Norfolk, or that claimed by the company, a higher fare was justifiable.

The valuation claimed by the company is about $10,500,000, while the city's approximate value is $6,150,000. In Norfolk it is generally believed that the decision of the Corporation Commission may mean an even higher fare, as the token fare would be only about 6¼ cents a passenger.

In the 7-cent fare order the testimony of the Virginia Railway & Power Company is cited that jitneys handled 25 per cent of the traffic in Norfolk and at Richmond only 10 per cent. Attention was also called to the admission of Walter H. Taylor, director of public works, chief witness for the city at the hearings, that there were some jitney lines in Norfolk in unfair competition with the cars of the traction company. Further, that jitney owners were not required to contribute to street paving, that the buses operated only in well settled sections and that they were permitted to charge a fare higher than on the street cars.

An important part of the order concerned the 3 per cent depreciation reserve set aside by the company from its earnings. However, the commission purposely withheld opinion as to the methods used in calculating depreciation, but said "it is certain that any adjustment thereof that might be made would not involve a sufficient amount in the Norfolk street railway system to result in bringing the return up to a fair amount even on the basis of valuation presented by the city.

The matter of the Norfolk fare has been under discussion for some time. Some facts about the situation were recently brought out in a letter to the editor of the *Ledger-Dispatch* entitled "Street Car Fares," by T. Norman Jones, Jr., general manager of the Norfolk division. His letter takes the form of a reply to some comment in the paper on the comparative cost of bus and electric car operation, which said, among other things: "Gradually the street railway fares have been increasing and now the Virginia Railway & Power Company wants in Norfolk a fare that is equal to that of the motor-bus lines."

Mr. Jones referred to the jitney competition which the city had permitted to grow and said that financial results would be very different if jitneys were taken out of territory which for the

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most part had been developed by his company and were confined to territory which the company did not serve. His analysis of the situation brought out the following:

The longest haul on a motor bus line in Norfolk for one fare (no transfer privilege) is approximately 4.3 miles.

The longest haul on street cars in Norfolk for one fare without transfers is approximately 5.5 miles. The longest haul, including the use of a free transfer, is approximately 9.5 miles.

The average of the one-way distances traversed by jitney routes in Norfolk, exclusive of the second zone on the Naval Base jitney line, is approximately 3.3 miles.

The average of one-zone fare routes on street cars in Norfolk, exclusive of second and third zones, which do not transfer to each other, and exclusive of the shuttle line in Berkley, carrying with it second transfer privilege, is 4.05 miles, without transfers. With transfer privilege a person can travel varying distances up to a maximum of 9.48 miles for one fare.

The average fare collected on the street cars, exclusive of free transportation for company employees and policemen and firemen in the city service, but including free transfer passengers for three months, Jan. 1 to March 31, 1923, is .0513 cent.

The Corporation Commission of Virginia, under the new statutes and recently compiled Code of Virginia, is placed in charge of all electric street railway systems in the state whose franchises have been granted since the code was compiled. Realizing that the Corporation Commission has become the rate-making body of the state, Norfolk has twice petitioned that body to set the fare in Norfolk.

The city attorney has been asked to render the Council an opinion on the power of the Council as a rate-making body should a blanket franchise be granted and no action will be taken on the company's petition until this opinion is in hand.

Eastern Massachusetts Wants to Operate Buses in and Out of Woburn

The Eastern Massachusetts Street Railway, Boston, Mass., is negotiating with the Woburn-Reading Bus Company, Inc., for the purchase of its good will and equipment in Woburn, Stoneham, Reading, Wakefield, Burlington and Billerica. The bus company was started some years ago when the Eastern Massachusetts abandoned the tracks in these cities and towns, and is operating bus lines out of Woburn to Reading, to Billerica and Burlington, and from Reading to Wakefield. Now the Eastern Massachusetts is willing to reclaim the territory, to continue the bus lines already established and perhaps operate others as feeders of its trolley system.

John F. Lovell, who organized and owns the Woburn-Reading Bus Company, has recently taken over the territory which the Concord, Maynard & Hudson Street Railway, a bankrupt road, abandoned, and he intends to give more personal attention to that field if he can reach an agreement with the Eastern Massachusetts Street Railway, relieving him of the jitney service in and out of Woburn.

State authority has been granted to the Eastern Massachusetts to operate bus lines in any part of Massachusetts within the reach of its system, provided it secures permits from the local authorities. It has already secured a permit from Stoneham and has filed applications for permits in Woburn, Wakefield, Reading and Burlington.

Jitney Regulatory Ordinance Introduced in Terre Haute

The first regulatory jitney ordinance including many stringent provisions for the operation of jitneys was introduced to the City Council of Terre Haute, Ind., on June 7. If the ordinance is passed jitneys will be barred from streets on which electric railway cars operate. This will put an end to the accumulation of jitneys in parking spaces on Wabash Avenue.

According to the ordinance as drafted, when the jitney operator applies to the city comptroller for a license he must state, besides his own name and address, the names of all persons outside of himself who will be liable to operate the car.

No person under eighteen years of age will be allowed to drive a jitney nor one who is not physically fit. No person who has been convicted more than twice for violating the speed law nor one who has been convicted of transporting liquor or any other offense in connection with an automobile will be licensed.

With the application must be stated the route which the applicant expects to drive, and the hours which he intends driving. The time limit for one day is nine hours of continuous driving. The yearly fees for cars used as jitneys will be $15 for cars carrying five passengers including the driver, $25 for cars carrying more than five and less than eight including the driver, and $35 for cars carrying more than seven, including the driver.

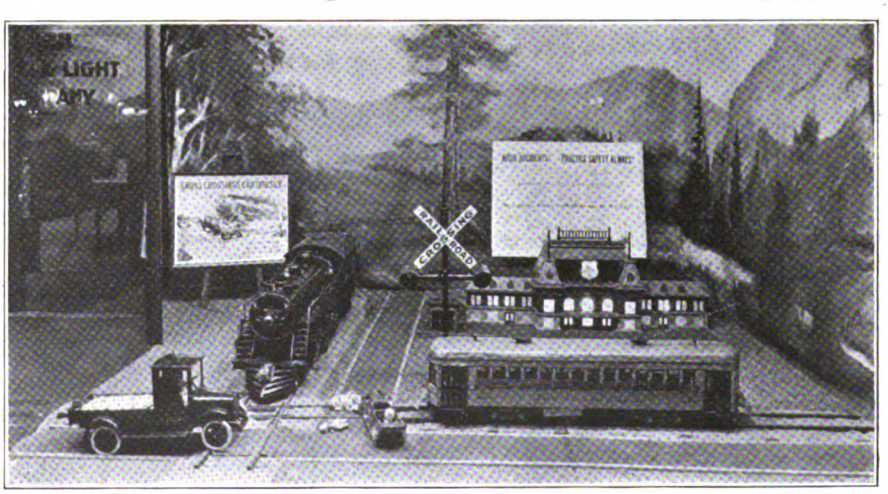
A bond of $20,000 will be required of the driver if his car carries more than seven passengers. For failing to comply with the ordinance and its provisions the driver is liable to have his license revoked and upon conviction is liable to any punishment not to exceed $300 and costs and 180 days imprisonment.

The ordinance was referred to the committee on ordinance. The ordinance refers only to vehicles carrying passengers over fixed routes inside of the city. The regulations have nothing to do with hotel buses, cabs or taxis charging fares of not less than 25 cents.

New Fare Plan in Bellingham

The Puget Sound Power & Light Company, operating the railway system in Bellingham, Wash., on May 31 announced that the experimental tariff of twenty tickets for $1 was discontinued and a new experimental plan of selling four tickets for 25 cents or sixteen tickets for $1 placed in effect for ninety days. The company announced that the reason for discontinuing the lower tariff was that the increase in return was not sufficient and that the company was losing steadily on the fare. The City Council permitted the company to introduce the new tariff, but Mayor E. T. Mathes sent a letter to the Public Service Commission at Olympia protesting the higher car fare and suggesting that "to the minds of a great number of citizens the evidence is not conclusive that the cost of maintenance (under the 5-cent fare) has been readjusted to meet the new conditions, and the opinion is held that other phases of the question might well be considered before a permanent advance in rates is ordered." The Mayor also asks that the commission order an extension of the Meridian Street car line to the entrance of Cornwall Park, and if this could not be profitably made, he suggests that auto bus service might meet the need.

Utah Power & Light Safety First Window Display



A very effective "Safety First" window display was exhibited by the Utah Power & Light Company at Salt Lake City during National Safety Week, from June 4 to 9 inclusive.

A miniature locomotive, electric street car and two automobiles were shown approaching a railroad crossing. Considerable interest and attention were attracted by the display, which offered a very impressive visualization of the disastrous results of such situations.

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Eight Cents in Youngstown

Fares on the lines of the Youngstown Municipal Railway were advanced on June 11 to 8 cents or seven tickets for 50 cents. The fare increase was announced on June 9, when Commissioner Engle received official word from the company. In making the announcement G. T. Seely, president and general manager of the company, stated that if jitneys were eliminated it would be possible to reduce fares as well as supply ample additional bus and car service. However, on June 11 the ordinance giving the safety director power to bar jitneys from the congested district was again tabled for one week.

The weekly pass in Youngstown was discontinued on April 1. The new rate of fare adopted for a trial period was 7 cents cash, three tickets for 20 cents, and 1 cent for a transfer. The rate previously in effect was 9 cents cash, six tickets for 50 cents, 1 cent for a transfer and an unlimited ride weekly pass for $1.25. Youngstown's fare troubles have been followed in the ELECTRIC RAILWAY JOURNAL.

Know Your Buses—New York's Conception of Education

If concentration on something desired spells attainment, then inhabitants of New York will be transported by buses and buses only in the near future. In the twenty-fifth anniversary of the consolidation of Greater New York the city finds another opportunity to extol this method of transportation as a contribution to the present welfare and future development of the city. At the Municipal Education Exposition now going on at the Grand Central Palace the Department of Plant and Structures is enjoying a respite from the labors of bridge and highway construction and is reveling in the statistical feats which are placarded on the wall for the consolation and edification of the city traction magnates and the small town bus promoters who are celebrating the quarter century mark of Greater New York.

Here are some things the department says about the motor bus: Under municipal ownership and operation they would be profitable to the city. On the basis of 100 buses on a 5-cent fare there is an estimated daily profit of $376.80, or an annual profit of $137,532. There are many reasons why the motor bus will aid in solving serious street congestion and one of these is that the bus would eliminate the safety zones, thus leaving in the roadway additional space for traffic. In addition is is said that the bus is more economical than the street cars, the only capital charges being the bus and garage. Further, the bus renders better service because it meets with no delay because of traffic blocks and is not put out of service by the closing of streets and numerous other causes.

Though the department is partial to the bus, it can't be said that it doesn't recognize electric railway transportation, trackless trolleys, etc., for it shows at the exhibit pictures of trackless trolleys being operated under its own supervision. Then, too, there is quite some display of street car appliances and appurtenances. There are models of the various types of motors on the elevated, surface and subway cars, including safety car motors, a model standard trolley base, and lightining protection equipment for street railway cars and for trackless trolleys.

The booth in charge of the Department of Plant and Structures has one of the most interesting displays at the exposition, which includes the activities and aims of every New York City department.

Last Minute Ruling by Commission Prevents Fare Rise in Buffalo

Eleventh hour notice was served on the International Railway, Buffalo, by the Public Service Commission that it could not put into effect the proposed 8-cent fare on the local lines of the company in Buffalo. The International had planned to make the 8-cent fare effective at midnight June 8 or thirty days after formal notice of the proposed increase had been filed with the Public Service Commission. The commission has suspended the proposed fare increase for 120 days. In its order suspending the fare increase, the commission held that it would be unjust to the public to allow a fare increase at this time, inasmuch as the rate proceeding is now pending before the commission. This proceeding was brought by the city to force the return of the 5-cent fare. The fare is now 7 cents on local lines or four tokens for 25 cents. The company proposed to charge 8 cents or four tokens for 30 cents.

In announcing its plan to charge an 8-cent fare, the International is charged by the municipal authorities with ignoring the new law just signed by Governor Smith which prevents public utility corporations from raising its rates until after a hearing has been held by the Public Service Commission and a decision has been handed down by that board. This law was referred to in the ELECTRIC RAILWAY JOURNAL, issue of June 9. The International acted under a former law which allows public utility companies to file notice of the proposed advance and put it into effect after thirty days upon one-day notice to the public, providing the increase is not suspended by the Public Service Commission.

The city law department stood ready to apply to the courts for an injunction restraining the railway from putting into effect the 8-cent fare, if the Public Service Commission had not acted within a few hours.

The decision of the commission in suspending the proposed increase was received from Albany twelve hours before the increase was to have gone into effect. The patrons of the lines were prepared for the increase and were making large purchases of fare tokens at the rate of four for 25 cents. The company had planned to use similar tokens which would be sold four for 30 cents. It is estimated thousands of dollars were invested by the car riders in tokens on the day before the proposed increase was to have become effective.

Twenty One-Man Cars in Operation.—The Oklahoma railway has been using twenty one-man cars in regular schedule all day service in Oklahoma City. They are used on five routes, supplemented with tripper service with large cars during the busy hours. The results of the one-man car operation have not been thoroughly tried out.

Pamphlet Issued as Traffic Guide.—The Atlanta Motor Club has prepared a pocket size pamphlet "for the guidance of motorists, pedestrians and people who ride the street car." The booklet explains the law's requirements on traffic problems. *Two Bells*, the official publication of the Georgia Railway & Power Company, suggests a ten-minute study of the booklet.

Favor Jitneys.—At an election held on June 9 the citizens of Houston voted to retain the jitneys by a vote of 7,261 to 5,083. The Houston Electric Company has made no announcement as to what course it will follow in order to obtain financial relief made necessary by jitney competition.

Clinton Fare Cut.—The Terre Haute, Indianapolis & Eastern Traction Company is experimenting with another lower fare plan. A little more than a year ago the company introduced the $1 weekly pass on the lines in Terre Haute. The present reduction will affect interurban patrons and will be introduced on the Clinton line. A 100-mile mileage ticket will be sold for 1¼ cents per mile. If the idea appeals to the Clinton interurban riders these fare strips will be introduced on all of the other interurban lines entering Terre Haute. The announcement of the fare cut was made by E. M. Walker, general manager of the Terre Haute division.

Amsterdam Seeks Return to Five-Cent Fare.—Testimony was taken on May 29 before Executive Clerk Harry M. Ingram of the Public Service Commission by the Fonda, Johnstown & Gloversville Railroad to show that during the last four months the company had not paid in running expenses. The company is seeking authority to continue its present fare of 8 cents in the city of Amsterdam. The city authorities had served notice on the company that it must reduce its fare to 5 cents. Amsterdam was represented by Ambrose P. Fitz James, corporation counsel; John Boyd, chairman of the committee on public works of the Common Council, and Jacob Labischner, city engineer. The railroad company was represented by Wesley Maider and C. S. Nisbett, attorneys, and J. Ledlie Hees, president; William H. Collins, general manager, and Frank Burton, secretary.

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Personal Items

11,000 Trainmen Under Him

New Superintendent of Transportation at Chicago Has One of Biggest Jobs of Its Kind

C. H. Evenson, who has been appointed superintendent of transportation of the Chicago Surface Lines, has been connected with the transportation companies in Chicago for fifteen years. Mr. Evenson was only twenty-three years old when in 1908 he entered the service of the Chicago City Railway as a clerk. Then for three years he was secretary to the president of the Calumet & South Chicago Railway.

In a semi-official post of this kind transportation affairs passed before him daily in cinema review, and being of the type that he is, Mr. Evenson saw the picture as a whole and profited accordingly. All phases of the business had their appeal for Mr. Evenson, but he became interested especially in the problems of management and men. Under given circumstances all similar machines will act alike, but under given circumstances not all human beings will act alike. Here enters the fascination of the study of human reactions. And here was where Mr. Evenson quickly showed himself to be most competent.

C. H. Evenson

At first Mr. Evenson's work brought him in touch with the matter only on its academic side, but he was building steadily for the future and in 1920, after more than ten years' service in a secretarial capacity, came real opportunity with Mr. Evenson's appointment to the position of assistant superintendent of transportation. And now in less than three years he is advanced to the very responsible post of superintendent in charge of 11,000 trainmen and the operation of 3.100 cars. There are few jobs bigger than this anywhere in the transportation world.

Four years after he entered the service of the Chicago City Railway in 1908 Mr. Evenson was promoted to the position of secretary to President Leonard A. Busby. When Mr. Busby was elected president of the Chicago Surface Lines in 1914 Mr. Evenson was retained as his secretary. When Henry A. Blair became president in 1920, he was made assistant superintendent of transportation. As superintendent of transportation he succeeds F. P. Edinger, resigned.

One of Mr. Evenson's accomplishments is that he has a great faculty of winning first prize at the annual golf tournaments of the Surface Lines.

William A. Whitney, general manager of the Utah-Idaho Central and the Utah Rapid Transit Railroads for the past six years, has been made active head of the Mount Hood and Sumpter Valley Railroads in Oregon, as well as manager in charge of operations of the Oregon Lumber Company mills in Oregon and Washington. Mr. Whitney will remain with the two Utah electric roads as vice-president and director. He will be the active head of the Eccles lumber and railroad interests in Oregon and Washington. Mr. Whitney came to Ogden as head of the electric roads in 1917 from the position of superintendent of transportation for the Union Pacific. Prior to that time he was superintendent of several different divisions of the Union Pacific and from 1911 to 1914 was superintendent of the Sacramento and Oakland divisions of the road. In railroad circles Mr. Whitney is regarded as one of the ablest operating officials in the West. P. H. Mulcahy, who has been auditor and assistant manager of the above electric roads, will be general manager of the two lines.

Albert H. Sisson, better known to his many friends as "Pop," has, as assistant to the president, joined forces with the Columbia Machine Works & Malleable Iron Company of 3303 Atlantic Avenue, Brooklyn, N. Y. Mr. Sisson first appeared on the railroad horizon when he founded the Jewett Car Company in 1897. In 1905 the Jewett company was purchased by the St. Louis Car Company and "Pop" went with it, acting as general manager of the latter organization until 1908. He then became general manager of Forsythe Brothers Company and remained there for five years, until, in 1913, he was appointed president of the Southern Car Company. In 1917 he joined the National Pneumatic Company as a special representative and continued to occupy this position until making his present connection with the Columbia Machine Works.

John W. Hulme Resigns at Buffalo

Superintendent of Equipment of International Railway Resigns After Serving Company Ten Years

John W. Hulme has resigned as superintendent of equipment of the International Railway, Buffalo, N. Y., to be associated with the maintenance department of the Interborough Rapid Transit Company as master car builder. It is understood that Mr. Hulme was anxious to give up his work in Buffalo six months ago, but at that time the company was engaged in a strike, so Mr. Hulme did not press the matter. The strike is now over, and Mr. Hulme has asked definitely to be released, so that his resignation has been accepted. He will remain with the company in a consulting capacity for a month or more.

Mr. Hulme has made an enviable record in Buffalo as superintendent of equipment, a position for which his previous experience had well qualified him, as he has been engaged in the mechanical side of electric railway service since 1904. At that time he entered the employ of the Chicago Elevated System, after an experience of about five years with the Western Electric Company, for which he installed its exhibit at the St. Louis fair. He remained with the Chicago Elevated System for five years, and in 1909 he resigned his position of inspection barn foreman with that property to accept that of general inspection foreman of construction for the Hudson & Manhattan Railroad. Subsequently he was made general foreman of inspection of that company. He remained with this property until 1913, when he accepted a position in the car equipment department of the Interborough Rapid Transit Company. He was appointed superintendent of equipment of the International Railway in January, 1918.

J. W. Hulme

Mr. Hulme has taken an active part in the work of the American Electric Railway Engineering Association and has served on several of its committees. He also has contributed articles on technical topics to this paper.

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Heavy Traction Expert with Virginian

Engineer in Charge of Southern Electrification Has Had Wide Experience in Similar Undertakings

Hugh Pattison, whose appointment as engineer of electric traction of the Virginian Railway was noted in the ELECTRIC RAILWAY JOURNAL for May 19, was formerly with the Illinois Central Railroad, with which for the last two years he has been engaged on preparation work for the coming electrification of the Chicago terminal. In his new post Mr. Pattison will have charge of directing the extensive electrification program of the Virginian Railway.

Mr. Pattison was born in Maryland on Aug. 3, 1872. He was graduated from the Johns Hopkins University, electrical engineering course, in 1892. His first position was that of foreman electrician of the Norfolk, Va., Navy Yard, wiring and installing electric apparatus on naval vessels.

In 1893 he became assistant engineer with Sprague, Duncan & Hutchinson, consulting engineers of Baltimore. From 1894 to 1903 he was associated as engineering assistant to Frank J. Sprague, vice-president and technical director of the Sprague Electric Company in New York, and assisted in equipping and operating Sprague multiple-unit control on the Boston Elevated Railroad, and also in Brooklyn. During this period he was also resident engineer representing Cary T. Hutchinson, consulting engineer, New York, in charge of design and erection of a new power plant for the Pennsylvania Steel Company at Steelton, Pa., including substations, high tension transmission line, and lighting and power equipment for the shop.

In 1905 Mr. Pattison joined Westinghouse, Church, Kerr & Company as an engineer, having charge of the work on foundation for the Long Island City power house of the Pennsylvania Railroad, the design and installation of the multiple unit cars for the Long Island electrification; also the design and construction of the brick and concrete inspection shops and carhouses. All types of control since that period have been more or less patterned after the Long Island equipment. That installation is recognized as the first real achievement in multiple-unit operation for suburban service.

From 1905 to 1911 Mr. Pattison was assistant engineer of electric traction for George Gibbs, consulting engineer. During this period, when the Pennsylvania tunnel electrification was carried out, Mr. Pattison was superintendent of construction in charge of the Pennsylvania Tunnel & Terminal Railroad. Here again was a very marked achievement in the working out of all engineering details for the free movement of locomotives and multiple-unit trains through this tunnel and terminal.

Later, Mr. Pattison had charge of the electrification of the West Jersey & Seashore Railroad from Camden to Atlantic City. He also built an experimental single-phase electric railway on Long Island and had charge of the conduct of locomotive test on the West Jersey & Seashore Railroad to determine the effect on track. As superintendent of construction work in connection with the electrification of the Pennsylvania Railroad at New York, he was responsible for the foundation and erection of a steel tower transmission line across the New Jersey Meadows, all substation equipment, third-rail and bonding, and all lighting, air and water equipment in tunnels and yards.

The work performed by Mr. Pattison on these undertakings was recognized in 1911 when he was appointed engineer in charge of the Chicago Association of Commerce Committees in the study of smoke abatement and the electrification of terminal railways in Chicago. This undertaking covered a period of approximately four years, and it is admitted that the most comprehensive study of electrification of yards was made by this committee and, as previously mentioned, Mr. Pattison was in charge of practically all of the electric engineering studies and reports.

When the war broke out Mr. Pattison was placed in charge of inspection and was finally made assistant to the general manager of the Remington Arms Company, later the Eddystone Rifle Plant of the Midvale Steel & Ordnance Company, at Eddystone, Pa. At the close of the war this factory discontinued operations and Mr. Pattison joined the heavy traction staff of the Westinghouse Electric & Manufacturing Company under F. H. Shepard, director of heavy traction.

Twenty-five Years a Secretary

Mrs. Roberts of Los Angeles Railway Remembered with Presents from Company Executives

Not all the honors nor all the worries of the electric railway business go to the sterner sex. Witness Mrs. Mabel Knight Roberts, secretary to G. J. Kuhrts, general manager of the Los Angeles Railway, who recently completed twenty-five years of service with the company. Her silver service anniversary, celebrated recently, was remembered with presents from executives of the company.

Mrs. Mabel K. Roberts

Mrs. Roberts has been secretary to every general manager the company has had. Starting in 1898, Mrs. Roberts was secretary to F. W. Wood, then general manager. The property was owned by Eastern capital, and a small two-story frame building at Sixth and Central Streets served as headquarters for the railway, which Mrs. Roberts has seen develop into an extensive system serving nearly 1,000,000 passengers a day.

In 1898 the company had two car dispatchers, one for day and one for relief and night service. The cars were of various types.

The latter months of 1898 were busy ones which Mrs. Roberts well remembers. It was then that Henry E. Huntington acquired the property and proceeded to reconstruct the entire railway system.

In 1904 Mrs. Roberts and others of the general manager's office moved from the small frame building on Central Avenue to the Pacific Electric Building at Sixth and Main, which was completed that year.

H. G. Bonner, general manager of the Meridian Light & Railway Company, Meridian, Miss., will resign on July 1 to take charge of the Ohio Public Service Company, Alliance, Ohio. He will be succeeded at Meridian by W. R. Phipps. Mr. Bonner first became connected with the Doherty organization in 1913.

Obituary

Dr. Louis Bell

Dr. Louis Bell of Boston, well known consulting electrical engineer, died in West Newton, Mass., on June 14 at the age of fifty-nine years. One of his outstanding achievements was the design and installation of what is said to have been the first polyphase power plant in this country. This was at Taftville, Conn., about 1894. He organized the course of electrical engineering at Purdue University. Dr. Bell was editor of the *Electrical World* for two years from 1890 to 1892 and after he gave up active editorial work was a frequent contributor on technical subjects to the electrical press, including the ELECTRIC RAILWAY JOURNAL. For three years he was chief engineer of the electric power transmission department of the General Electric Company. He was a former president of the Illuminating Engineering Society, lectured at Harvard University and the Massachusetts Institute of Technology and was a member of the advisory committee of the Council of National Defense. He was the author of numerous books on electric lighting and power distribution.

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Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Linseed Oil Combination Dissolved

Competition Is Restrained by Subscription Agreement, According to Supreme Court Decision

"Open price" associations are unlawful when they restrain competition, according to a decision of the United States Supreme Court handed down June 4 in the case of the American Linseed Oil Company, et al., comprising twelve corporations, in six different States, which manufacture and distribute linseed oil cake and meal, and Julian Armstrong, who operates at Chicago under the name of Armstrong Bureau of Related Industries. The opinion said:

> This bureau conducts a so-called "exchange," through which one subscribing manufacturer may obtain detailed information concerning the affairs of others doing a like business. The defendant "crushers" constitute one of the groups who contract for this service. They manufacture and distribute throughout the Union a very large part of the linseed products consumed therein, and prior to the challenged combination were active, unrestrained competitors. Sometime in September or October, 1918, each of them entered into an identical written "subscription agreement" with the Armstrong bureau, and a year thereafter signed another, not essentially different.

The crushers secure from this bureau information relating to markets and other data and report to it all sales, quotations, offerings and other statistics. The obvious policy of this arrangement, according to the decision, was "to submerge the competition theretofore existing among the subscribers." Continuing, the decision said:

> The Sherman act was intended to secure equality of opportunity and to protect the public against evils commonly incident to monopolies and those abnormal contracts and combinations which tend directly to suppress the conflict for advantage called competition—the play of the contending forces ordinarily engendered by honest desire for gain.
>
> Certain it is that the defendants are associated in a new form of combination and are resorting to methods which are not normal. If, looking at the entire contract by which they are bound together, in the light of what has been done under it, the court can see that its necessary tendency is to suppress competition in trade between the States the combination must be declared unlawful. That such is its tendency, we think, must be affirmed."

Permanent Foreign Outlets Should Be Maintained

An old abuse, so costly in the past to American prestige abroad, according to the Department of Commerce, is again creeping into our export trade. Under the allurements of domestic boom conditions many manufacturers are showing increasing apathy to foreign contacts. The sound policy of definite allotments for export is being ignored in far too many cases. Unless this disloyalty to firmly established foreign contacts is promptly overcome, American commercial prestige and good will abroad are likely to suffer serious damage.

If the United States is to level out the valleys of periodic depression in the curve of its business cycles and is to keep its factories and farms steadily and fully occupied, the maintenance of permanent foreign outlets must be assured regardless of fluctuations in domestic market conditions. It does not improve the standing of America's business abroad to have the first sign of better domestic trade bring about the immediate abandonment of all interest in those foreign contacts which had been hailed with such joy and solicitous regard during the dark days of 1921.

Steady Trend Toward Electric Heating

Two important factors, characteristic of general conditions since the war, have strongly influenced the development of car heating. In the first place anthracite coal suitable for use in the ordinary coal stove has more than doubled in price. The cost of electric power, on the other hand, has increased very little, because greater efficiency in production has largely balanced higher fuel cost. For this reason the differential between the cost of heating by coal and heating by electricity is not so great at the present time as it used to be.

In the second place the wages of common labor have doubled or trebled in recent years, and this has greatly increased the cost of handling fuel and ashes at the car houses. Coal stoves require a good deal of attention, not only for operation, but also for upkeep, because grates, etc., at times have to be replaced, and at present wages such attention is a serious item of expense. With electric heat a very considerable saving can be made in labor costs.

The average length of time that a car is in operation each day has some bearing on the question. Where the period of daily service is short, electricity has the advantage because it produces adequate results with a minimum amount of manual labor, but where the period of daily service is long, this advantage is less because the labor cost becomes secondary to fuel cost.

Railway cars are particularly well adapted for the use of electric heat because many people are seated in a comparatively small space with a low roof overhead and the volume of air to be heated per passenger is smaller than in an ordinary room.

Manufacturers of electric heaters report a rapidly increasing demand for equipment of this type during the past year. This is the natural reflection of the changed conditions. Some very interesting development work in this field is also under way and with its completion the use of the "fireless heaters" is likely to be given further impetus. One manufacturer estimates that from 50 to 60 per cent of the electric railways in the country are now using electric car heating.

Railway Will Receive Energy from Electric Company

The Eastern Massachusetts Street Railway has entered into a contract with the Lynn Gas & Electric Company by which the railway will be supplied with all of the electrical energy required for the operation of its electric cars in its Lynn division, consisting of about 60 miles of track in Lynn, Saugus and Swampscott.

The light company expects to begin to supply electric power under the contract not later than Feb. 15, 1924. The power will be in the form of 13,200-volt a.c. current, transmitted through about 1 mile of duplicate underground cables to the new $125,000 substation of the railway company to be erected at the center of the d.c. distribution near the corner of Union and Washington Streets, in Lynn. The substation is to house three 1,500-kw. standard rotary convertible units and control equipment, with room for an additional 1,500-kw. unit.

A good deal of consideration was given to an automatic substation, but due to the fact that there was to be only one station in the division, consisting of about 24 square miles and a population of 118,000, it was deemed advisable to make the substation a manually operated one.

The automatic substation building will be a concrete brick and steel fireproof structure about 32 x 68 ft. long and 32 ft. in height, including the basement. The old power plant to be abandoned was built about thirty-two years ago.

Metal, Coal and Material Prices

Metals—New York	June 13
Copper, electrolytic, cents per lb.	15.125
Copper wire base, cents per lb.	18.00
Lead, cents per lb.	7.25
Zinc, cents per lb.	6.45
Tin, Straits, cents per lb.	42.00
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$6.125
Somerset mine run, Boston, net tons	2.875
Pittsburgh mine run, Pittsburgh, net tons	2.20
Franklin, Ill., screenings, Chicago, net tons	1.80
Central, Ill., screenings, Chicago, net tons	1.875
Kansas screenings, Kansas City, net tons	2.625
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.	$7.75
Weatherproof wire base, N. Y., cents per lb.	19.00
Cement, Chicago net prices, without bags	$2.20
Linseed oil (5-bbl. lots), N. Y., per gal.	$1.13
White lead, in oil (100-lb. keg), N. Y., cents per lb.	13.125
Turpentine, (bbl. lots), N. Y., per gal.	$1.06

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Rolling Stock

New Orleans Public Service, Inc., will shortly ask for bids for forty new cars, according to an announcement made by H. B. Flowers, president.

Montreal & Southern Counties Railway, Montreal, Que., expects to purchase one motor baggage car and two suburban passenger trailer cars.

Oklahoma Railway has purchased twenty one-man cars, which have been installed and placed in operation since Jan. 1 down to the present time.

Louisville Railway has ordered ten motor cars with a seating capacity of fifty passengers and thirty trailers. The new equipment, which will replace the rolling stock depleted as a result of serious carhouse fires, will cost $330,000. The cars have been purchased from the Kuhlman Car Company of Cleveland for Nov. 1.

Connecticut Company has purchased fifty cars from the Osgood-Bradley Car Company. The specifications of these cars are as follows:

Date order was placed	May 16, 1923
Date of delivery	Commencing August, 1923
Type of car	D.T. steel motor passenger; one-man, two-man type
Seating capacity	47
Total weight, approximately	30,000 lb.
Bolster centers	21 ft. 4½ in.
Length over all	44 ft.
Truck wheelbase	5 ft. 4 in.
Width over eaves	8 ft. 4½ in.
Height, rail to trolley base	10 ft. 8 in.
Body	Semi-steel
Interior trim	Cherry or natural birch
Headlining	Agasote or Nevasplit
Roof	Arch
Air brakes	Westinghouse
Axles	A. E. R. A. Standard
Armature bearings	Friction
Bumpers	Channel
Car signal system	Consolidated
Car trimmings	Bronze statuary finish
Center and side bearings	Bradley
Conduits and junction boxes	General Electric and Westinghouse
Control	General Electric and Westinghouse Type K
Couplers	Connecticut Company standard
Curtain fixtures	Curtain Supply Company
Curtain material	Pantasote
Destination signs	Hunter
Door operating mechanism	National Pneumatic
Fare boxes	Johnson
Wheelguards	H. B.
Gears and pinions	General Electric and Westinghouse
Hand brakes	Bradley
Heater equipment	Gold panel heaters
Headlights	Golden Glow
Journal bearings	Friction
Journal boxes	Symington
Lightning arresters	General Electric and Westinghouse
Motors:	
25 cars	4 General Electric 264
25 cars	4 Westinghouse 508
Inside hung.	
Paint and varnish:	
Exterior	Sherwin Williams
Interior	Castillian System
Registers	International
Sanders	Bradley
Sash fixtures	J. L. Howard Company
Seats	Bradley
Seating material	Rattan
Step treads	Mason safety
Trolley catchers	Ohio Brass
Trolley base	U. S. No. 13
Trolley wheels	5½ in.
Trucks	Osgood-Bradley—OBC 30-64
Ventilators	Bradley exhaust
Wheels	26 in. steel
Safety equipment	Safety Devices Company

Paris-Orleans Railway, Paris, has just placed an order for two electric locomotives with Brown-Boveri & Company, Ltd., of Baden, Switzerland. These two locomotives, which are for express passenger trains, will be run on the Paris-Vierzon section. Each locomotive is equipped with four motors and a type of drive after the new system of the Baden firm. The capacity of each locomotive is 4,000 hp., the maximum speed 130 km. per hour. The weight, only 116 tons, is relatively small. The length of the engines is nearly 18 meters. All the mechanical parts are supplied by the Winterthur Locomotive Works.

Track and Roadway

Hamilton (Ont.) Street Railway proposes to lay new tracks on Main Street from Ottawa Street. This project is estimated at $40,000.

Tri-City Railway, Davenport, Iowa, has begun relaying tracks on Brady Street, in Davenport. The estimated cost is $58,000.

Des Moines City Railway will spend approximately $460,000 in improvements this year. Of this amount $326,000 will be for track construction, $30,000 for construction equipment and $50,000 for substation equipment.

Portland Railway, Light & Power Company, Portland, Ore., has recently completed trolley line construction, including the laying of 122-lb. rails, on Hawthorne Avenue, at a cost of $40,000. Other improvements recently completed represent an expenditure of $10,000.

Los Angeles Railway has started the double-tracking of the "C" Line on Douglas Streets from Bellevue to the end of the line. This is one of the track construction jobs to be carried out in the extensive program for the improvement of service. Eight tracks in the new carhouse which is under construction at South Park will soon be available for the storage of cars.

Power Houses, Shops and Buildings

Milwaukee Electric Railway & Light Company will erect in Racine a modern steel and brick car house building, 80 ft. x 160 ft., to cost between $75,000 and $100,000.

Arkansas City - Winfield Northern Railway, Wichita, Kan., will discontinue its power plant now in use and will install an up-to-date substation. Power will be purchased from the Kansas Gas & Electric Company.

Niagara, St. Catharines & Toronto Railway, St. Catharines, Ont., will spend $300,000 for improvements on the building of a modern terminal, passenger station and freight building at St. Catharines.

Fort Dodge, Des Moines & Southern Railroad, Boone, Iowa, has ordered a new 10,000-kw. turbine and condenser. Improvements will be effected necessary to their installation for the generating station at Fraser, Iowa. The new equipment, which will cost $400,000, will be delivered about Jan. 1.

Trade Notes

General Electric Company, Schenectady, N. Y., has announced a number of important improvements in its P. C. multiple-unit control for train operation. The main air engine has been redesigned to include a spring which eliminates delay in passing from the "off" to the first position. After fitness tests, phosphor bronze stems and monel metal seats have been adopted to lengthen the life of magnet valve parts. Other improvements include a new type of control finger which cannot stub even if worn through at the line of contact. A new accelerating relay has also been designed with features including brush contact, a better and more accurate means of adjusting drop out point of series armature and a guard to prevent chance of affecting adjustment by careless handling.

Surplus Steel Exchange, Inc., New York, N. Y., has been formed for the purpose of presenting an outlet for surplus stock material. Surplus stocks of steel will be listed free of charge and stock lists mailed to users of similar material at frequent intervals. A commission will be charged only on sales actually made as the exchange does not propose to purchase material, but to act solely in the capacity of agent. It is known that very large quantities of steel at all times lie idle in the store rooms of manufacturers who for lack of organization or knowledge of possible buyers do not make any effort to reduce inventory, or make way for new material from the steel mills, and it is the expectation that this valuable service can be rendered at a moderate cost. The officers of the new company are Robert D. McCarter, president; George E. Dix, vice-president; William L. Cooper, treasurer, and Edward Michaud, secretary and general manager. The offices are at 7 Dey Street, New York City.

New Advertising Literature

General Electric Company, Schenectady, N. Y., has issued Bulletin No. 47,672, describing Type PB-53 and Type PB-54 control relays.

Pennsylvania Crusher Company, Philadelphia, Pa., has issued Bulletin 1005 illustrating and describing the complete line of heavy duty "Pennsylvania" Steelbuilt Hammer mills for cement rock and limestone. The pamphlet contains sixteen pages.

Combustion Engineering Corporation, New York, has published a pamphlet on Quinn pure oil burning equipment, with a list of some representative installations among industrial plants. Particulars are also given of the Quinn oil burner, a comparison on the operating and equipment costs of oil versus coal and articles on the design of furnaces for oil burning and the economy of oil as a fuel.

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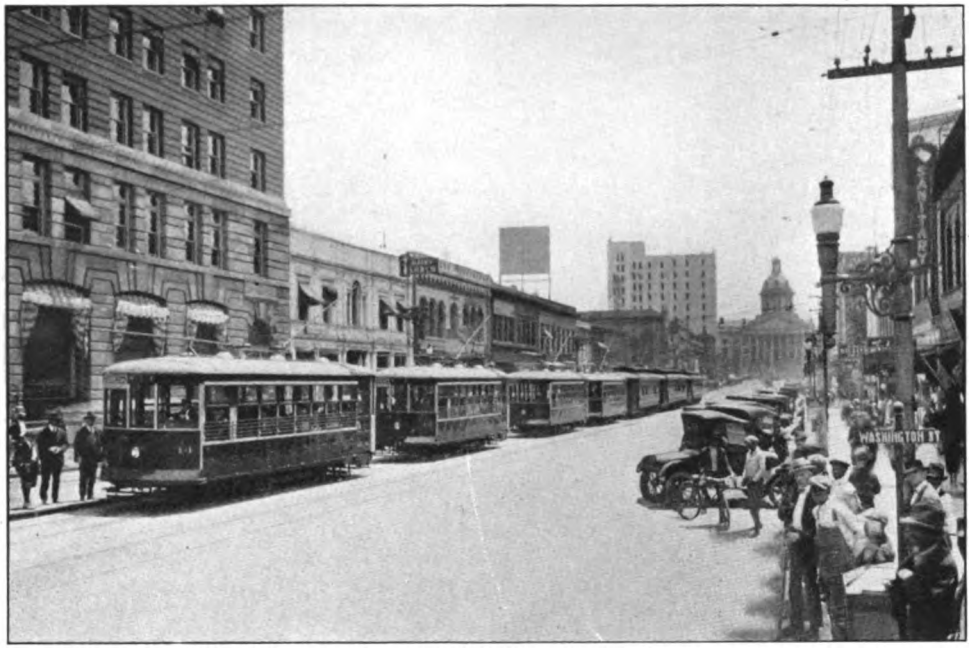
Another Safety Car Success



Birney Safety Cars make hit with public in Columbia, S. C.

A few weeks ago the Birney Safety Car was introduced for the first time to the public in Columbia, South Carolina, and four cars of this type, built in our Philadelphia Plant, are shown above making their initial bow.

Since that time the officials of the railway have received the most gratifying reports relative to their comfortable riding, splendid appearance and general all-round suitability to the service requirements of the South Carolina capital.

Again it has been demonstrated that the light-weight Birney Safety Car is still capable of improving service and, at the same time, reducing operating expenses just as it has done for over 200 other electric railways in the United States since its introduction almost seven years ago.

THE J. G. BRILL COMPANY
PHILADELPHIA, PA.
AMERICAN CAR CO. ST. LOUIS MO. — G. C. KUHLMAN CAR CO. CLEVELAND, OHIO. — WASON MANF'G CO. SPRINGFIELD, MASS.

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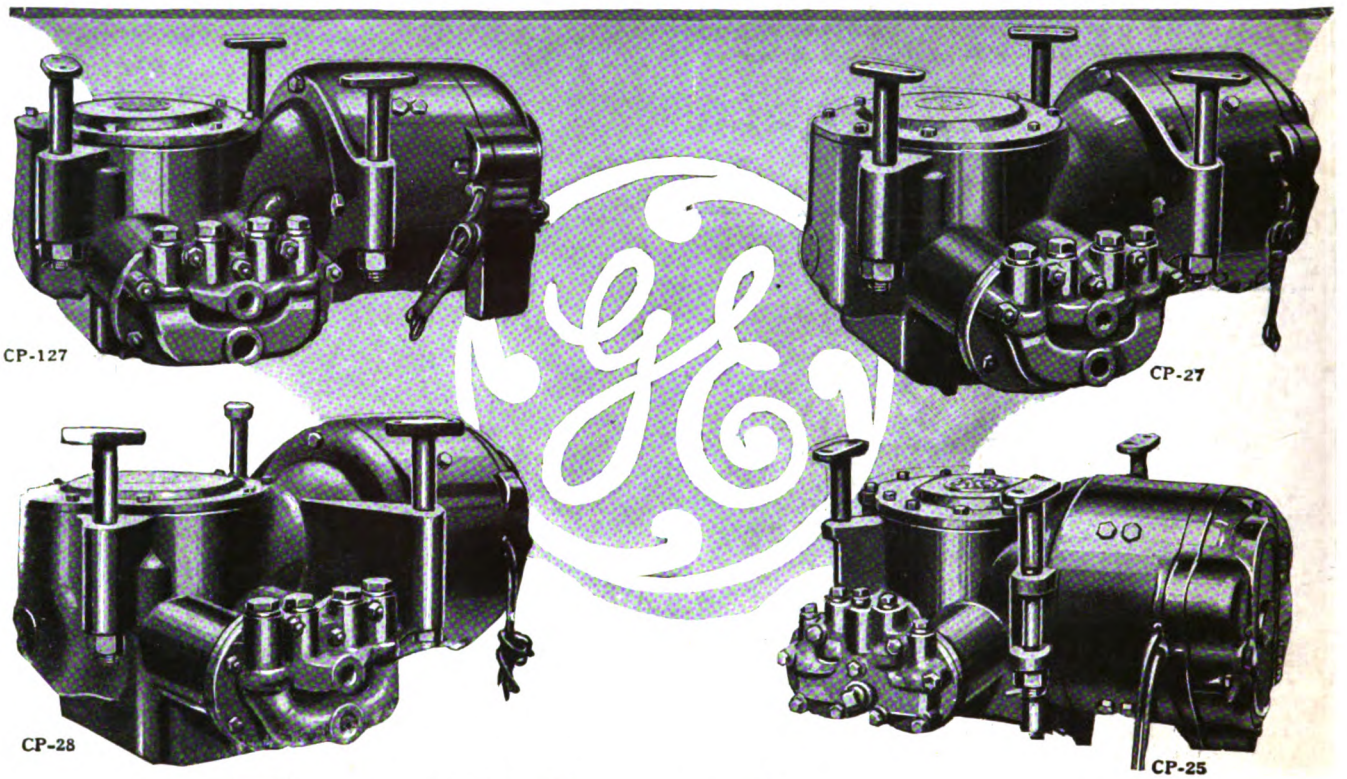
Type CP—the Low-Maintenance Compressor



These 19 Companies Wanted 1100 More

The best recommendation for any equipment is continued repeat orders. Low operating costs of CP center-gear type Air Compressors have resulted in recent repeat orders for 1133 equipments from the following companies:

	No. of cars	Type
Buffalo & Lake Erie Traction Co., Erie, Pa.	25	CP-25
Chicago Surface Lines, Chicago, Ill.	45	CP-27
Chicago Surface Lines, Chicago, Ill.	169	CP-127
City of Detroit, Detroit, Mich.	100	CP-27
City of Seattle, Seattle, Wash.	9	CP-27
Cleveland Railways, Cleveland, Ohio	100	CP-127
Conestoga Traction Co., Lancaster, Pa.	12	CP-27
Indiana Service Corp., Ft. Wayne	15	CP-27
Kentucky Traction & Terminal Co., Lexington	27	CP-25
Knoxville Power & Light Co., Knoxville, Tenn.	14	CP-25
Nashville Railway & Light Co., Nashville, Tenn.	12	CP-27
New Orleans Railway & Light Co., New Orleans, La.	100	CP-27
Oakwood Street Railway Co., Dayton, O.	12	CP-27
Philadelphia Rapid Transit Co., Philadelphia, Pa.	201	CP-27
Public Service Railway, Newark, N. J.	110	CP-27
Pennsylvania-Ohio Electric Co., Youngstown, O.	12	CP-27
San Francisco-Oakland Terminal Ry., Oakland, Cal.	55	CP-27
Terre Haute Traction & Light Co., Terre Haute, Ind.	10	CP-25
United Traction Company, Albany, N. Y.	55	CP-27
Virginia Railway & Power Company, Richmond.	50	CP-27

General Electric Company
Schenectady, N. Y.

GENERAL ELECTRIC

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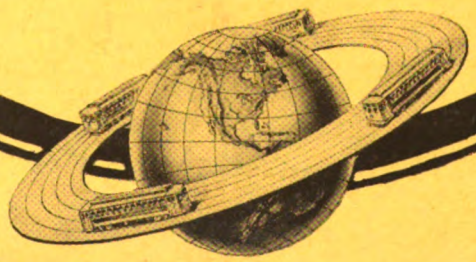
McGraw-Hill Co., Inc. June 23, 1923 Twenty Cents Per Copy

ELECTRIC RAILWAY JOURNAL

Choose well

By entrusting the disposal of your car card space to Barron G. Collier, Inc., you are assured that this earning asset of your company will receive the attention of a nation-wide organization and the benefit of the services of the most competent men operating in this specialized field of advertising—qualifications which are essential to a successful use of the space.

Barron G. Collier, Inc.
Candler Building, New York



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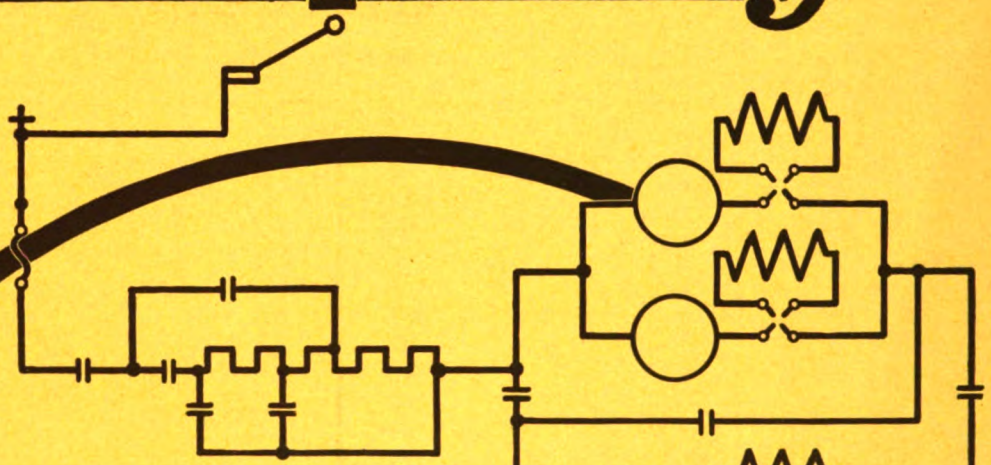
Simplicity



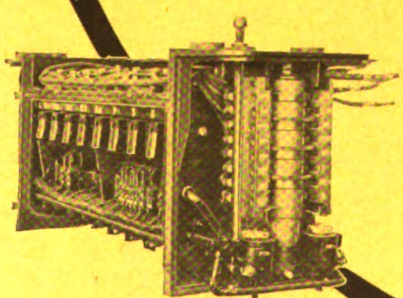
HL Control

The Recognized Standard for Fifteen Years

During this period it has rendered a real service to the Electric Railway Industry.

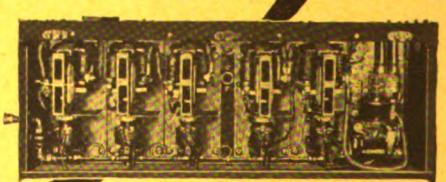
Years of successful operation on more than 250 properties are a measure of its superiority.

Westinghouse Electric & Manufacturing Co.
East Pittsburgh, Pa.



No. 480 Group

WESTINGHOUSE ELECTRIC



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MEMBER AMERICAN ELECTRIC RAILWAY ASSOCIATION AERA

Westinghouse

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New York, Saturday, June 23, 1923

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Company, Inc.

HENRY W. BLAKE and HARRY L. BROWN, *Editors*

Volume 61
Number 25

Maintenance of Men as Well as Maintenance of Plant to Be Considered

PROBLEMS of maintenance usually are confined to the material features of the railway's equipment; but another element that merits careful consideration was again brought to the attention of the industry in the address of Dr. Alden Coffey before the street and interurban section of the Southwestern Public Service Association, abstracted in this week's issue.

Good maintenance, and in fact good work in any department, requires good health of the individual. It is entirely a personal problem, and each case must be handled on its own merits. The best way to have good health is to educate the employee to pay personal attention to it. But a railway needs to start right by employing only those men who can pass a suitable physical examination. Then periodic examinations will reveal any changes for better or worse in the well-being of each employee.

The writer points out that conservation of health should apply not only to the workman, but to all in the employ of the company from the top down. The value of this is obvious, since a man cannot give the best attention to the problems at hand if he is sick. He is more likely to be hard to do business with, and this reacts on those who must work with him.

Numerous direct financial savings are cited in favor of the plan, such as reduced turnover of labor, since those who are hired have a greater chance of remaining at work. These results also reduced compensation for accidents. Incidental advantages come in better relations between motormen and conductors and the public. When it is remembered that the trainmen are the company's principal salesmen, the importance of having them present the best appearance and greatest show of cheerfulness is evident.

Stored Cars Constitute Large Fire Hazard

THE greatest fire risk on an electric railway, because representing the greatest aggregation in inflammable material, is usually the carhouse. Several times a year it is demonstrated that a carhouse full of rolling stock furnishes ideal conditions for a conflagration that quickly gets beyond control and consequently wipes out the structure and reduces the contents to a tangled mass of scrap. Many steel cars include considerable inflammable material in their construction. Hence even though isolated, each car itself is a considerable fire hazard. But when a large number of cars are within an inclosure, which confines the flames, and close to other inflammable material, such as wood, oil, paint and waste, a condition is produced which is extremely favorable to the rapid spreading of a fire.

Unfortunately also there are conditions in and around carhouses and shops such as bare 600-volt conductors that are favorable to the starting of fires. These facts are not mentioned because they are new. But, as a recent article in this paper showed that a number of companies are favoring inside over outside storage for cars, the matter of carhouse fire risk remains a live topic. Though probably more progress has been made in intelligent protection against the fire hazard during the past five years than during any previous decade, more remains to be done.

One of the most disastrous carhouse fires within the last two years was that of the Devon carhouse of the Chicago Surface Lines on Jan. 26, 1922. This case illustrates how rapidly such a fire spreads and how complete is the destruction. Ninety cars were destroyed in this fire, which wiped out one-half of the structure. Although the Devon carhouse fire was spectacular because of the large number of cars lost, it is but one example of many that might be cited to show how rapid is the spread of fire in the average carhouse, which is often the case in spite of what is usually considered adequate fire protection.

Besides the monetary loss from the destruction of cars, which may be covered by insurance, there is another loss which may be nearly as large as the value of the car, but is usually not considered a subject for insurance. This is the loss in revenue because of the lack of cars until those burned have been replaced. This emphasizes the need for the adoption of all practicable safeguards against the fire loss of any considerable number of cars.

Customer Ownership Is an Excellent Means of Improving Public Relations

WE ALL want good service, and most of us are willing to pay what we think a fair price for it; but how many of us know what some of the seemingly minor demands made of the utilities mean in the matter of expense? So long as the other fellow has to foot the bills we do not care, provided the service continues as we normally expect it to. The only time it is realized that there is something wrong is when the service deteriorates and the utility asks for more revenue in order to put the quality back where it should be. Even then the usual thought is that the corporation can find the money somewhere or else cut off some of the always "excessive dividends."

Several speakers at the recent convention of the National Electric Light Association emphasized the value of customer ownership in developing better public relations. The problems involved in providing satisfactory utility service, while at the same time earning a reasonable return on the investment, are then brought home to the customers.

Make the customer an owner of the property, keep him informed constantly through financial statements and other timely material addressed to him as a stock-

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holder, and then let him know that the attacks made by demagogues are attacks against *his* business, and are likely to jeopardize *his* investment, and there will not be so much enthusiasm for the corporation baiter, whether it be politician or newspaper.

One phase of the matter must not be overlooked, however. The customer will not stand for poor service just because he may be a stockholder. It is not likely to be a major investment with him, and when the poor service becomes apparent he forgets his partnership and complains as any ordinary customer. Of course, no management should be misled into thinking that poor service ever pays, whether or not the customers participate in the profits. However, it is important to keep quality of service close in mind, for a few instances of notably poor service may undo much of the work of a long and carefully-planned ownership campaign. In other words, make the service such that the partners can be proud of their interest in the enterprise, not ashamed of it, among the circle of friends in which they are going to take the part of the utility.

Furthermore, customer ownership challenges utility executives to be very conservative in the extent of their financing, lest over-capitalization result in failure to earn dividends and the reverse of the expected advantage from customer ownership.

Benefits of Surface Car Subways Not All for Electric Railways

RECENTLY there was a discussion in this column on the cost of subway construction for surface cars, in which it was pointed out that surface car subways are not an economic advantage to the electric railways using them. What, then, is the argument in favor of this form of construction? Repeatedly it has been urged that the street cars should be taken off the streets to reduce traffic congestion, as though the street cars are the primary cause of the congestion.

While street cars, or any other vehicles in the streets, are a cause of congestion, they do not compare with some other users of the streets. Daniel L. Turner, in his report to the New York Transit Commission abstracted in this paper on June 9, states that touring cars take up in our congested streets nine to thirteen times as much space per passenger carried as the most economical street car. Taxicabs, he says, are still worse. His conclusion is that it is such extravagant users of the streets that cause the difficult traffic conditions.

If the street cars are taken off the streets, instead of providing a true relief of congestion, the result is to give up more space to the less efficient passenger vehicles. The street car rider, who, by virtue of his number, has the logical right to the street space, is inconvenienced by having to walk, sometimes several blocks, to a subway station in order to get his car. If he has been accustomed to take a short ride in the district where the cars have been put underground, the chances are that he will walk the entire distance rather than go to the trouble of walking a good share of the way to a station and then climbing down and up stairs in the bargain.

In return for this inconvenience to the greatest users of the streets, they have the privilege of paying more for their car rides, either in increased fares or increased taxes, while the beneficiaries frequently demand, and sometimes get, added free garage facilities in the form of additional parking space on portions of the streets vacated by the railway.

It is about time for the public to wake up to this condition. It is no more logical to put the street cars off the streets than to do the same thing with automobiles and taxicabs. One main reason that subways are proposed for the railway rather than for these other vehicles, is that with the latter there is no convenient corporation that can be made the collector of the tax on the public necessary to finance the proposition.

Why not put the matter before the public in this light and then see if the citizens will be so enthusiastic about a public improvement of this character? It is another matter of education.

Is Enough Thought Given to the Comfort of Passengers?

WHEN street railways were younger and were fighting actively to obtain business a great deal of attention was paid to the little details that distinguish comfort from purely utilitarian purposes. As the demand for local transportation became better established passengers came naturally to the street cars and less attention was paid to methods of inducing people to ride.

When the era of increasing costs arrived many managers considered it advisable, among other economies, to eliminate certain refinements which made for comfort. Cane seats replaced the earlier upholstered seats, and finally in some instances these gave way to wooden slat seats. The spacing between seats has often been reduced so as to take care of more passengers, but the knee room has become uncomfortably small for tall persons. On some roads the once familiar cross seats gave way to the longitudinal type, despite the very clear public disapproval of side seats, for the reason that the railway man saw in this change a means to give the same seating capacity while permitting of a greater standing load in addition. The old-fashioned open car, although an accident breeder and requiring duplicate equipment, was liked by the public on account of the view obtained and the fresh air. This, too, is passing away, no new orders for this type having been placed for several years.

Changes such as these have followed one after another, until in many cities, even apart from the influence of the automobile on the kind of transportation comfort demanded, it scarcely can be said that riding in the street cars is a diversion to be indulged in for the pleasure of it.

In contrast to this, it is interesting to note that recently the London Underground system has been making experiments with various types of car, whose major differences appear to the public to be in the interior decoration and in the quietness. Another indication of the same thought is the use of plush-covered seats in safety cars of the North Shore Line used in Milwaukee. These innovations are made primarily to attract business.

If cars equipped with features of this sort for comfort of the passengers perform in other respects as well as the cars not so arranged, there can be no question but that additional traffic can be attracted. Whether the amount of this business is sufficient to justify the increased expense of maintenance is another matter. These two companies, at least, think the idea is well worth trying.

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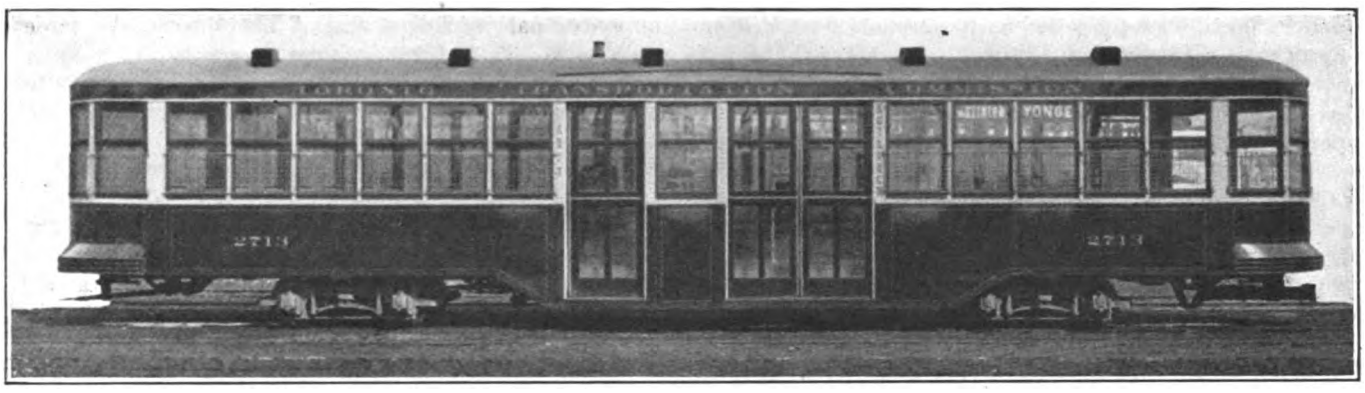


The Three-Door Arrangement Speeds Up Movement of Passengers

Three-Door Trailers in Toronto

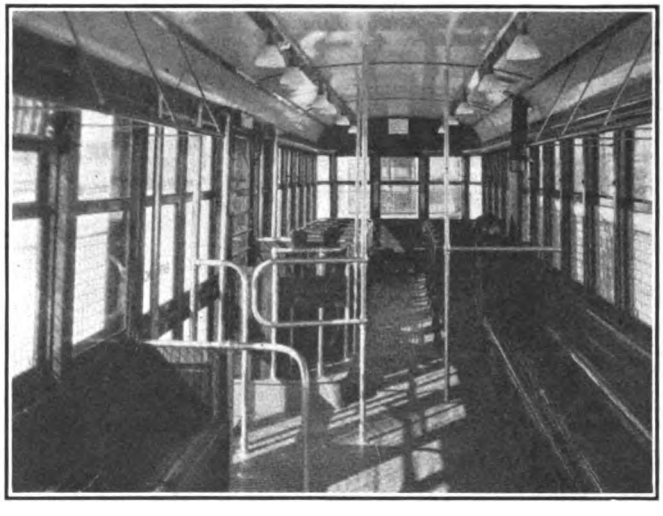
Operated on the Pay-as-You-Pass Plan and Have Three Doors, of Which One Can Be Changed by the Conductor from Entrance to Exit—Run in Conjunction with Peter Witt Motor Cars—A Fast Schedule Is Made

THE traffic on Yonge Street, Toronto, and on some other streets in that city is very heavy during rush hours, so much so that trailers are used, attached to the Peter Witt motor cars during the busy morning and evening hours. Since it took over the street railway system in September, 1921, the city has added 450 cars to its rolling stock equipment. In 1921-22 it purchased 190 motor cars and 60 trailers and in 1922-23 100 motor cars and 100 trailers were added.

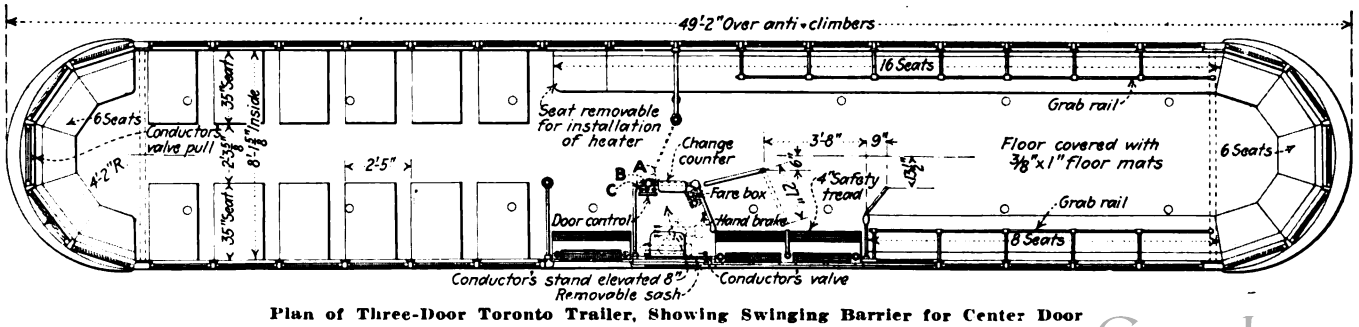
All of the trail cars are center-entrance, but in the last 100 trailers added there are three side doors instead of two, to increase their loading and unloading capacities. With the wide doors of the Peter Witt motor cars it is possible for two streams of passengers to enter and two to leave the car at the same time, and as motor car and trail car have equal carrying capacity it was found desirable to have the entrance and exit capacities of the trailer the same as those of the motor car to prevent a slowing up of running time.

This is accomplished by the three-door arrangement. In this arrangement the door to the rear in the trailer is always used as an exit, while the door nearest to the front is always an entrance. The center door, on the right of the conductor's stand, may be used either as an entrance or as an exit, but not as both at the same time. It is changed from one to the other by the conductor, who alters the position of a movable barrier as the character of the traffic demands.

When the trailer is inbound during the morning rush period the two front doors are used as an entrance and accommodate two streams of passengers, the barrier being set so that passengers turn slightly to the right as they enter at either door. When the trailer reaches the central or unloading zone on its in-bound trip the barrier is altered so that passengers from the forward, or unpaid section of the car, may deposit their fare and leave at the door to the conductor's right without conflicting or causing aisle interference with the passengers leaving from the paid, or rear, section of the car, who use the door to the conductor's left. The movable barrier is operated by a lever at the con-



Center Well, Stanchions and Swinging Barrier, Grab Rail Over Longitudinal Seats, and Slat Seats



Plan of Three-Door Toronto Trailer, Showing Swinging Barrier for Center Door

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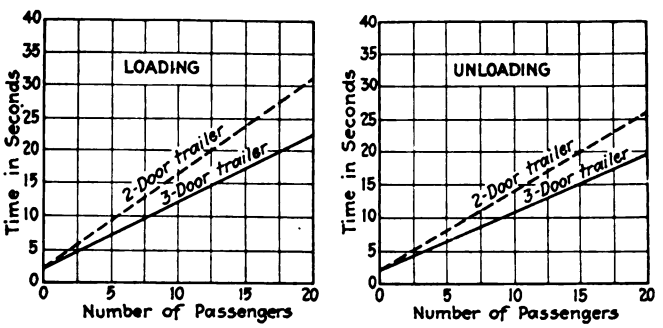
ductor's left. The doors are each equipped with a door engine, and the valves controlling the engines are located in the conductor's stand. The three valve handles are placed so that it is as convenient for the conductor to operate one or three, or any two of them, as conditions warrant.

The trailer doors are interlocked with the motor car control, and a light is being installed at the conductor's stand, which will burn when the entrance doors of the motor car are open. It is considered that this signal will assist in speeding up the service.

Since the fall of 1921, the Toronto Transportation Commission has operated sixty trailers which have a single entrance door to the conductor's right and a single exit door to the conductor's left. The first of the 100 new three-door trailers went into service on Feb. 26, 1923, and all are now in operation.

Two charts are published on this page, one showing loading time and the other showing unloading time for the two types of trailers. These charts are based



The Charts Show the Reduction of Time in Loading and Unloading for the Three-Door Trailer

on about 600 observations with each type of trailer, but the data were produced after the three-door type had been in operation only a short time. It is expected that the new equipment will show still further savings in loading and unloading time as passengers and conductors familiarize themselves with it.

The cars are not supplied with hand straps, but the end of the car with longitudinal seats has a grab rail on each side, as shown in the accompanying plan. This grab rail is at the height of the usual strap handle, or about 5 ft. 10 in. The upper window sash in this car is deeper than usual to permit a good view outside to standing passengers. Specifications giving other details of the cars follow:

GENERAL DIMENSIONS OF TRAILERS

Length over vestibule	48 ft.
Length over bumpers	49 ft. 2 in.
Width over side sill angles	8 ft. 4 in.
Width over lower deck eaves	8 ft. 6 in.
Width inside of side lining	8 ft. 1⅛ in.
Width between stanchions, exit doors	2 ft. 6 in.
Double doors	5 ft.
Height from rail to top of roof	10 ft. 4⅛ in.
Height from rail to top of ventilator	10 ft. 4⅛ in.
Height from top of rail to top of floor	2 ft. 4 in.
Center to center of truck	26 ft.
Center to center of side posts	2 ft. 5 in.
Height from top of rail to underside of side sill at sliding doors	10 in.
Step heights	14⅛ in. and 13⅛ in.
Diameter of wheels	22 in.
Weight	26,300 lb.
Seating capacity	60

DETAILS OF CONSTRUCTION

The side sills are of angle iron construction and the center sills extend from bumper to bumper. The underframe is reinforced by diagonal bracings, which are connected to the center sills, side sills and other members. Posts and carlins are of T sections. The side girder plates are ⅜ in. thick, American open hearth cold rolled and box annealed steel. The letterboard plates are No. 16 gage and the dash panels are No. 13 gage.

For the roof construction white ash carlins are bolted to the steel carlins and are also used midway between the steel carlins. The roof boards are of ⅛-in. poplar, 2¼-in. face tongued and grooved, except the hood roof, which is double sheathing ⅜ in. thick. The roof is covered with No. 8 cotton duck and No. 22 gage copper gutters are used over the doors.

The main body floor is double thickness with three-ply waterproof paper laid between the two layers of flooring. The lower floor is laid diagonally and is ⅞ in. thick by 2½-in. face red pine. The upper floor is ⅝ in. thick by 2½-in. face hard maple except at the mat strips, where the floor is ⅞ in. thick and of hard maple. All flooring is tongued and grooved. In the aisles and standing spaces ⅜-in. x 1-in. hard maple mat strips are used. These are spaced ½ in. apart and are ⅛ in. high.

The interior of the car is finished in clear birch, all molding being of the plain sanitary type. The headlining is regular quality ⅛-in. Agasote. The forward part of the car has longitudinal sanitary slat seats and the rear part of the car has cross seats, also of slat construction. The cross seats are equipped with Ottawa Car Manufacturing Company's pressed steel pedestals, with hinged cushions and wooden hand rail on the top of the back. The cross-seats are bolted to pressed steel brackets, which are riveted to the side plate girder. All stanchions and rails are of hard drawn aluminum, which contains 1½ per cent manganese. Window guards are attached to the side posts and are made of Clinton electrically welded 2-in. square mesh with ¼-in iron pipe frames.

The trucks have a 4-ft. 2-in. wheelbase and 22-in. diameter single plate chilled cast iron wheels with 2½-in. tread. The journal bearings are 3¼ in. x 7 in. and A.E.R.A. standard E-4 axles are used. The trucks have annealed cast steel side frames and are equipped with roller bearings. The miscellaneous equipment includes:

Air brakes: Canadian General Electric Company's automatic air brakes with conductor's emergency valve handles located at conductor's stand and at rear of trailer.	
Hand brakes	Peacock
Couplers	Tomlinson
Door and step mechanism	Consolidated Car Heating
Buzzers	Consolidated
Signals	Consolidated
Tail lights	Nichols-Lintern
Shades	None
Signs	Hunter
Lighting: Fifteen 46-watt lamps in Safety Car Heating & Lighting Company's fixtures, with Jefferson Glass Company's shades.	
Ventilators	Nichols-Lintern
Heaters	Peter Smith No. 2P
Enamel	Pratt & Lambert

Heaters for Drying Out Generators

THE MOIST climate of Havana requires special precautions in the use of electrical apparatus which has been left idle for any considerable time. In fact, the average humidity is so high that if a generator in the station should not be run for a week or more it is often necessary to give it a drying out run before it is fit to carry full voltage. Various ways of protecting the generators in the power station of the Havana Electric Railway against moisture were tried without much success until electric heaters were installed, just below the stator core. These heaters are run all the time that the generator is idle and keep the temperature of the winding well above that of the air. All of the generators in the power station of the company are now so equipped.

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Co-ordinated Operation of Street Cars and Buses Urged

A Statistical Picture of How the Public Travels—1,623 Passenger-Miles per Capita in 1922 in All Conveyances—Street Railway Development Has Lagged—Opportunity Still Waits to Provide Monopoly Service

By George H. Davis
Ford, Bacon & Davis, Inc., New York, N. Y.

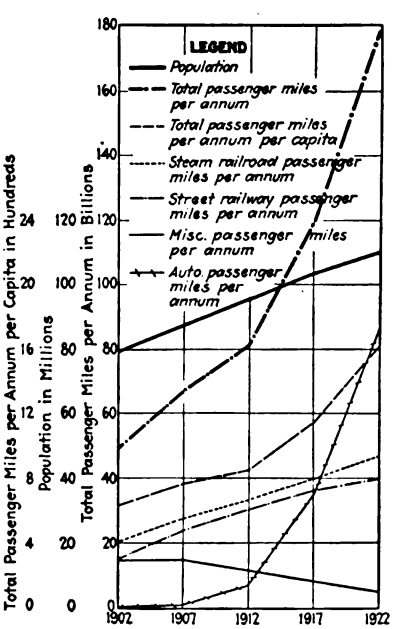
POSSIBLY there have been fewer advances in the business of city street railway passenger transportation during the past twenty years than in almost any of our other basic modern industries. While it was hardly to be expected that the rate of progress of the decade from 1890 to 1900 could be maintained, yet during the last ten years, at least, the industry has permitted other types of transportation to make marked inroads upon its business. That there have been real obstacles to progress in the electric railway industry all will admit, but a comparison of the type of electric street cars in use in 1902, which was the product of more than ten years of development, with that in use today, and of the passenger automobiles in use on those respective dates, is significant.

We are inveterate travelers. In fact, we almost live in conveyances. This is confirmed by a study of transportation records, largely obtained from government sources, which give the surprising information that the passenger-miles traveled per capita per annum by the population of the continental United States in all conveyances, including steam railroads, street railways, automobiles and miscellaneous conveyances, were approximately as follows: For 1902, 620; for 1907, 766; for 1912, 851; for 1917, 1,149, and for 1922 as much as 1,623. It will be noted in Tables I and II and in the diagram that the increase in total miles per capita in the period 1902-1907 is 24 per cent; 1907-1912, 11 per cent; 1912-1917, 35 per cent; 1917-1922, 41 per cent, and for the entire period 1902-1922, 162 per cent.

For street railways, the increase in passenger-miles per capita in the period 1902-1907 is 48 per cent; 1907-1912, 16 per cent; 1912-1917, 11 per cent; 1917-1922, 4 per cent, and over the twenty-year period it has been 98 per cent, while for their principal competitor, the passenger automobile, this increase has been from 1902-1907, 267 per cent; 1907-1912, 573 per cent; 1912-1917, 357 per cent; 1917-1922, 133 per cent, and for the twenty-year period the extraordinary amount represented by 26,100 per cent.

The transportation industry as a whole, over the period in question, has been aggressively and profitably conducted. The departments of transportation, however, that relatively have lagged behind in rate of increase have been the steam railroads, the street railways and animal power conveyances.

The enormous potential profit in the means and use of transportation has been thoroughly realized by the manufacturers of passenger automobiles, and as a whole the automotive industry has catered most completely to the pleasure and convenience of the traveling public. The volume of this business indicates its importance. The wholesale value of passenger automobiles and parts manufactured in the United States in 1921 was about $1,666,140,189. It is now probably the second industry in the country in value of products. Slaughtering is the first industry, its products amounting to $2,200,942,000.



Graphic Statistics of Passenger Travel in the United States

The present financial condition of the street railway industry is due largely to the lack of progress on the part of the companies in that they did not provide the kind of service demanded by the public, especially in the way of quiet, safe, convenient, flexible, comfortable and rapid transportation. In making this statement I am not unmindful of the vicissitudes through which the industry has passed during the past ten years. But

TABLE I—POPULATION AND PASSENGER-MILES PER ANNUM AND PER CAPITA, CONTINENTAL UNITED STATES—ALL CONVEYANCES

Year	Population Continental United States	Passenger-Miles: Steam Railroads	Street Railways	Passenger Automobiles	Miscellaneous	Total	Per Capita
1902	79,000,000	20,000,000,000	14,580,000,000	201,000,000	14,200,000,000	48,981,000,000	620
1907	87,320,000	27,719,000,000	23,800,000,000	995,000 000	14,400,000,000	66,914,000,000	766
1912	95,410,000	33,132,000,000	30,040,000,000	7,070,000,000	11,000,000,000	81,242,000,000	851
1917	103,500,000	39,740,000,000	36,200,000,000	35,000,000,000	8,000,000,000	118,940,000,000	1,149
1922	110,000,000	47,000,000,000	40,000,000,000	86,500,000,000	5,000,000,000	178,500,000,000	1,623

Note: The amounts in the various columns are based upon United States Census reports of 1902, 1907, 1912, 1917, various Interstate Commerce Commission reports, various reports by the National Automobile Chamber of Commerce, miscellaneous sources, and estimates. The passenger-miles for the street railways were calculated on the basis of an average ride per passenger of 2½ miles, and for the automobiles on the basis of 1.75 passengers per automobile-mile and 4,000 miles per automobile per year. These figures have been checked in various ways and are believed to be reasonably close to the actual values.

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TABLE II—PASSENGER-MILES PER CAPITA PER ANNUM AND RATES OF INCREASE, CONTINENTAL UNITED STATES—ALL CONVEYANCES

Year	Steam Railroad	Percentage Increase Five Years	Street Railways	Percentage Increase Five Years	Passenger Automobiles	Percentage Increase Five Years	Miscellaneous	Percentage Increase Five Years	Total	Percentage Increase Five Years
1902	253	..	184	..	3	..	180	..	620	..
1907	318	26	272	48	11	267	165	—8	766	24
1912	347	9	315	16	74	573	115	—30	851	11
1917	384	11	350	11	338	357	77	—33	1,149	35
1922	427	11	364	4	786	133	46	—40	1,623	41
Period			Percentage Increase by Decades and for Twenty-Year Period							
1912–1902	37	..	71	..	2,367	...	—36	....	37	..
1922–1912	23	..	16	..	962	...	—60	....	91	..
1922–1902	69	..	98	..	26,100	...	—74	....	162	..

Note: The basis for the figures in this table is given in the note under Table I.

the popularity, in our largest cities, of motor buses which have comfortable seats and de luxe furnishings and make convenient delivery shows that people are willing to pay for this kind of service. They have without doubt come to stay.

ADVANTAGES AND POSSIBILITIES OF ELECTRIC RAILWAYS

The distinct operating advantages of street railways are:

1. A steel roadway, which is far superior in smoothness and durability to any other road surface ever devised.
2. Practicable express train, high-speed operation, with few, long-spaced stops, through effective traffic regulation in congested areas, and
3. Relatively low operating costs with high density.

Street railways may largely retrieve their former financial status by:

1. The inauguration of a supplemental local bus operation, co-ordinated with the operation of the various lines of an express service.
2. The remodeling or supplementing of their roadways and equipment for express service.
3. The development of public sentiment in cities so that vehicular traffic on street railway tracks will be lessened and limited through effective traffic regulations, particularly in congested areas, enabling reasonably high speeds by the street railway cars for the proper accommodation of the public.
4. The reorganization of their plans of operation.

This combination may save the situation for both types of service, which are at present, under independent operation, often failing to earn a reasonable return on the respective investments.

PLAN AND FEATURES OF COMBINED OPERATION

Street railways generally occupy the middle of the street, while vehicle traffic occupies the entire roadway up to the curbs. In a combined street railway and bus operation, safety island stations might be established at distances ranging from six to eight blocks apart for the use of a railway express service, analogous to that of the subways of various cities, while the buses would furnish the local service, stopping for passengers at the curb at all street crossings. A transfer between bus and car would give passengers the advantages of both.

The public generally accepts the street railway as a public necessity and realizes that it can prosper and render adequate service only with a sufficient fare rate. The response which the public has made to recent fare increases on the street railway and the charges of the bus lines confirm this view. Through joint ownership and operation of the street railways and bus lines, with a scale of charges in accord with the service rendered, increased revenues to the street railways should be possible.

A transportation company should furnish all the types of service the public needs. There is at present a distinct place in street transportation for both the street car and the motor bus.

Street railway companies should follow the practice of industrials and maintain development departments so that the requirements of those served will be anticipated and satisfied. This policy means the discontinuance of the use of antiquated equipment and plans of operation, and the substitution of such facilities as will enable the companies fully to meet the public's natural and stimulated demands.

The time is ripe for a long step forward in diversified means of street transportation. The twenty-year period in which the industry has gained but slowly should be followed by a period of greatly increased earnings. In general, the companies already have the organization and often the franchises for conducting such supplementary bus service as may be required. They should now give the question of street transportation by all the various means a broad, exhaustive study, covering especially the necessities, pleasures, sentiments and practices of people desiring transportation. Such a study should include:

1. A review of types and modifications of street cars and street car service, and the manufacture of street railway equipment.
2. A thorough understanding of motor bus design, construction and manufacture, and the uses and possibilities of buses for co-ordinated or supplemental service in street transportation.

It is reported that at least 7,500 automotive engineers and designers are now constantly engaged in the development and manufacture of various types of autos, and that more than 100 individual companies are manufacturing motor vehicles, while the number of designers of street cars and street railway construction and equipment is limited to not more than one-tenth of this force. The number of street cars manufactured and put into service each year is almost insignificant compared with the number of automobiles manufactured yearly.

The original purpose of the organization of street railway companies was not to engage in a part only of the street transportation business but to carry practically all passengers seeking public conveyances. They should now, through new and old means of street transportation, regain their former position.

The present year marks the fortieth anniversary of the opening of the first hydro-electric tramway in the world. According to the London *Engineer* this was at the Giant's Causeway in 1883 by Earl Spencer, then Lord Lieutenant of Ireland. Credit for this venture must be given William A. Traill, the originator, and also the engineer and constructor of this line, which was 8 miles long with heavy gradients. Power was obtained from a waterfall on the River Bush. Originally current was collected from a side conductor or third rail, later replaced by an overhead trolley.

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Subway Construction Costs Have Increased

Expense Has Been as High as $2,500,000 a Mile in Lower Manhattan—Present Costs Probably Double Those Prior to War

SOME interesting figures on the cost of rapid transit construction in New York and other features of that city's subway and elevated systems were given in a talk before the Providence Engineering Society, Providence, R. I., on May 15, by Robert Ridgway, chief engineer Transit Commission, State of New York. Referring to the construction cost of the existing subways in New York, Mr. Ridgway said that it varied from $700,000 per track-mile in an outlying portion of Brooklyn to $2,500,000 per track-mile in a very congested section of lower New York. This cost included track, stations, maintenance and underpinning of abutting buildings, and maintenance and restoration of surface, subsurface and overhead structures, but did not include the installation of third rail, signals, light and other railroad equipment. At pre-war prices the cost of a steel elevated railroad, also including track, stations and other appurtenant work, ranged from $235,000 to $275,000 per track-mile, depending on whether a three-track or a two-track structure was built. Under present market conditions, the speaker thought these costs would probably be doubled.

He declared that there are but few cities in the world where a direct profit can be expected from the investment necessary to construct and equip an extensive system of subways. It requires many huge office and commercial buildings, large and intensively patronized shopping and amusement districts, and the concentration of a population in many large apartment house districts.

The adoption in New York of the shallow type of subway instead of the deep subway, like those in London, has been justified, in the speaker's opinion, by experience, but the art of subway construction has advanced since 1900, and experience has shown the necessity of longer stations, provisions for ventilation, emergency exits between stations and other improvements. New York is believed to be the only city in the world that operates both express and local service in subways. The subways in other cities generally contain only two tracks. Excluding the privately-owned rapid transit lines constructed prior to 1913, but including the city-owned subways and extensions built prior to that date, there has been expended for construction of the dual rapid transit system in New York City nearly $400,000,000. This is in addition to about $190,000,000 which has been expended by the companies in equipping all of the new lines and in improving their old lines. New York has been called a subway city, and rightly so, because it has more miles of rapid transit subway than all of the other cities of the world combined.

Much of the rapid transit system in New York in the outlying sections is elevated, and elevated lines are still to be considered for use in such sections because their cost per mile is but one-fourth or one-fifth that of subways of the same track capacity. In such locations something can be done to make the appearance of the structure less objectionable. For example, at stations at parkway crossings in New York the steel members have been incased in concrete, the surfaces of which are tooled and decorated with colored tile with pleasing results. On a boulevard 200 ft. wide, in the Borough of Queens, a reinforced concrete viaduct was substituted for the standard steel structure, and its surfaces were also treated in the manner described. While such a massive structure is in keeping with its setting in that location, it would be out of place in the ordinary city street because it would cut off light, and its columns would offer greater obstructions to traffic than do steel columns.

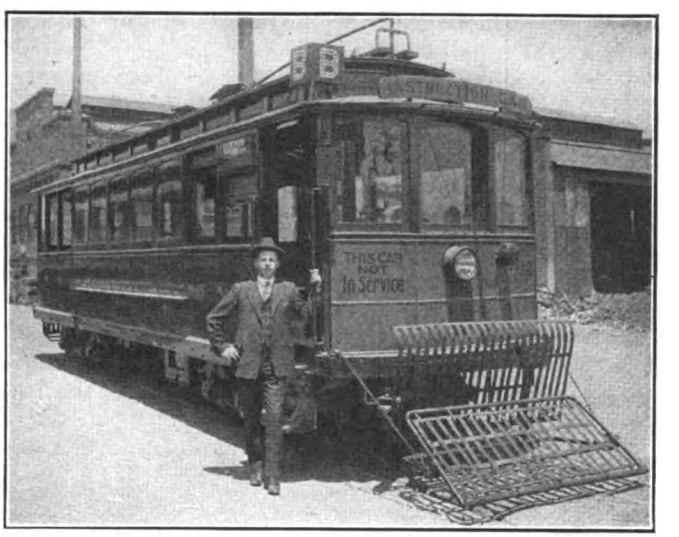
The open-cut method of construction for rapid transit lines is also worthy of consideration where property values are low enough to permit the taking of private rights-of-way for this purpose. Some of the old steam rights-of-way controlled by the Brooklyn Rapid Transit Company have been improved by depressing the tracks in this manner.

Working Off the Rough Edge on Prospective Motormen

BY J. G. JEFFERY
Director of Pubic Relations Los Angles Railway

THE Los Angeles Railway, Los Angeles, Calif., has equipped a special car known as the "rough edge" car for instruction purposes. When a new man is accepted for service as a motorman, he is given only a short talk on the fundamentals of his job before he is put on a car, but it is the "rough edge" car and not a passenger car to which he is assigned.

The "rough edge" car is built practically the same as



Los Angeles Test Car Used to Work Off the Rough Edges of New Motormen

a passenger car except that the seats in the open end sections are placed longitudinally, as this gives more space for student trainmen to observe the work of the men at the controller than if cross-seats like those on regular passenger cars were used. The step at the right rear of the car is removed so that passengers will not mistake it for a regular car and attempt to board.

A class of not more than four new motormen is taken from the instruction department by an instructor and put on the "rough edge" car. The instructor runs the car until a district of light travel is reached. During the first part of the run he calls attention to the various signs on the overhead wire, the method of operating at electric switches, and the necessity for throwing off the power while passing special overhead work. He points out the traffic officers at intersections, the sema-

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phore "go" and "stop" signals, and other features of traffic with which the new man must become acquainted.

When a district of light travel is reached, usually at a terminal, the power is switched off and the new men in turn sit at the controller and are taught how to feed it. After each man has learned the "feel" of the motorman's position, the students begin operating the car up and down the track where they will not be bothered by other traffic.

On the first day they learn to aim at definite stop points and get practice with late conductor's signal bells given by the instructor. On the second and third days, the new men operate the "rough edge" car through semi-congested territory and finally through the downtown streets. They are taught about the mechanical features of the car and learn how to locate trouble.

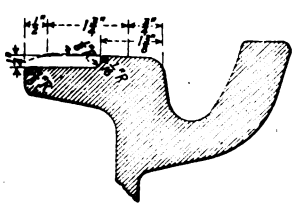
In the opinion of the instruction department, the important feature of this plan is that a new motorman is capable of handling a car under various conditions and understands the mechanical features before he is placed on a regular passenger car in service. The new man's remaining instruction is given by a regular motorman to whom he is assigned. Having learned the fundamentals of operation on the "rough edge" car, the line instructor can devote his attention to teaching the new man matters peculiar to the line on which he is running, the proper attitude toward passengers, etc.

Barbey Rail Has Reduced Noise

AS A result of numerous complaints from residents of the neighborhood about the "unearthly noises" made by cars taking the curve at Washington Avenue and Marion Street, Scranton, Pa., the railway installed in 1915 a "frictionless" rail for the inside rail of the curve. The rail is made under the Barbey patent and is the ordinary Lorain section 132, with part of the head machined down ¼ in. as shown in the accompanying illustration. The theory of the curve is that the narrower the rail head the less the friction and noise.

At this point the service is a seven and one-half-minute headway and during the eight years since the rail was laid the head on the rail has worn nearly flush with the planed surface. Practically no complaints about squealing have been received since the installation of the Barbey rail.

No change has been made in foundation, ties or paving where this rail is used. The practice of greasing curves is the same as for other rail.



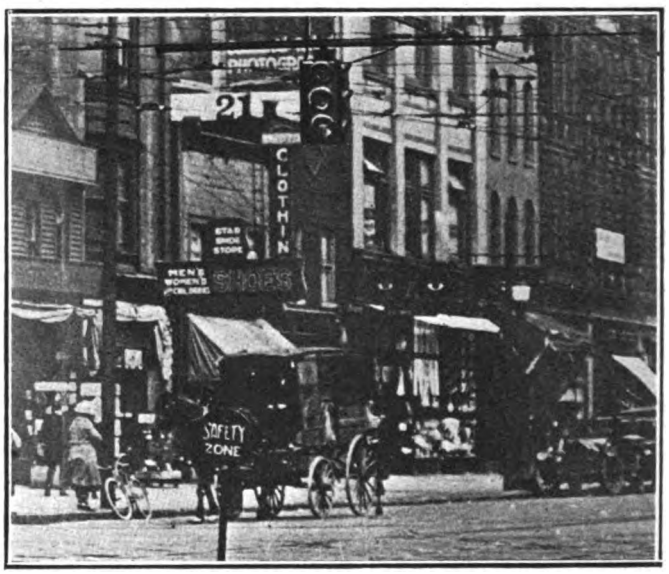
Head of Rail Is Machined Down ¼ In. for Curves

More recently the Barbey rail has been used by the Scranton Railway at various other intersections and has given very satisfactory results, not only reducing noise to a marked extent, but also giving longer wear than the ordinary type. A curve installed in November, 1921, at the intersection of Lackawanna and Wyoming Avenues, where the headway is three and one-half minutes, shows practically no wear after sixteen months service.

Interlocking Traffic Signals Hinder Railway Operation

AT ERIE, PA., the problem of placing traffic signals on streets with railway tracks has been solved in a way quite different from that in effect in Scranton, Pa., and described in the JOURNAL for May 12. A system has recently been installed for the control of both cars and vehicles on, and crossing, a section of State Street. Regulation is effected by colored electric lights suspended from the span wires of the Buffalo & Lake Erie Traction Company.

In the center of each intersection from Sixth Street to Thirteenth Street inclusive is hung a signal box containing three lights and twelve lenses, three on each side of the box, as shown in the accompanying illustration. The lenses are of red, green and white, and are



One of Eight Interlocked Signals at Successive Crossings

arranged in reverse order on alternate sides, so that the illumination of a single lamp gives simultaneously a "proceed" indication on State Street and a "stop" indication on the cross street, and vice versa. All of the signals are on a single circuit, which is controlled by a traffic policeman in a tower at the curb at Twelfth and State Streets.

This method of suspending the boxes from span wires is admirable in that there are no columns or towers in the street to obstruct traffic. Moreover it places the signal well up in the air where it can readily be seen by the drivers of all vehicles.

A serious objection exists, however, to the method of controlling all signals from a single point. The trolleys, unlike other traffic, are not able to continue block after block without interruption so long as the signal remains clear, but must ordinarily stop at each corner for passengers. Thus they are unable always to take advantage of the privilege of going ahead, but they are always forced to heed the red light.

For this reason the installation of the interlocking traffic signal system has been rather a handicap to the railway. It has been of some benefit to other vehicles perhaps, but has meant no economy to the city as police officers are stationed at most of the intersections anyway. On the whole, observation of the operation of this plan at Erie indicates that on trolley streets individually controlled signals are better than interlocked signals.

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Liverpool, Glasgow, Edinburgh Compared

Statistics on Traffic, Fares and Other Phases of Tramway and Bus Operation in These Cities Are Given in Report to New York Commission—Liverpool and Glasgow Shown to Be Developing Rapid Transit Surface Lines

DANIEL L. TURNER, consulting engineer New York Transit Commission, submitted to that commission on May 9 a report discussing car and bus design in relation to street area occupied, and also observations on city traffic in Liverpool, Glasgow and Edinburgh. An abstract of his comments on the first subject appeared in the June 9 issue of this paper. In his report on transportation conditions in Liverpool, Glasgow and Edinburgh, Mr. Turner expresses his great appreciation of the courtesies extended to him by the tramway managements in the cities visited.

An abstract follows of the technical portions of the report on these three cities:

LIVERPOOL

Liverpool, which has an area of about 33 square miles, is approximately a semicircular city located on the north side of the Mersey. In 1922 its population, within the city limits, was about 803,000 people. The Metropolitan District centering around Liverpool within 12 or 15 miles has an aggregate population of 1,250,000 people.

Liverpool has all kinds of municipal transit facilities: A subway line, an elevated line, trolley lines and buses, but the most important transit facilities are the trolley or tramway lines. The subway is a deep level line traversing Liverpool for a short distance and then crossing under the Mersey by tunnel and traversing the territory on the south side of the Mersey for a short distance. There are only seven stations on the line, two in Liverpool and the five others on the opposite side of the river. It was originally constructed for steam railroad service but was subsequently electrified.

The elevated line runs along the waterfront for a distance of about 6½ miles and has two tracks. There are sixteen stations on the line, the average distance between them being about four-tenths of a mile. The line was originally built to relieve the congestion existing on the waterfront street and to facilitate the trucking traffic. Neither the elevated nor subway line transfers to the surface lines. Traffic figures of the elevated and subway lines are not available.

During the calendar year ended Dec. 31, 1921, the surface line traffic in Liverpool was divided about as follows:

On the tramways	169,800,000 passengers	98.6 per cent
On the buses	2,430,000 passengers	1.4 per cent
Total	172,230,000 passengers	100 per cent

This was a reduction in total traffic compared with 1920 of about 48,000,000 passengers. The riding habit is only approximately obtainable, because the amount of traffic originating outside the municipal limits is not known. But the outside traffic is relatively small, so if all of the traffic is assumed as originating within the city limits, and the population is taken at 803,000, the riding habit amounted to 214 rides per capita per year, on the tramway lines and buses combined.

During 1921 ten bus routes were operated, but four of them were dropped at different times so that only six routes were continued in operation throughout the year. The bus service was introduced largely during the period of the war when it was impossible to make adequate renewals to the tramcars. In other words, the bus service was largely an emergency service. Now the buses are used chiefly as feeders to the tramway lines.

All the tramway cars in Liverpool are double-deck cars, top inclosed. The most modern type provides for twenty-two longitudinal seats on the lower deck, and forty-two cross seats on the upper deck, or a total seating capacity of sixty-four, and eighteen passengers are permitted to stand, nine on each deck. These cars are 16 ft. 1½ in. high, 7 ft. 4 in. wide over all and 30 ft. 2 in. long over all.

On some of the lines first-class cars were operated on intervals of ten or fifteen minutes. The lower decks of these cars have upholstered seats and they charge approximately a double fare, the upper deck charging the regular fare. The other cars charge one fare for both upper and lower decks.

The Pier Head on the Mersey is where the most intense operation occurs. This is really the neck of the bottle of the Liverpool tramway system. About 160 cars per hour are operated over the several routes located at this point, the maximum operation on any single track being about a three-quarter-minute headway. At another terminal, at Haymarket Junction, about sixty cars per hour were operated on eight or nine routes. At this point, to facilitate the loading of the cars, the passengers were confined in queues inclosed by pipe railings erected on the sidewalk at the curb lines.

Zone fares prevail. The fares on both the tramways and buses during 1921 varied from 1d. by half pennies to 4d. and over. The average fare was 2.128d. About 66 per cent of the total traffic was carried on the 2d. fare. For 2d. a passenger can ride from the center to the limits of old Liverpool, or just outside of the 2-mile circle. To reach the outer limits of new Liverpool, or within the 6-mile circle, an additional 2d. fare is charged if it is a broken ride, but through fares may be obtained from the center to the limits of the present city for about 3d. There are no free transfers.

Liverpool owns and operates its tramway lines. The operation is controlled by a committee of the Council. The equipment and operation of the properties is under the direction of the general manager of the Liverpool Corporation Tramways, who reports directly to the Council Committee, but the construction and maintenance of the tramway tracks is under the charge of the chief engineer of the city of Liverpool, who also reports directly to the Liverpool Council Committee. The general manager and the chief engineer are independent of each other, but, of course, there is full and

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complete co-operation between the departments. There did not appear to be any serious difficulties arising from this condition of affairs, but it was unusual, and the desirability of such an arrangement seems doubtful.

The most interesting thing in the Liverpool transit situation was the system of high-speed surface lines proposed by Mr. Brodie, chief engineer of the city. This type of line has been developed to provide relatively rapid transit in the place of subway or elevated lines. The tramway line is proposed to be located in the center of an arterial highway, 120 ft. wide. The width of the highway is made up as follows:

Two paved sidewalks	8 ft. wide
Two sidewalk grass and tree plots	10 ft. 6 in. wide
Two curbs and gutters	2 ft. wide
Two vehicular roadways	25 ft. wide
One centrally located grassed area occupied by the tramway line	29 ft. wide

making a total width of 120 ft. It is proposed to fence in the tramway right-of-way on either side to keep off pedestrians, dogs, etc. Only a low fence would probably be required. The transverse roads are only permitted to cross the tracks at about every one-quarter of a mile, at which points station stops will be provided. The highway crossings at these quarter-mile points will be made at grade. Average speeds, including stops, of 20 m.p.h. can be obtained on such a line. This speed is better than the speed now reached on the local train services on the elevated and subway lines in New York. The New York subway express train service is scheduled at only 25 m.p.h. The cost of building such a line would be very much less than a subway or elevated line, for its additional cost over an ordinary surface line would be only the cost of the extra street width. Mr. Brodie has proposed a number of such lines for Liverpool, and a number of old roads are being widened to conform to the dimensions of such high-speed arterial ways. Such a system of providing rapid transit in smaller cities is capable of being developed to the very great advantage of the community.

GLASGOW

Glasgow is approximately a circular city of about 20 square miles area. The outline of its boundary is irregular, but the city can be almost completely circumscribed by a circle of 3 miles radius. The River Clyde runs through Glasgow. No up-to-date population figures for the city itself are available. In its tramway report the corporation gives the population of Glasgow and the suburban area served by the tramway lines as about 1,339,000. It is believed that the city itself has a population approximating 1,200,000 now.

Glasgow is now served by two types of transit facilities—tramway lines and a single subway line. There are no bus lines.

The subway is a deep tube line, operating in a circular route about 6½ miles long. About half of it is located north of the Clyde and the other half south of it. The tubes are about 11 ft. in diameter inside and the railroad is operated by a cable. Until recently it was owned by an independent company, which had to suspend service because of the inability of the line to support itself. Recently, however, the city acquired possession and is now operating it. My understanding is that it ultimately expects to electrify the line. As an independent line its usefulness was limited, but as a loop line, connecting with all of the surface tramway lines, it can serve a useful function in distributing the traffic around the central business area of the city on both sides of the Clyde.

During the year ended May 31, 1922, the tramways carried about 431,372,000 passengers, or about two and one-half times as much traffic as the Liverpool system, although Liverpool has about 50 per cent more area than Glasgow. The riding habit in Glasgow is about 322 rides per capita per year. In New York the rides per capita for 1922 were about 435, or about 35 per cent greater than in Glasgow.

During 1922 the Glasgow system operated about 100 route-miles, equivalent to approximately 200 miles of single track. The longest route now operated is the tramway from Paisley on one side of the city to Bailieston on the other side. The length of this line is approximately 13 miles. The route is being extended at both ends, and when these extensions are completed the two termini of the route will be about 25 miles apart. The ride from Paisley to Bailieston now costs 8½d., or a little more than 15 cents. No fare has yet been fixed for the 25-mile ride.

The tramway cars in Glasgow are practically of the same type—double-deck cars with the body and upper deck inclosed except for the portion of the upper deck over the platform. The cars have a body length of about 17 ft. with 6-ft. platforms and are 7 ft. 2 in. wide. The over-all height is 16 ft. 1 in. They are mounted on single-truck cars and weigh empty about 25,280 lb. Inside of the car below there are twenty-four longitudinal seats and above there are twenty-eight cross-seats inside and 10 seats outside. During the rush hours six passengers are permitted to stand inside below. As a matter of fact, oftentimes more than this number stand, but the policy is to keep down the standing passengers to six as nearly as possible. The company constructs and equips all of its own cars.

The car crews are trained both as conductors and as motormen. A man is first taken into the service as a conductor. After about eighteen months of service he is required to take the training as motorman, whether he is to serve afterward as a motorman or not. This method of training men places the company in a very strong position in case of any labor troubles or on occasions when an extraordinary demand is made for service, as it is relatively easy to break in men to serve as conductors temporarily, whereas to train motormen is another matter.

Zone fares prevail. The ordinary fares range from 1d. to 9d. by ½d. grades. There is also a minimum token fare of ¾d. The minimum fare distance is about 1.15 miles, that is, for the ¾d. token fare, or the minimum ordinary fare of 1d. The maximum ride is 15.27 miles for 9d. Only a few of the long rides have fares of 6½d. and over. The average fare paid by a passenger is 1.306d. The distance paid for on the average by this passenger is for a ride of 1.96 miles. Fifty-seven per cent of the passengers paid a penny or a ¾d. token for their fare, and approximately 40 per cent of the total revenue of the company was derived from these fares.

Just as Liverpool has done and is doing, Glasgow is preparing for high-speed surface tramway lines. In the outlying sections the roadways are being widened for such lines. The same general plan is being followed as in Liverpool.

The Glasgow tramways are owned and operated by the municipality, under the direction of a committee of the Council. The municipality took the lines over in 1894. In 1917 the whole indebtedness of the tramways was cleared off. At present, the only indebtedness is that which has accumulated since 1917 for the improve-

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ment and extension of the system. This does not amount to a very large sum.

EDINBURGH

Edinburgh and Leith together have an area of approximately 19 square miles. Leith is the port of Edinburgh and is practically surrounded by it. The combined cities approximately form a circular city of about 3 miles radius. The population served by the joint transit facilities in 1922 was about 420,000. In 1920 Edinburgh was enlarged to include Leith and several adjoining towns, giving an area aggregating about 51 square miles, but the transit facilities have not yet been extended to include all this area.

The tramway system in Edinburgh is in process of transformation from a cable system to an electric system. Although the cable conduits were available, the city has adopted the overhead system because of its relative cheapness in cost as compared with the underground trolley system. Approximate statistics for the year ended May 15, 1922, follow:

STATISTICS OF TRAMWAY SYSTEM

	Single Track Mileage		Passengers Carried	
	Length in Miles	Per Cent of Total	Number	Per Cent of Total
Cable	49	43	67,986,000	67
Buses	47	41	20,408,000	20
Electric	18	16	12,633,000	13
Total	114	100	101,207,000	100

Note: The bus mileage referred to above means the mileage operated over by the buses in both directions of travel, or means the length of the streets traversed by the buses, doubled.

Based on the population served, as estimated by the tramways department, the total traffic amounts to about 241 rides per capita, as compared with 214 for Liverpool and 322 for Glasgow.

The corporation looks upon the bus operation as only suitable as feeders. Buses have also been used as substitutes for cable routes during the time of transition from cable to electric operation. I was informed that as the transition from cable to electric traction takes place the latter will be substituted for a number, if not all, of the bus routes also, as rapidly as it can be effected economically.

The car equipment on the cable lines is of an old type of double-deck car. The car equipment utilized on the electric lines is of the same general type as that used in Glasgow—that is, double-deck closed-top cars with about the same seating arrangements as in the Glasgow cars. The motor buses in use are single-deck, seating about thirty-one.

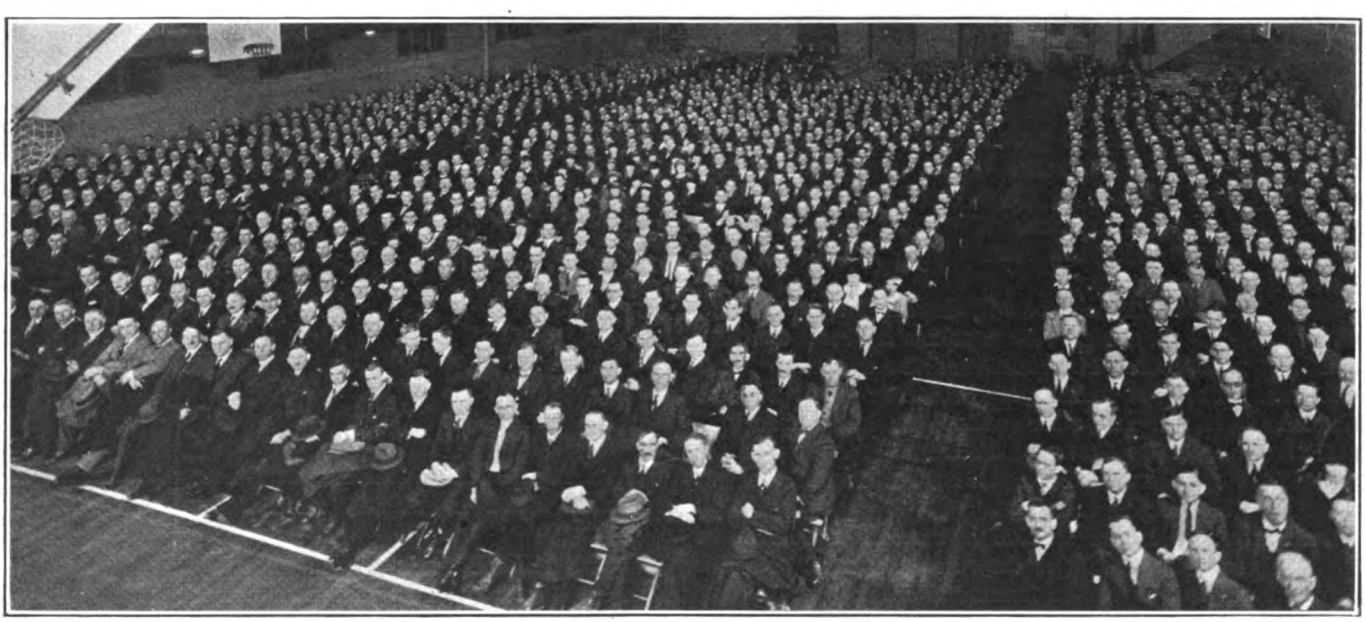
Zone fares prevail, as in Liverpool and Glasgow, and range from 1d. to 8d. The average fare per passenger on the cable lines was 1.949d.; on the buses 2.024d., and on the electric lines 1.476d. As in Liverpool and Glasgow also, the Edinburgh system is municipally owned and operated. The responsibility for the ownership and operation rests with a committee of the Council, which directs the operation through a general manager. The general manager is responsible, as in Glasgow, for the construction and equipment as well as operation. There is no divided responsibility such as obtains in Liverpool.

Carrying Safety to the Public—VII*

Public Safety May Be Promoted in the Industries Through Organized Instructional Work—A School for Foremen Is the Means of Reaching a Large Group of Workers

BY C. W. PRICE
Vice-President in Charge of Public Safety, Elliott Service Company, New York City

A FEW years ago the average railway executive and industrial manager thought of industrial safety and public safety as two separate and distinct fields of activity. Now they have learned from experience that these two fields merge and overlap; that each has a vital bearing on the other. They are more and more coming to see that safety is a habit, an attitude of mind, not a technique; that a workman in a factory who has become thoroughly imbued with the safety idea and has learned to operate his machine with safety is pretty apt to carry that habit, that attitude of mind, in favor of safety, from his work out to the street as well as into his own home.



Part of the Class of 1,500 Foremen Enrolled for the Safety Instruction in Milwaukee

The Carnegie Steel Company, for instance, in the

*Seventh of a series of ten articles.

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Pittsburgh district is not only interested in stimulating community safety in the towns in which its plants are located, but is including safety on the street and in the home as a part of the daily instruction program for its workmen.

Therefore, it is quite proper in this series of articles on public safety that we give a place to industrial safety and point out how, in an organized community effort, safety in the industries may contribute directly to safety of the public. In 1917 a safety school for foremen was organized in Pittsburgh, and so successful did it prove that since that time in some thirty cities in which local safety councils have been organized similar schools for the instruction of foremen have been conducted each year.

Industrial managers have come to see that the attitude of workmen toward safety depends on the attitude of their foreman. He must not only know how to organize safety in his department, but what is more important, he must believe in it just as he believes in any other feature of his work which has to do with efficiency. He must get back of the movement for safety, and stay back of it so unmistakably that not a workman will doubt for a moment what he proposes to do to safeguard their lives—and what he expects them to do. Possibly the greatest service which the school for foremen renders is to convince these men of the value of safety and imbue them with the safety spirit and enthusiasm.

In the cities where schools for foremen have been conducted, the superintendent, foremen and subforemen in charge of railway construction work and repair shops have attended the classes and have received valuable help.

The course of study in the school should include ten lessons—each lesson covering some important phase of safety. The material to be treated is of the nature suggested by the following subjects: "Safety and Industrial Efficiency," "The Foreman the Determining Factor," "Workmen's Safety Committee," "Mechanical Guards," "Visualizing Safety on the Bulletin Board," "Inspection," "First Aid," "Shop Sanitation," and "Reaching the Workmen Through Community Safety."

Each lesson should be presented by some man who has had practical experience in his own plant. Half of the lesson should be given up to a round-table discussion, and the foremen should be encouraged to ask questions, to express their views, and if possible to suggest new topics.

The success of the school will depend largely on the ability of the chairman who presides at each session, and on the character and ability of the speakers. The chairman must be thoroughly familiar with safety, must know how to stimulate enthusiasm in the meeting, and must be able to draw out discussion. The speakers should not only know their subjects but should present them in a convincing manner.

In many schools the session is opened with singing and a motion picture film is shown at the close.

When the course of ten lessons is finished it is customary to give a graduation banquet at which diplomas are presented and inspiring addresses are delivered by two or three prominent citizens.

The value of a school for foremen will not be confined merely to the instruction of a number of individuals. The foremen of plants in which safety has not been organized may quickly, say within a period of ten weeks, familiarize themselves with the experience of plants in which successful work has been done. They then will go out of the school convinced, because they have received first-hand information from men of experience, and because they have heard the testimony of foremen from other plants, speaking out of their own experience.

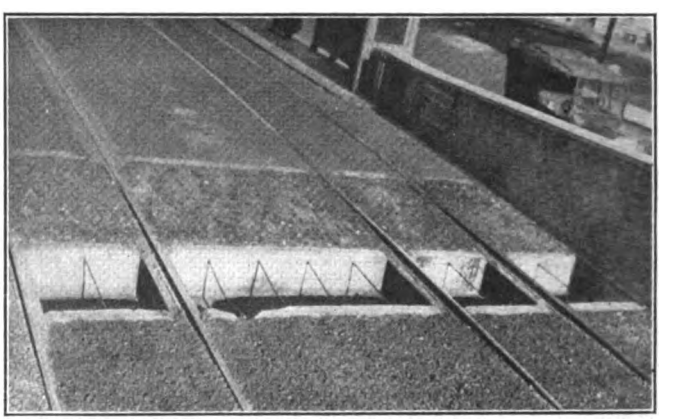
Through the influence of the foremen who carry the message back to their managers many plants will be stimulated to organize safety. In St. Louis, for instance, in 1917 there were 110 industrial workmen killed by accident, and in 1922 only fifteen; in Milwaukee, substantial reductions were made in industrial accidents since 1920; and in Louisville, accidental deaths were reduced from thirteen to five in two years. The schools for foremen in each city played an important part.

The school for foremen offers an exceptional opportunity to introduce into the industries of a community this new and larger conception of safety, and to broaden the scope of the safety instruction to include safety in the home and on the street, and then to furnish a new appeal to the workmen.

In communities where local councils have been organized it is customary each year to arrange for two or three luncheon conferences of factory managers. These conferences offer a splendid opportunity to acquaint the managers with the more important developments of community safety and its value to the industries.

The magnitude of the instructional work in the foremen's school is shown by the photograph of the class in session at Milwaukee. This is one of the largest groups ever gathered for the purpose, more than 1,500 men being enrolled in the course. The picture was obtained through the courtesy of C. M. Anderson, manager of the Milwaukee Association of Commerce Safety Council.

Concrete Ditch Barrier at Entrance to Tunnel Stops Automobiles



A Practical Device to Keep Automobiles Out of Tunnel

A CONCRETE ditch has been built across the east entrance to the Twin Peaks tunnel in San Francisco for the purpose of keeping motorists from trying to drive through the tunnel. Before this ditch was built a motorist drove his car part way through the tunnel. He met a street car and was forced to back his car out. The ditch is about 3 ft. across and if an auto should be driven across it, the front wheels would drop in and the further progress of the vehicle would be arrested.

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New Transfer System for New Orleans

Present System Involves 12 per Cent Misuse—Requirements Complicated by Necessity for Second and Third Transfers and Reversal of Direction—New Form Would Require Conductor to Punch Time, Line and Direction at Time of Issue

SECTION V of the report by John A. Beeler on local transit conditions in New Orleans deals with the order of installation of the various changes in track layout, routing, etc., which have been discussed in previous issues of the JOURNAL. This was worked out to give the most practical plan, taking into account the convenience of patrons, the immediate transportation needs of the city, the official paving program, the minimum number of temporary changes, and the most economical expenditure of time and money.

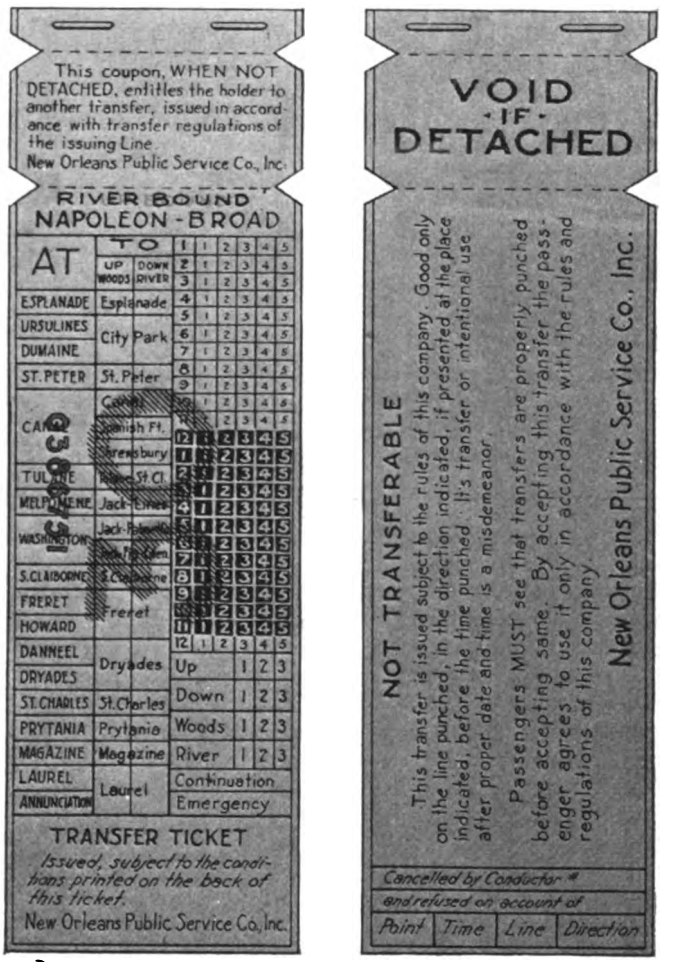
Section VI of Mr. Beeler's report takes up the question of transfers and deals with the present practice and recommends a new transfer which it is believed will regain for the company some $134,000 a year of the amount now lost through misuse. The report points out that the present system of transfers is not a universal one. It was not founded upon any particular method, but is an outgrowth from the regulations adopted haphazardly by the individual companies years ago. The operation of belt lines, with other lines doing combination trunk and crosstown service, presents a complicated situation. To establish a universal transfer under these conditions would be extremely difficult, if not impracticable.

Since 1908 on the New Orleans system the proportion of passengers using transfers has been steadily increasing. In that year, transfer passengers numbering 15,492,363 were 20 per cent of the revenue passengers, which numbered 77,459,499. This percentage has increased steadily each year until in 1922 it was 30.21 per cent, the actual figures being 31,934,874 transfer passengers and 105,712,503 revenue passengers.

It is pointed out that the total revenue passengers have increased 50 per cent, while the transfer passengers have increased more than 100 per cent. The enlarged use is undoubtedly due to one or more of the following reasons: Changes in routing, changes in location of the population, or abuse of the privilege. The first item is considered almost negligible, as few changes in routing have been made. Changes in population account for some of the increase, as many sections, especially those in outside districts, are growing rapidly. The abuse factor also contributes largely to the growth. The engineer states that the looseness of the present system, combined with the lack of systematic checking, has invited and encouraged abuse. He comments that there will always be more or less loss in connection with the transfer, and that the problem is how best to reduce this to a minimum. From observations made and from information furnished by the railway, it is estimated that the misuse of the transfer privilege is at present not less than 12 or 15 per cent of the total collected. On a basis of the lesser figure, if a system can be devised that will reduce the abuse by one-half, the revenue will be increased $134,000 annually.

PROPOSED TRANSFER SYSTEM

It is stated in the report that a universal transfer system can be adopted under the proposed routing plan. It should be based on the principle that any rider, upon payment of a fare, is entitled to one continuous trip from any point on the system to any other point by the shortest practicable route. Provision must be made for use of more than two lines to reach the desired destination and the transfer form must be simple and readily understandable.



Proposed Form of Transfer for Use in New Orleans

A form of transfer that will admirably fit itself to the requirements in New Orleans, according to the engineer, is reproduced herewith. It is recommended that it should be printed on four different colored papers, one for each direction of travel. Its face contains the following information:

1. Day of the month in large red numerals.
2. Name of the issuing line.
3. Direction of the trip of issuing line.
4. Line to which transfer is issued.
5. Point at which transfer must be used.
6. Time limit after which transfer becomes void.

The points requiring punching by the conductor when issuing are three: Time, line and direction. In making the latter punch, conductor will indicate whether it is the first, second, or third transfer, by locating it under 1, 2 or 3, as the case may be, in the line which indicates the actual direction of travel. Conductors when issuing

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TRANSFER CHART
FOR THE NAPOLEON-BROAD LINE
Woods Bound

Note-Abbreviations
U = Up
D = Down
R = River
W = Woods

TRANSFER POINT	TO LINE	DIRECTION OF TRANSFER	FURTHER TRANSFERS	FIRST CONTINUING TRANSFER				SECOND CONTINUING TRANSFER			
				TRANSFER POINT	TO LINE	DIRECTION	FURTHER TRANSFERS	TRANSFER POINT	TO LINE	DIRECTION	FURTHER TRANSFERS
Annunciation	Laurel	U		Peters Ave	Dryades	D	None				
					Louisiana	W	None				
				Louisiana Ave	Tchoupitoulas-Gentilly	W		Elysian Fields	Elysian Fields	W	
								Lafayette Ave	Desire	D	N
								St Claude Ave	Tulane-St Claude	D	
Laurel	Laurel	D		Jackson Ave	Jackson Lines	R or W					
				Canal St	Canal						
					Shrewsbury	W	None				
					West End						
					North Claiborne	D					
Magazine St	Magazine	U		Walnut St	Broadway	W					
				Peters Ave	Dryades	D	None				
		D		Louisiana Ave	Louisiana	R or W					
				Jackson Ave	Jackson Lines						
		U	None								
Prytania St	Prytania	U		Peters Ave	Dryades	D	None	Issued only to passengers boarding car beyond Magazine St.			
		D	None	Louisiana Ave	Louisiana	R or W	None	Issued only to passengers boarding car beyond Magazine St.			
				Jackson Ave	Jackson						
				Peters Ave	Dryades	U or D	None				
		U		Broadway	Broadway	R or W					
				Carrollton Ave	Tulane-St Claude	D		Oak St / S. Claiborne Ave	Shuttle	W	None
				Louisiana Ave	Louisiana	R	None				
						W		Dryades St / Howard St	Dryades	D	None
						R	None				
St Charles Ave	St Charles			Jackson Ave	Jackson Lines	W		Dryades St / Howard St	Dryades / Freret-Howard	D	None
		D						S. Claiborne Ave	S. Claiborne		
				Canal St	Canal			Dauphine-Burgundy	Esplanade	W	None
					Shrewsbury	W		N. Rampart St	Paris-St Bernard / Tulane-St Claude	D	None
					West End						
					North Claiborne	D		Elysian Fields	Elysian Fields	W	None
					Desire	D					
					City Park	W	None				

Portion of Transfer Chart Showing Transfer Conditions in One Direction for the Napoleon-Broad Line, New Orleans

the last transfer necessary for the patron to reach his destination will give him a transfer without the upper coupon. Usually this will be the first one.

Direction of travel is designated by the words "Up," "Down," "River," "Woods." Aside from the normal transferring in the same general direction, it is necessary that the patrons have the privilege of reversing their direction of travel at certain points on the system. This transfer is designed to permit this, and at the same time guard against its abuse, but in order to allow this privilege it is necessary to designate certain lines in both up and down town districts, as "change of direction lines." The report then lists eight uptown lines and seven downtown lines that come under this category.

The rules that will govern transfer issuance and acceptance are as follows:

Transfers will be issued for a continuous trip upon request at the time the fare is paid. They will be accepted only at the designated point on the line and in the direction indicated, if presented within the time limit shown. A transfer will be issued good only in the same general direction except on "change of direction lines." On such lines if the conductor takes up a transfer with the coupon attached, he can issue a transfer good for travel in a direction opposite to the direction shown in the first transfer. Shuttle lines should collect fares and accept transfers. They should issue a "ride-ticket" in lieu of a transfer, which will entitle a holder to all the transfer privileges of a cash fare.

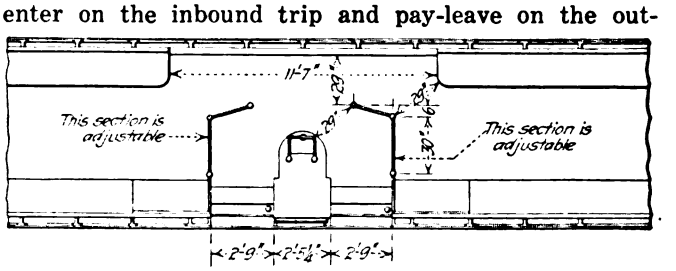
The report recommends that a method of careful inspection and checking should be adopted. Where a line is served by safety cars, the use of transfer machines is recommended. Each conductor should be supplied with a complete set of rules governing the issue of transfers, and this should be made up in looseleaf form to permit easy revision.

A portion of a transfer chart for one of the most intricate lines proposed, so far as transfer conditions are concerned, is reproduced with this article. A similar chart for the opposite direction of travel for the same line was included in the report, the pair serving as an example of the manner in which the transfer privileges of each line should be tabulated.

Cleveland Trailer Being Changed

Adjustable Railing Installed to Improve Pay-Enter and Pay-Leave Conditions—Results to Date Have Proved Satisfactory

A NUMBER of electric railway properties are using a design for trailers known as the Cleveland trailer design. Hence added interest attaches to the fact that the Cleveland Railway is experimenting with some changes in the floor plan. These changes are in the form of a railing and are such as better to fit the car for the Cleveland system of fare collection, which is pay-enter on the inbound trip and pay-leave on the out-



Adjustable Railings Quickly Change This Center-Entrance Trailer from Pay-Enter to Pay-Leave

bound trip. The new form of railing is shown in the accompanying diagram, which represents the center of the car. In this railing the two sections transverse to the car can be raised or lowered, but the shorter sections, which are set at an acute angle to the center line of the car, are permanent. The operation of the railing is then as follows:

When the car is going down town, or pay-enter, the adjustable railing toward the rear of the car is lifted and the one toward the head of the car is lowered. Then,

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as the passengers enter individually by the front door, they pass by the fare box, and those who expect to leave the car by the exit or rear door before it reaches the terminal gather in the rear of the car, while the others gather in the front of the car. At the final point of unloading both bars are lifted and passengers leave by either door. When the car is going out in the evening the conditions are reversed. On that trip the car is operated pay-leave, and at the principal downtown loading point or points both bars are lifted. Then the rear one is lowered. This makes passengers who leave the car file by the fare box.

The new arrangement of railings meant that some seats opposite the fare box had to be removed. This cuts down the seating capacity of the car by four seats, but not the total carrying capacity. As, however, trailers in Cleveland are used only during the rush hours, this was not considered a great disadvantage. It has been found that the method adds slightly to the time of loading, but it has not been necessary to reduce the scheduled speed of the runs, and fewer fares are missed. The effect of the railing also is to keep passengers away from the fare box.

In a few special cases, as at ball grounds, the usual plan is reversed. Thus, when attendants at a ball ground are being taken away after the game the car is run pay-leave, although it may be going down town in the pay-enter direction.

The company has equipped four cars in this way, and the results so far have been very satisfactory.

Benefits of Subdividing Operating Expense Accounts

Experience of Eight Years with an Extensively Subdivided Series of Accounts Indicates a Number of Advantages for It—Through Its Use Specific Cost Figures for Any Purpose Are Always Available

By Clifford A. Elliott
Cost Engineer Pacific Electric Railway

THE instructions contained in the uniform system of accounts for electric railways prescribed by the Interstate Commerce Commission, effective July 1, 1914, say that any carrier or any receiver or operating trustee of any such carrier, in addition to the accounts prescribed by the commission, may, unless otherwise ordered, keep any temporary or experimental accounts the purpose of which is to develop the efficiency of operation, provided that such temporary or experimental accounts shall not impair the integrity of any primary account prescribed.

Possible subdivision of the primary accounts is indicated to some extent by the definitions in the I. C. C. classification, but it is left to each company to work out such details, if it desires to do so. To some persons any advantage in such a subdivision of the operating expense accounts may not be apparent, but the writer's familiarity with such a system, covering a period of eight years, shows that it has been desirable from the standpoint of all concerned.

Before this accounting system was adopted, considerable study and planning, as well as co-operation of all concerned, were required. All departments were called upon to submit a tentative schedule of what should be the proper number and titles of the proposed subdivisional accounts. Judgment in this respect rested in a majority of instances on experience as to what particular subheads were required under each account. In the way and structures accounts the department was thoroughly familiar with the most important subheads required.

The final draft of the schedule was the result of an elimination process, and the impression was general that too many subhead accounts would defeat the benefits to be derived from the system. If carried too far the division would entail a tedious volume of bookkeeping upon the auditor, as well as burden each department in determining the proper accounts for charges in documents prior to their transmittal to the accounting department for auditing.

The schedule herewith shows the subdivision of the operating expense accounts in Way and Structures for a Class "A" company with which the writer is familiar. The system is such as to benefit all departments concerned. This particular exhibit takes the reader only through the way and structures operating expense accounts, but the same efficient subdivision is likewise followed throughout the equipment, power, conducting transportation, traffic, etc., accounts.

The writer will now endeavor to point out some of the great advantages of this plan.

Advantages of the Subdivision

Of what benefit is a grand total statement of operating expenses to an operating official, month after month? The change in the total as between one month and another may be as much as $10,000, but if the official wants to know the reason for this variation, he must have a subdivision of the accounts. Take, for instance, the way and structures accounts. There is provided under each account a subdivision for municipal and legal requirements, and by adding up the total of each subdivisional account with this title the official may determine that at least 65 per cent of the way and structures expenses were attributed to this one cause. In other words, franchise requirements, which are an uncontrollable expense, caused the increase. Also, take into consideration the subdivision

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of accounts for flood control. Large unforeseen expenditures may be incurred on this account.

Not only does this statement of the accounts, so subdivided, give the operating official a well analyzed lineup on his expenses, but it gives the engineer or superintendent of way and structures a system of figures whereby he may budget his way and structure expenses for subsequent months. Take, for instance, the subdivision account 8-g, "Removing grass and weeds." If the current month's expenses have exceeded the previous month to such extent that it has virtually robbed his department of allowances for more important maintenance work, the way engineer knows that in the subsequent months he can limit the amount of labor for weed extermination. The same principle applies to the various other labor accounts. Labor is the vital issue. Many times it will run 65 per cent of the expense.

The writer has also found this system of accounts of great help at the end of the fiscal year in summing up the expenses for a given class of maintenance work, such as the upkeep of road crossings, annual cost of flood control work, maintenance of automatic flagmen, block signals, pavement, switch lamps and targets, repairing of tools, etc. Take, for instance, the subdivision of accounts No. 16, "warning signals," or automatic flagmen. This subdivision is even carried out as between material and labor. As the number of these devices in operation is known, it is easy to find the average cost for both labor and material of their maintenance.

On all street railway properties also there is a large number of items of operating expense that are uncontrollable such as paving, maintaining road crossings, exterminating rodents, cutting grass and weeds by orders of municipalities, etc. This subdivision of accounts enables one to work out by percentages just what portion of the operating expenses are attributable to these sources.

Detailed Classification of Way and Structures Accounts

I. Track, Roadway and Buildings

1. Superintendence:
   (a) Salaries, maintenance engineer and clerks.
   (b) Salaries, supervising engineers.
   (c) Salaries, field engineering forces.
   (d) Salaries, draftsman.
   (e) Salaries, roadmasters and supervisors.
   (f) Miscellaneous supplies and expenses.
   Total superintendence.
2. Ballast:
   (a) Ordinary.
   (b) Municipal and legal requirements and property retired.
   Total ballast.
3. Ties:
   (a) Ordinary.
   (b) Municipal and legal requirements and property retired.
   Total ties.
4. Rails:
   (a) Ordinary.
   (b) Municipal and legal requirements and property retired.
   Total rails.
5. Rail fastenings and joints.
   (a) Ordinary.
   (b) Municipal and legal requirements and property retired.
   Total rail fastenings & joints.
6. Special work.
   (a) Crossings.
   (b) Other special work.
   (c) Municipal and legal requirements and property retired.
   Total special work.
7. Underground construction.
8. Track and roadway labor.
   (a) Surfacing and aligning track.
   (b) Unloading and laying ballast.
   (c) Unloading and laying ties.
   (d) Unloading and laying rail and rail fastenings.
   (e) Unloading and laying special work.
   (f) Inspecting and repairing switches.
   (g) Removing grass and weeds.
   (h) Cleaning tracks.
   (i) Patrolling, inspecting and watching tracks.
   (j) Repairing tools.
   (k) Rent of teams.
   (l) Wages trainmen — work train service.
   (m) Flood control.
   (n) Municipal and legal requirements and property retired.
   (o) Removing drift sand from tracks.
   (p) Miscellaneous track and roadway labor.
   Total track and roadway labor.
9. Miscellaneous track and roadway expenses.
   (a) Renewal roadway tools and material used in repairing tools.
   (b) Material and supplies for weed burner.
   (c) Miscellaneous material and supplies—flood control.
   (d) Section house and camp expenses.
   (e) Material used in repairing retaining walls, rip rap, etc.
   (f) Power and sundry expenses—work train.
   (g) Operation and maintenance of motor velocipedes and cars.
   (h) Miscellaneous material and expenses.
   (i) Municipal and legal requirements and property retired.
   Total miscellaneous track and roadway expenses.
10. Paving.
   (a) Payroll labor — asphalt and concrete paving.
   (b) Material — asphalt and concrete paving.
   (c) Payments to contractors—asphalt and concrete paving.
   (d) Payroll labor — oil macadam paving.
   (e) Material — oil macadam paving.
   (f) Payments to contractors—oil macadam paving.
   (g) Hire of teams and trucks.
   (h) Wages of trainmen, power, sundry expenses — work trains.
   (i) Paving tools.
   (j) Municipal and legal requirements and property retired.
   (k) Miscellaneous expenses.
   Total paving.
11. Cleaning and sanding track.
   (a) Oiling roadway.
   (b) Cleaning, greasing and sanding tracks
   (c) Municipal and legal requirements and property retired.
   Total cleaning and sanding track.
12. Removal of show and ice.
13. Tunnels and subways.
14. Elevated structures and foundations.
15. Bridges, trestles and culverts.
   (a) Bridges and trestles—labor.
   (b) Bridges and trestles—material.
   (c) Culverts.
   (d) Cleaning culverts and bridge channels.
   (e) Wages trainmen, power, etc., for work trains.
   (f) Repairs account floods.
   (g) Bridge tools.
   (h) Municipal and legal requirements and property retired.
   Total bridges, trestles and culverts.
16. Crossings, fences and signs.
   (a) Crossings—repairs and renewals.
   (b) Crossings—paving repairs and renewals.
   (c) Fences.
   (d) Warning signals—labor.
   (e) Warning signals — material and supplies.
   (f) Roadway signs.
   (g) Municipal and legal requirements and property retired.
   Total crossings, fences and signs.
17. Signal and interlocking apparatus.
   (a) Signal and interlocking buildings.
   (b) Tower operated-signal and interlocking apparatus — labor.
   (c) Tower operated-signal and interlocking apparatus—material.
   (d) Automatic block signal system—labor.
   (e) Automatic block signal system—material.
   (f) Signal light circuits.
   (g) Switch lamp and targets.
   (h) Municipal and legal requirements and property retired.
   (i) Miscellaneous.
   Total signal and interlocking apparatus.
19. Miscellaneous way expenses.
22. Distribution system (bonding).
   (h) Bonding—labor.
   (i) Bonding material.
   (j) Testing for defective bonds.
   (k) Wages trainmen, power, supplies, etc., bonding cars.
   (l) Municipal and legal requirements and property retired.
   Total bonding.
24. Buildings, fixtures and grounds.
   (a) Carhouses and shops.
   (b) General offices.
   (c) Station buildings and signs.
   (d) Landings and platforms.
   (e) Docks and wharves.
   (f) Moorings.
   (g) Grounds.
   (h) Section buildings.
   (i) Municipal and legal requirements and property retired.
   (j) Miscellaneous.
   Total buildings, fixtures and grounds.
28. Equalization — way and structures.
   Total way and structures — track roadway and buildings.

II. Electric Line

1. Superintendence.
   (g) Salaries electrical superintendent, assistants and clerks (proportion).
   (h) Salaries draftsmen (proportion).
   (i) Miscellaneous supplies and expenses — general office (proportion).
   Total superintendence — electric line.
18. Telephone and telegraph lines.
   (a) Labor.
   (b) Material.
   (c) Wages of trainmen, power and sundry expenses of work trains and line cars.
   (d) Municipal and legal requirements and property retired.
   Total telephone and telegraph lines.
20. Poles and fixtures.
   (a) Labor.
   (b) Material.
   (c) Wages of trainmen, power etc., work trains and line cars.
   (d) Municipal and legal requirements and property retired.
   Total poles and fixtures.
21. Underground conduits.
   (a) Ordinary.
   (b) Municipal and legal requirements and property retired.
   Total underground conduits.
22. Distribution system.
   (a) Overhead feeders—labor.
   (b) Overhead feeders—material.
   (c) Wages of trainmen, power, etc., work trains and line cars—feeders.
   (d) Overhead trolley labor.
   (e) Overhead trolley—material.
   (f) Wages of trainmen, power, etc., work trains and line cars—overhead.
   (g) Municipal and legal requirements and property retired.
   Total distribution system (except bonding).
23. Miscellaneous electric line expenses.
   (a) Expenses light and power department.
   (b) Miscellaneous.
   Total miscellaneous electric line expenses.
   Total way and structures—electric line.
   Total way and structures (excluding depreciation).

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Crossing Protection on High-Speed Railway

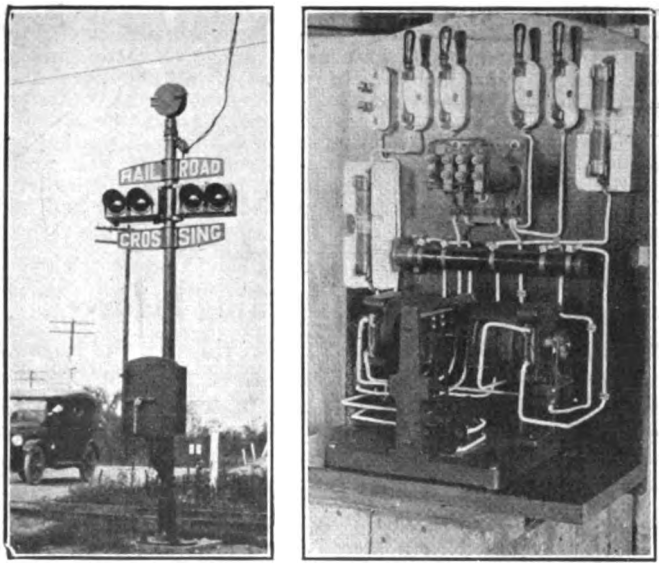
Interurban Railway Connecting Indianapolis and Louisville Uses Flashing Lights Behind Hooded Lenses in Combination with Trembling Bell at Thirteen Intersections with Highway

THE Interstate Public Service Company operates high-speed interurban service between Indianapolis, Ind., and Louisville, Ky., over a 600-volt d.c. line, with overhead trolley. Speeds up to 70 m.p.h. are reached. Both trolley wheels and Miller shoes are employed as contact devices.

For the protection of the public, the company has installed at thirteen of its grade crossings with highways a type of signal comprising a 12-in. trembling bell in circuit with which are four 25-watt Mazda lamps that flash with the current fluctuations caused by the operation of the bell. Each lamp is placed at the focus of an 8-in. hooded lens, so that it is visible night and day. The signal is operated from the trolley wire.

The bell, group of hooded lamps and case containing the operating relays are mounted on a steel pole or standard, which in some cases has been painted in yellow and black stripes, as an experiment, in the hope of making the warning more impressive.

The halves of the light case containing the lenses are separately pivoted, so that one-half may be pointed or "focused" in one direction along the highway and the other in another direction which may be at any angle from the first. While the lamps in these cases are connected in series with the bell, a shunt is provided so that the burning out of a lamp does not open the operating circuit or stop the ringing of the bell, which will



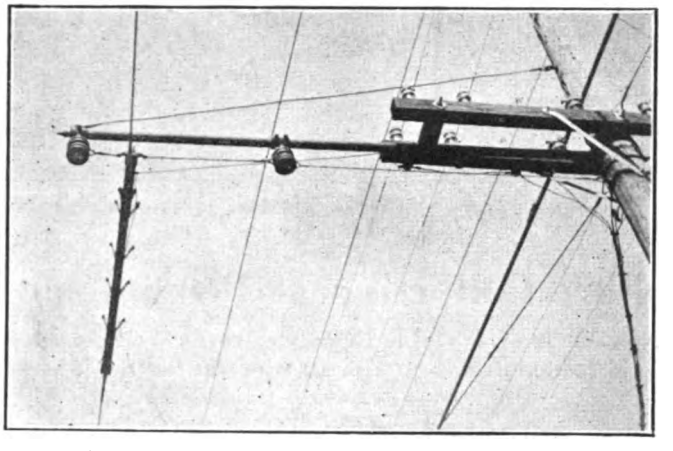
At Left, Crossing Signal at Marshfield, Ind., with Pivoted Light Cases and Off-Set Relay Box. At Right, Relay Board Complete for Single-Track Control, Removed from Relay Box

continue to give its warning even if all of the lamps are burned out.

A valuable feature of the Interstate Public Service installation is the motorman's indicator, which is installed three or four spans beyond the starting contactor. The indicator is one of the series of flashing lights. It is housed in a hooded light signal, mounted on a pole and "focused" so that the motorman will see it as he passes the contactor. The blinking of the light indicates that the bell is ringing.

The signal at Marshfield, shown in one of the illustrations, is one of those equipped with "overlapped stopping control." In this a unidirectional stopping contactor is located in the overhead a short distance each side of the crossing, the contactor on the far side operating to cut out the bell for each direction. Thus, when the car is held by an accident near the crossing, the bell will continue to ring.

The starting contactors are also unidirectional and



Spine Type of Overhead Trolley Contactor on Bracket Suspension at Memphis, Ind.

are located about 1,500 ft. on each side of the crossing. They operate to start the signal when the car is approaching the crossing, but are inoperative in the other direction.

One form of contactor used is known as the "spine" type, illustrated as installed at Memphis, Ind. This consists of two steel contact strips, supported on an insulating frame, so as to be wiped by the trolley wheel. Each strip has a phosphor-bronze spring forcing it against limit stops at four points along its length. The two strips are connected in multiple and insulated from the trolley wire. The lead runs off the binding post from these strips to the relay to be operated, and thence to ground. A car passing under the contactor diverts a transient current to operate the relay due to its trolley wheel bridging the wire with the strips. The strips are insulated at the middle, so as to give a sense of direction by the order in which the contact is made.

The impulse of current from the trolley contactor is received on a "last-position" relay. This is mounted in an iron relay box at a height convenient for inspection and maintenance. The door of the box is gasketed and padlocked. An accompanying illustration shows the relay board for single-track control and the form of last-position relay used. This is of the quick-acting type, with double-break contacts. The directional relay is mounted above it in the case. The incoming leads pass through disconnecting switches and fuses, so that the maintainer can work safely on the relay. Resistors and terminals are also mounted on the relay board, which is removable as a unit.

Of the crossings protected by the signals, twelve are single-track crossings and one is a double-track crossing. A number of the signals have been in operation for two years or more and have proved to be entirely reliable. They are Nachod automatic highway crossing signals of the BL type.

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The "Box-Portable" in Action on United Electric Railway's Safety Car

Fare Collection at Providence

New Form of Portable Register Proves Well Adapted to Conditions on United Electric Railway's Property—Provision Is Made for Registering Both Cash and Token Fares

THE United Electric Railways, Providence, R. I., has for a number of years used the standard Rooke register in fare collection. This until recently has been a one-coin machine, so that when the fare of 6 cents was collected the passenger inserted a nickel in the register and handed the conductor the extra cent.

On Jan. 1, 1923, the railway put a reduced fare in operation by selling ten tokens for 50 cents, the cash fare remaining as before. This necessitated a new form of register, and the company adopted the type made by the Rooke Automatic Register Company, which has been used on a number of other properties during the past eighteen months. This is a modification of the previously standard Rooke register by means of which it is practicable to register nickels, dimes and tokens (or quarters). These are inserted in the same slot and registered on separate dials. The same principle can be applied to as high as four or more coins or combinations of coins and metal tickets properly registering on several totalizing counters.

R. R. Anderson, superintendent of transportation United Electric Railways, states that the use of these registers results in a uniform collection system and a uniform accounting system. This is highly desirable on account of the varied equipment operated by the company. The same register is used on cars operated one-man and two-man, the cars being of a number of types. There are pay-within, pay-enter, pay-leave and open-bench cars. In addition the company operates both city and suburban buses, on which the registers also are used. Another feature is the use of these registers for street collections.

On the suburban buses the tokens are not accepted, but the registers take quarters instead. The conductor's turn-in is based on a return of 5 cents for each point on the nickel dial and 25 cents for each point on the other.

For use on the one-man cars in Providence the Rooke people developed a simple "box-portable" which consists of a steel cash box mounted on a pipe standard and containing an inspection plate. An aperture in the side of the box receives the hand register, which, inserted in the aperture, is operated by a pedal. After registration the coins can be readily removed by the operator.

Among the railway properties besides the Providence company which are using the multiple-coin register are the Union Street Railway, New Bedford, Mass.; the Lehigh Traction Company, Hazleton, Pa., and more than a dozen others.

Livestock Transportation by Electric Railways

AN INTERESTING statement showing the growth of business in the handling of livestock by traction lines entering the Indianapolis Union Stockyards is included in a report by the traffic manager of the company. The statement covers January and February of this year and permits a comparison with previous traffic. In January this year 905 carloads of livestock were brought to the stockyards here by the traction companies compared to 511 for January a year ago. In February this year 773 carloads were handled compared to 364 carloads in February, 1921. Bert Henley, financial editor of the Indianapolis *Star*, writing on the growth of this feature of the traction freight business at Indianapolis, says:

> Statistics compiled by the Belt Railroad & Stock Yards Company reveal that the total amount of livestock handled by the interurbans in January and February of 1919 was 206 cars; in 1920, 267 cars; 799 in 1921; 875 in 1922, and 1,678 in 1923.
>
> These figures cover a period of the year when a seasonable falling off in receipts of livestock is to be expected, and can be taken as fairly representative of the year's traffic. Within the last year or eighteen months, all four of the large interurban companies have made many improvements and changes in order to develop the livestock line of their freight traffic. More changes are to be made during the present year, including purchase of rolling stock and equipment, the remodeling of old rolling stock; the construction of receiving pens at way stations.
>
> In order to facilitate prompt unloading and marketing of stock transported by electric interurbans the Belt Railroad & Stock Yards Company has provided greater switching facilities and extended the unloading platform and receiving pens.

Changes in Cost of Living Figures

THE U. S. Department of Labor, through the Bureau of Labor Statistics, has completed the compilations showing changes in the retail cost of food in twenty-two of the fifty-one cities included in the bureau's report.

From April 15, 1923, to May 15, 1923, fifteen of the twenty-two cities showed increases as follows: Philadelphia, 4 per cent; Baltimore, Bridgeport, Butte, Cleveland, Louisville, Norfolk, and San Francisco, 1 per cent. The following cities increased less than five-tenths of 1 per cent; Indianapolis, Little Rock, New Haven, Omaha, Pittsburgh, Portland, Me., and Providence. There was a decrease in five cities, i.e., Memphis and Newark, 1 per cent, and Buffalo, Fall River, and Manchester less than five-tenths of 1 per cent. Boston and Richmond remained the same. For the year, May 15, 1922, to May 15, 1923, twenty-one of the twenty-two cities showed increases. Bridgeport was the highest with 8 per cent. Richmond was the only one which decreased, its reduction being less than five-tenths of 1 per cent.

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Track Notes from Detroit

Special Trackwork Is Laid on Wood Ties for Ease in Replacement—Cause of Corrugation Is Being Investigated

THE standard system of track construction in Detroit was described in the issue of this paper for July 23, 1921. Briefly, it consists of 100 lb. A. R. A. plain girder rail on International steel ties laid in concrete, which is carried up over the ties and about 1 in. up on the rail. After this concrete bed has set, the remainder of the trench up to the level of the rails is filled with crushed granite, which is crowned between the rails. This is rolled and then filled with rich cement grout and rolled again.

For special trackwork, wooden ties are used instead of the monolithic construction so that parts can be more easily replaced. Broken stone is used under and between the ties, and granite, tarvia and other materials have been used for paving. The bolts for the angle plates and tie rods are spot welded. At present manganese insert special trackwork is being employed, but the tendency is to work toward solid special trackwork of manganese steel or other alloy.

The accompanying engraving shows a typical cross-section of track for special work with sloped base, used by the Department of Street Railways, Detroit.

Very much attention has been given to the study of corrugation, as considerable of this trouble has developed in the 100-lb. A. R. A. rail, which the company has laid. Formerly corrugation had been noticed particularly on sections of the track where the cars are braked to a stop and on down grades, but on the new 100-lb. rail it is quite continuous.

An interesting experiment was tried to determine whether the cause was in the rail or in the type of foundation. Detroit has a short section of open tangent track laid on oak ties with stone ballast and the joints not welded. The 80-lb. rail used in this track has not shown corrugation. Four lengths of it were taken up and the same lengths of the 100-lb. rail were put in, and they developed corrugation as rapidly as in the monolithic construction.

Corrugation rarely develops in two-way track, but it seems always to develop in one-way track, and the theory now held by P. A. Kerwin, superintendent of tracks, is that it is a movement of the metal in the head of the rail produced by the same forces which cause steam railroad rails to creep. As the street railway rail is held so tightly that it cannot creep, the movement has to take place in the metal in the head of the rail.

One peculiar feature of all of the corrugations found in the recently laid 100-lb. rail is that they are about 2 in. in length. In some cases where corrugations have developed in older rails, they have been 4 in. and sometimes 6 in. in length.

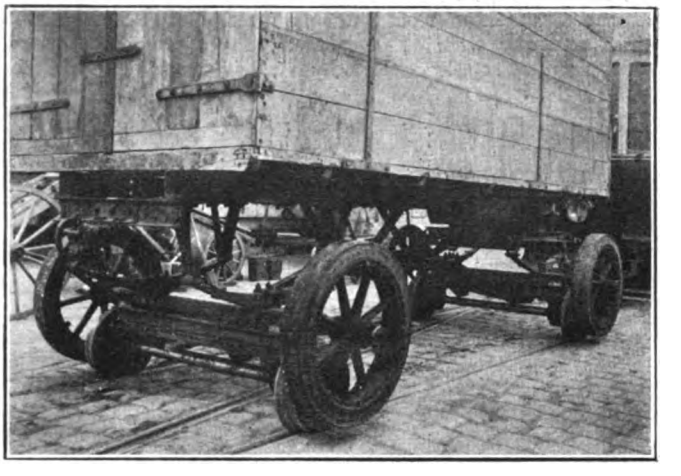
The Readers' Forum

A Wagon with Auxiliary Flanged Wheels

VIENNA, AUSTRIA, May 10, 1923.

To the Editors:

I have noted with interest the article in the Jan. 6 issue of the ELECTRIC RAILWAY JOURNAL, page 49, entitled "Hauling Wagons with Electric Cars." The device described in this article was first used in Düsseldorf, Germany. A similar device has been constructed and tried out by the city electric railway in Vienna, as



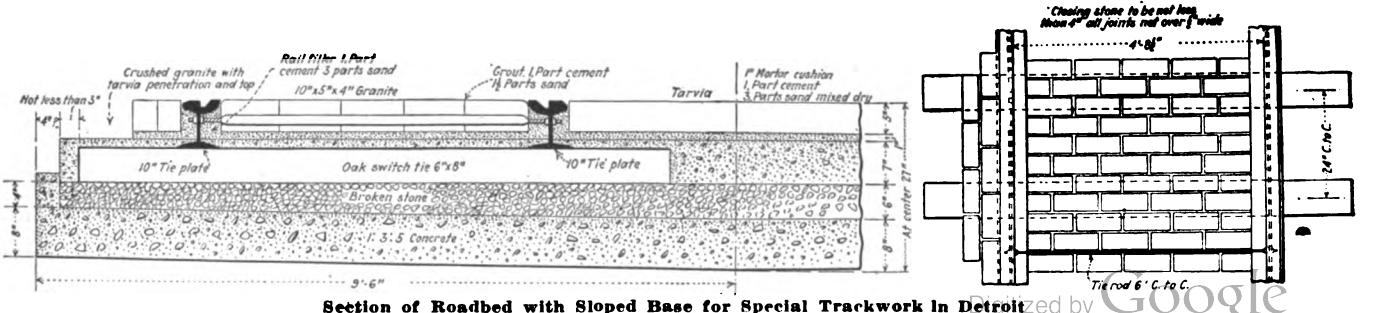
Postal Trail Car Mounted on Auxiliary Trucks to Permit Use on Electric Railway Tracks

shown in the accompanying illustration. Trail trips made with this car have proved satisfactory, but no decision has been reached as to its general introduction.

The illustrations show a trail car of about 11,000 lb. weight, constructed in accordance with the Büssing system. When the trailer is to be run on the railway tracks, a small, single-axle truck is slipped under each trailer axle. Unlike the four-axle auxiliary truck used and illustrated in the ELECTRIC RAILWAY JOURNAL article, this one does not need to be carried around with the trailer, but can easily be removed and set aside.

In the use of the newer auxiliary truck, the car needs to be lifted only a short distance onto the truck, just enough to provide clearance between the rubber-tired wheels and the paving. The trailer is lifted a sufficient distance to admit the auxiliary truck by running the rubber-tired wheels up a pair of light wooden inclines placed outside the rails. The auxiliary trucks are held in place by means of pins by which they are attached to an angle iron mounted under the body. This requires but a few minutes. One of the auxiliary trucks weighs about 670 lb., and a pair will carry about 17,500 lb.

FRANZ SCHREY, Consulting Civil Engineer.



Section of Roadbed with Sloped Base for Special Trackwork in Detroit

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Association News & Discussions

Human Maintenance in Industry*

BY ALDEN COFFEY, M.D.
Fort Worth, Tex.

THE value of human maintenance to any industry is just as great as the maintenance of machinery, for an expensive machine would not be used night and day without periodically inspecting it to repair damaged parts before it is injured, and the employee should be given the same character of inspection.

The benefits and influences of a thorough human maintenance department are so great that it is impossible to estimate its value. The cost of such can be ascertained exactly, but the monetary returns cannot be determined. How could one estimate the financial gain due to the increased efficiency of an employee who has for years been below par because of some chronic ailment which was discovered by periodical examinations and removed, thereby restoring the man to his full producing capacity?

The work covered by a human maintenance department should consist of the following:

1. Examination of applicants for employment.
2. A periodical examination of employees.
3. Treating the sick and injured.
4. Preventive medicine.
5. Emergency service to the injured.

The examination of applicants for employment is most important. The only proper time for such an examination is before the beginning of employment. It assists materially in the proper placing of applicants. It should be able to show the class and character of the work for which the applicant is best suited. It determines the ability of the individual to meet the public and to get along peacefully with his fellow workmen.

Periodical examination should be made of all the employees at least once a year, extending from the manager to the lowest employee. It should consist of taking blood pressure, examination of urine and a thorough physical examination. This will enable the medical department to render better service, and often will disclose the cause of many accidents.

Treating the employees in the time of sickness and injury enables them to have medical service when in a great many instances they otherwise would hesitate to call a physician on account of the expense, and they and the company would lose in the time away from their work.

Preventive medicine is the duty of the medical department. In the prevention of diseases it would be necessary to look after the sanitation and general working conditions of the shops and use proper preventive measures for the spread of infectious diseases. Look into the environments of the home life and teach the employees the proper care of the body.

Many injuries which seem to be of minor importance, unless properly treated at the time of occurrence, may later become infected, in some instances producing a great loss of time, or possibly permanent disability. Prompt attention relieves a great deal of suffering and sometimes saves lives.

The advantage of a health maintenance department to the employer are as follows:

1. Increases output by having a steadier working force.
2. Decreases cost of training new employees.
3. Increases efficiency of the employer's service to the public.
4. Secures the good will of the employees.
5. Increases the proportion of old employees, with their gradually increasing value.
6. Reduces compensation for accidents resulting in deformity and death.

The advantages of a health maintenance department to the employee are as follows:

1. Properly places employees according to physical ability and condition.
2. Furnishes better medical and surgical service.
3. Prevents accidents to himself or fellow workman.
4. Reduces permanent disability.
5. Protects from infections or contagious diseases.
6. Prevents loss by finding focal infections.
7. Discovers diseases early.

The health maintenance department increases the output of the man by keeping him well, so that he can work, say, from 75 to 90 per cent of his time, as compared with 25 to 50 per cent of his time when his health is poor. This is a great advantage both to the company and to the man himself. The cost of training new employees is decreased, since with better health there are fewer changes. The loss in the time it takes to develop a new employee is greater than can possibly be the health maintenance of several men.

The efficiency of the company's service to the public is increased, because the employees are better able to handle the public by meeting them in a pleasant attitude, which they could not do if they were ailing or were suffering from hidden diseases. The spread of infectious diseases among employees and from them to the public is prevented.

By properly placing each employee according to his physical ability to serve, he is enabled to work without being handicapped by some infirmity that would prevent his advancement. Likewise the proportion of older employees will be increased, and their value to the company and to themselves will be gradually growing greater. By properly protecting the employees' health his expectancy of age will be increased materially, making it possible to increase his years of service.

Proper care of those injured should result in quicker recovery, reducing the amount of compensation very materially, due both to the decreased time required for healing and to the reduction in the number of deformities and permanent disabilities that usually follow injuries. Death cases can be reduced to a minimum in many instances, provided the injury is handled properly and with the least delay after its occurrence.

*Abstract of an address before the street and interurban railway section of the Southwestern Public Service Association, Fort Worth, Tex., May 16.

City Officials Hear About Railways' Paving Problems

SPEAKING before the engineers' section of the conference of Mayors and city officials held at Buffalo on June 13, H. H. George, engineer maintenance of way Public Service Railway, drew attention to the impracticability of preparing a definite specification for street railway track construction which would be suitable for all conditions.

He spoke also on the need of closer co-operation between municipal and utility engineers in relation to the location of surface and underground work. Sewers, water, electricity, gas, telephone, steam mains and sometimes mail tubes occupy space and require frequent service connections to the adjacent structures along the street. Some streets also carry exceedingly large trunk sewers and water mains which are frequently independent of the regular local mains. Practically all of these utilities have manholes and valve boxes which extend to the surface at frequent intervals and these often form quite a collection at street intersections. Instances have been noted of

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as many as eleven manhole covers at one location within the confines of two 50-ft. intersecting streets. When there are many manhole heads in the vicinity of the car track, curves and special trackwork it becomes a nice problem to design tracks to dodge them, and their presence usually causes great difficulty in properly constructing and maintaining the tracks and track pavement.

Concerning the paving obligations of street railways, Mr. George said that the only justifiable basis for the imposition of the paving impost disappeared with the horse cars; the companies today pave and maintain a right-of-way merely because, when the change was made from the horse-drawn vehicles to electrical propulsion, no consideration was given to changed conditions as far as the resultant wear on pavement was concerned. The question of relief from the paving burden is a vital one to the street railway industry. Relief has been granted in a certain relatively small number of cases through special legislation. A good beginning has been made and the sentiment for complete relief is gaining ground among thoughtful people. It would appear to be high time that laws making burdensome paving requirements on the street railway companies should be repealed and the justice of the street railway's claim for relief from the responsibility for paving expense recognized and this burden placed where it properly belongs.

American Association News

Heavy Traction

THE heavy traction committee met at New York on June 13. The members present were: A. H. Armstrong, J. M. Bosenbury, H. W. Cope, J. C. Davidson, Mr. Chase (representing J. V. B. Duer), N. Litchfield, L. B. Wells and Sidney Withington, chairman.

The draft of the proposed annual report was carefully reviewed and discussed in detail. The committee members were requested to make suggestions of men who may discuss it at the annual meeting. Suggestions were also requested for activities of the committee for the coming year.

Collection of data which has not yet been completed includes information on electric locomotives below 80 tons weight for industrial purposes and which conform to the M. C. B. standard.

It is understood that a committee of the Association of Railway Electrical Engineers is to study self-propelled car operation. To avoid duplication of effort it was the consensus of opinion that the data collected on this subject be sent to the A.R.E.E. committee of the association interested, with the understanding that the American Electric Railway Association will receive the benefit of any information which may be collected by the A.R.E.E.

A letter from H. A. Johnson, sponsor, was read in connection with the presentation to the American Engineering Standards Committee of subjects for national standardization. Since these standards primarily concern steam railroads it was held that any presentation to the A.E.S.C. would come more appropriately from the A.R.A. rather than from this association.

Preparing for Atlantic City Exhibit

AT THE time this paper went to press there were applications for more space for exhibits at the annual convention than at the corresponding period in 1919, 1920 or 1922. There was no exhibit in 1921. The application blanks went out to manufacturer members the first part of the month. They called for the usual particulars of space required, dimensions of the largest piece to be shipped, weight of the heaviest pieces, total weight of exhibit, needs in the way of steam, electric power, compressed air, etc., with the regulations adopted by the exhibit committee to govern exhibits at the convention. The chairman of the exhibit committee this year is L. W. Shugg of the General Electric Company, and Fred C. J. Dell is director of exhibits, with headquarters at the association office, 8 West Fortieth Street.

It is the intention of the exhibit committee to allot space shortly after July 1 on all applications received up to that date. To all applications received after July 1 space will be allotted in the order in which they are received.

Wood Preservation

A STEP toward the eventual establishment of uniform specifications for methods of wood preservation was taken at a meeting of the special committee on wood preservation of the Engineering Association in New York on June 15. A report on specifications for brush treatment of poles was submitted. Discussion was held as to the maximum temperature at which the oil should be applied for unseasoned timber and a suggestion was made that the temperature be raised to about 250 deg. F. It was brought out in the discussion that the bristles in the brushes used would not stand up at such a high temperature.

The extent to which non-seasoned timbers, and seasoned timber which has been made wet by rain, would respond to preservative treatment was also discussed. It was brought out that some wood case-hardens on seasoning and will take treatment better if moistened slightly before the application of a preservative. A. P. Way raised a question as to the desirability of recommending the use of grade 1 coal tar creosote oil for the brush treatment of timber. The committee was of the opinion, however, that this grade of oil was not suitable for brush treatment, but thought it would be desirable to recommend that next year's committee prepare specifications for a type of oil for brush treatments.

Specifications for open tank treatment of poles was the subject of a report submitted by E. F. Hartmann. There was a discussion concerning the result obtained by treating unseasoned or green poles by the open-tank method. A report on specifications for pressure treatment for pine poles was submitted by C. A. Smith. It was thought that these specifications should include the use of grade 2, as well as grade 1, coal tar creosote oil for this purpose, and that the range of temperature of the oil should agree with the existing specifications for treatment of ties and dimension timber.

Because specifications for pressure treatment of poles have not yet been adopted as standard by the American Wood Preservers' Association, the report of this committee was accepted for information only. It was thought that the existing specifications for the purpose of treating crossarms were entirely suitable, and nothing further was done along this line. The perforation process for timber treatment was discussed. A historical sketch, consisting of a review of existing specifications, was presented.

Those present at the meeting were H. H. George, chairman; A. P. Way, M. J. Curtin, W. H. Fulweiler, E. F. Hartmann, E. L. Morier and C. A. Smith.

Joint Committee on Engineering Accounting

A MEETING of the joint committee of the Accounting and Engineering Associations to study the subject of engineering accounting was held at association headquarters on June 15. Those in attendance representing the Accountants' Association were G. F. Dineen, Holyoke, and J. E. Heberle, Washington, while L. R. Brown, Rochester, and E. D. Dreyfus, Pittsburgh, represented the engineering members of the committee.

The study of the committee this year will be the drafting of a suggested classification of detailed accounts in the standard classification for the benefit of those companies which, on account of their size, find it convenient to divide their accounts to a greater extent than is called for in the standard classification. Under the rules of the Interstate Commerce Commission, companies are permitted to do this providing they make no change in the accounts called for in the classification.

It was found that a number of companies have been subdividing the I. C. C. accounts to a considerable extent, and it is hoped that through the work of the committee a more scientific method of following this practice will be available for those companies that wish to adopt it.

The work of the committee last week was devoted largely to reviewing suggested subdivisions of the way and structures capital account, or accounts 501 to 550, inclusive.

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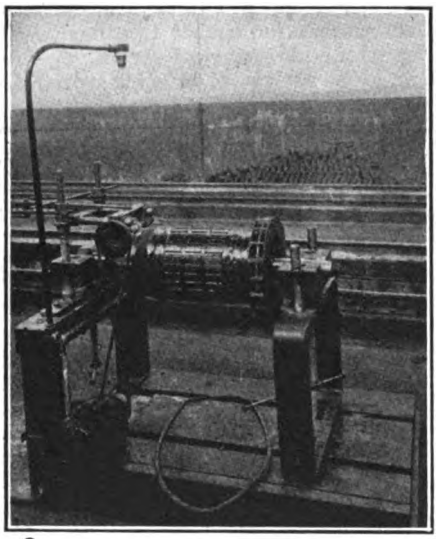
Maintenance of Equipment

Convenient Commutator Slotter

A COMMUTATOR slotter that provides for both vertical and horizontal adjustment of the armature has been constructed in the shops of the Lehigh Valley Transit Company, Allentown, Pa. It is mounted on a bedwork frame and has a wooden framework at the operating end, for supporting the operating mechanism, and a strap-iron mounting at the pinion end, constructed of 4-in. x 1-in. iron. The slotting saw is driven by



Home-Made Commutator Slotter

a belt from a 1-hp., 110-volt, 60-cycle motor, which is mounted on the bedplate. The framework for the shaft which carries the slotting saw slides on two 1-in. rods and is moved back and forth to cut the slot by a lever at the outside end. Two vertical rods threaded at the upper ends provide for adjustment of the saw in a vertical direction so as to accommodate commutators of different size.

The armature shaft fits into wooden saddles, which can be raised and lowered by means of screws. Sidewise adjustment of one end of the armature is provided by moving the supports, which are clamped in position by bolts. Thus, commutators which are somewhat out of alignment can be set so as to cut an accurate slot and not leave any mica on the side, or cut away an excessive amount of the copper. A 1-in. pipe supports a lamp for the convenience of the operator and a hose connection is provided for blowing away the particles of copper dust. A jib crane mounted on an adjacent post is used for handling armatures into and out of the slotting machine.

Table of Bushing and Pin Data Helps Repairmen

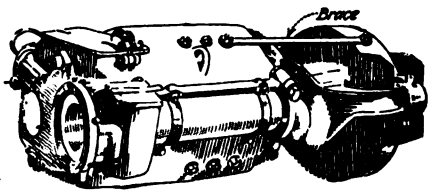
IN ORDER that the shopmen may know exactly the dimensions of parts required in making repairs, the San Antonio Public Service Company has prepared a table which shows the sizes of bushings and pins used on its various equipment of railway cars.

Each type of car is classified separately by the builder's name and series numbers. The apparatus in which pins and bushings are used is listed, and on the same line are given the dimensions of the several parts, and the stock names. This table, which is posted where it will be always available to shopmen, is convenient in making out storeroom requisitions.

The left-hand columns of the table show the sizes of bushings and pins in stock, and at the right are given the number required per car. It enables the workman to get the correct size from the stock room the first time and insures the use of bushings and pins of the right size.

Brace Holds Gear Case in Alignment

A DIFFICULTY frequently experienced, especially with older types of railway motors, is tilting of the gear case away from the perpendicular. This is because the case is not anchored to the motor frame with sufficient rigidity. Continuous vibration loosens the bolts, after which the finished surfaces rub and wear, so that a tight fit is impossible. The gear case then tilts until the



The Brace Prevents Vibration of the Gear Case

side clearance from the gear is gone, and the gear cuts through the thin metal, making a hole in the side.

To prevent this difficulty the West Penn Railways, Connellsville, Pa., has designed a brace that connects the top of the gear case to the motor frame. This consists of a 1-in. round bar, upset on the ends to provide bosses. One end is fastened beneath one of the pole-piece bolts, and the other to the top of the gear case. The brace entirely prevents the trouble, since vibration cannot move the gear to produce rubbing.

ST LOUIS CARS 285-299										
SIZE OF BUSHING STOCK					BUSHINGS			PINS	
Inside Diam. Ins.	Length Ins.	Outside Diam. Ins.	Name		Number per Car	Number Cars	Total	Pin Diam.	Pin Length
1 9/64	3/4	1 3/8	M	Air cylinder ram	2	15	30	1 1/8	3
1 9/64	1	1 3/8	O	Floating lever at ram end	6	15	90	1 1/8	3
1 9/64	3/4	1 3/8	M	Tie between dead and floating levers at cylinder	4	15	60	1 1/8	3
1 9/64	3/4	1 3/8	M	Air pull rod clevis cylinder end	4	15	60	1 1/8	3
1 9/64	1	1 1/4	I	Vertical floating lever	12	15	180	1	2 5/8
1 9/64	5/8	1 1/4	F	Connecting link between vertical floating lever and breakbeam bushed in vertical lever only	16	15	240	1	2 5/8
1 1/64	1	1 1/4	I	Brakebeam bushed on each end	6	15	90	1	2 5/8
1 1/64	1/2	1 1/4	E	Fulcrum pin support of vertical lever	8	15	120	1	2 5/8
1 1/64	5/8	1 1/4	F	Adjusting clevis or jaw	16	15	240	1	2 5/8
1 1/64	1	1 1/4	I	Adjusting eyebolt	4	15	60	1	2 5/8
1 1/64	5/8	1 1/4	F	Breakshoe head (lower hole)	8	15	120	1	2 5/8
57/64	3/4	1 1/8	C	Breakshoe head (upper hole)	8	15	120	7/8	3
57/64	3/4	1 1/8	C	Brake hanger links	8	15	120	7/8	3
57/64	3/4	1 1/8	C	Supporting casting engaging brake hanger links	8	15	120	7/8	3
				AMERICAN CARS 270-284					
1 9/64	1	1 3/8	O	Floating lever at cylinder stock	3	15	45	1 1/8	3
1 9/64	3/4	1 3/8	M	Ram in air cylinder	2	15	30	1 1/8	3
1 9/64	5/8	1 3/8	L	Tie rod between floating and dead levers not bushed on dead lever ends	2	15	30	1 1/8	2 1/4-2 3/4
1 9/64	7/8	1 3/8	N	Air pulls rod on air cylinder end	2	15	30	1 1/8	4 1/4

This Table of Bushing and Pin Data Aids San Antonio Shopmen

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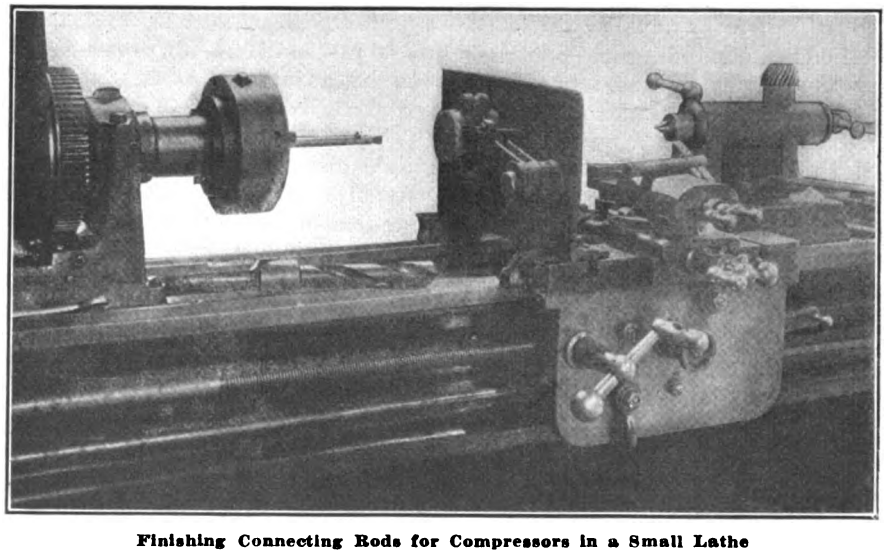
Trimming Springs with Acetylene Torch

WHEN leaf springs are made in the ordinary forge shop to replace broken springs, or when broken springs are welded, it is necessary to bend the ends exactly to size to give the correct length and to fit the suspension hanger pins. Since on repair work it is not always possible to determine beforehand the exact amount of material needed, there is usually a small surplus which must be trimmed off to make a correct fit. This is frequently done with a hot cutter on the anvil.

The West Penn Railways, Connellsville, Pa., has adopted a practice which is simple and effective. The spring is made exact to size in a jig and the ends bent over to form the link. The surplus metal is then cut off by means of the acetylene torch. This is done while the spring is still in the forge shop, and since there is no hammering, there is no chance for the spring to get out of shape. The metal is cut off cleanly, and the entire operation takes only from two to five minutes.

Finishing Connecting Rods in Small Lathe

THE accompanying illustration shows the fixtures used for finishing connecting rods for compressors in a small lathe at the Fairview shops of the Lehigh Valley Transit Company. The usual plan would be for such a piece to be held in the headstock of the lathe and rotated, but the lathe used in this case is not large enough to swing the connecting rod, so this is held stationary on a jig bolted to the carriage of the lathe and the cutting tool is rotated. The accompanying illustration shows a connecting rod in position for finishing. It is fastened to the face of a jig of L section by means of clamps with two bolts on either side of the rod. A pin projects from the jig to receive the finished part of the rod. The plate used has a base 2 in. wide to provide for fastening securely to the carriage of the lathe. It is 11 in. high at the base and ½ in. thick. After the connecting rods have been babbitted, the bearing surface is first drilled out and finished with a boring bar. The outside portions of the rod are finished with a tool rotating with the spindle of the lathe.

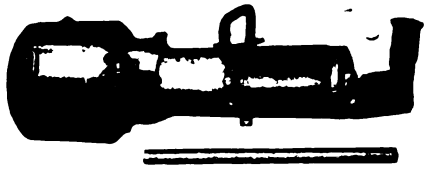


Finishing Connecting Rods for Compressors in a Small Lathe

New Equipment Available

Hydraulic Pinion Puller

THE accompanying illustration shows the Peerless hydraulic pinion puller, a new specialty being marketed by the Electric Service Supplies Company, Philadelphia. This device is designed to remove pinions from railway armature shafts quickly. It is of light weight so that it readily can be carried to the armature or motor from which the pinion is to be removed. It clamps over the end of the pinion, and since it pulls in a straight line it can be applied to the shaft without removing the armature from the motor.

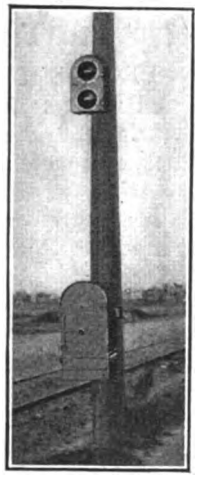


Portable Hydraulic Pinion Puller

The action is hydraulic, oil being used as the medium for producing the pressure. This is pumped up by means of a hand lever at the end of the pinion puller. Six sizes of jaws furnish a means of fitting pinions ranging from a minimum diameter of 2¾ in. up to a maximum of 9 in. The jaws consist of two heavy steel castings, held together by quick-action clamps. The inside face is machined so as to take care of variations between new and badly worn pinions. The device complete weighs approximately 50 lb., and is supplied with a handle for convenience in carrying.

Lights Only Indication in New Signal

A SIGNAL in which the indications are given only by colored lights has been developed by the Chapman Electric Railway Signal Company. The separation of the indicating lenses from the operating mechanism is a feature of the apparatus. This permits each to be placed in any desirable location. The case containing the operating mechanism can be placed low on the pole, where it may be inspected and worked on by any one standing on the ground, and the case containing the colored lenses and lamps in a position most easily seen by the motorman.



The Lenses Are Separate from the Operating Mechanism in This Signal

The indicating cases are each fitted with two 6⅜-in. diameter lenses, one of which, when the lamp back of it is lighted, will show red and the other, when its lamp is lighted, will show green. The lenses are so fitted that they will not give the appearance of being lighted when the sun shines on them. Behind each lens there are two 50-watt lamps, each on a different circuit, so that the failure of one lamp does

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not put out the other. All lamps are on circuits separate from the magnets of the operating mechanism.

The operation of the signal is as follows: When a car approaches the signal and the motorman finds it unlighted, he will understand that there is no car in the block. The car thereupon proceeds and as it passes the contactor a green light appears at the near end of the block and a red light at the remote end.

The motorman of a car approaching a signal which is displaying a green light will understand that another car, moving in the same direction, has preceded it into the block. As it proceeds under the contactor, the green light will momentarily disappear, the red light will momentarily be lighted and disappear, and the green come back permanently. The car may then pass the signal. Unless this series of operations, which shows that the car has counted itself into the block, takes place, the car should not proceed. When all cars that have entered the block have passed the clearing contactors at the leaving end, signals will return to their normal, non-lighted condition.

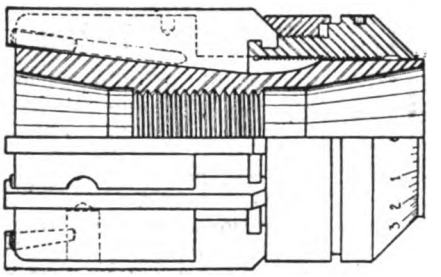
Roller Bearings Applied to Turntables

APROPOS of the interest in roller bearings in connection with electric and steam railway rolling stock, the recent construction of a turntable for the Canadian National Railways by the Dominion Bridge Company of Montreal is of particular interest.

This is an 85-ft. twin span turntable, equipped with Stafford roller bearings, 5 in. x 9 in. in size. Each bearing is subjected to 48,000 lb. impact load when a locomotive of the maximum weight for which the turntable is designed comes upon the table. The rollers are arranged in two races, staggered, eliminating the continual raising of the load as each roller approaches the crown of the bearing. The turntable is equipped with a 15-hp. motor, whereas, it is said, a 30-hp. motor would be required for operation with friction journal bearings. In addition to their low friction, the roller bearings have the advantage that they require no more power in winter than in summer, as the lubrication resistance is done away with.

New Line of Expansion Reamers

THE Davis Boring Tool Company, St. Louis, Mo., is placing on the market a new line of expansion reamers. Provision is made for rapid adjustment without the necessity of circular grinding, and individual blade screws are eliminated for holding the reamer blades in the body. The blades are firmly held in the reamer by means



Shell Type Expansion Reamer with Micrometer Dial

of hard taper pins, whose holding power is many times greater than the type of screws ordinarily used. The entire length of the hard taper pin is in contact with the notch in the blade, thus holding it rigidly in the bottom of the slot without interfering with the free movement of the blades for adjustment. The only time that it is necessary to release the taper pin is for replacement of the blade.

In replacing blades, the taper pins are driven out by means of a special drift inserted in "knock-out" holes. When the blades reach their limit of utility in one reamer, they are interchangeable in smaller sizes.

So as to meet various conditions, the expansion reamers are furnished in three types. Group 1 reamers are of superior quality and the methods of expanding and contracting the blades on the taper is by means of a positive micrometer dial graduated in one-quarter thousands. All threads are covered and protected. The taper drive and the internal thread hold the pilot or driving arbor in true alignment.

Group 2 reamers include those designed for shops where a moderate price tool is desired. It employs the forward movement of blades on a taper with the blades advanced and securely held with hardened taper pins. Rigid locking is obtained with a hardened locknut reinforced by a hardened jam nut. The driving arrangement is simple and requires only an ordinary arbor which can be purchased with the reamer if desired at a very low cost. Group 3 reamers are simple in construction and inexpensive, and are designed for withstanding hard usage. They can be used to advantage in boring as well as reaming. The expansion is by blades held by taper pins in the same manner as for Groups 1 and 2.

Automatic Window Cleaner

THE Folberth Auto Specialty Company, Cleveland, Ohio, announces the installation of its automatic windshield cleaners on the cars of the Cleveland and Louisville railways. This cleaner consists of a long wiper arm to which is affixed a rubber cleaning blade. The arm is caused to oscillate back and forth by a piston in an air cylinder fastened to the top of the window. The air cylinder is connected directly to the air line on the car, a small reducing valve being located between the cylinder and the air line connection. The cleaner can be operated

Window Cleaner Installed on Cleveland Car

on from 4 to 200 lb. air pressure and can be adjusted to any uniform speed desired.

The Folberth automatic windshield cleaner has been used quite extensively on automobiles, and its new use in electric railway service requires but few changes. A longer and heavier wiper arm with rubber cleaner blade is used and a heavier boss for supporting the driving shaft. Some changes in the interior mechanism have also been made, in order to adapt the piston head and valves for working on air pressure instead of on vacuum as developed by the suction of the automobile motor.

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The News of the Industry

No Service in Frankfort

Capital of Kentucky Loses Railway Service Because of Unwillingness to Approve Franchise Renewal

Frankfort, the state capital of Kentucky, has been without trolley service since June 5, on which date the franchise of the Kentucky Traction & Terminal Company expired. The question of the renewal of the contract had previously been taken up with the local Chamber of Commerce to see if a franchise could be worked out that would be worth while submitting to the City Council. Three open meetings were held at which several city officials were present. The company's operating statements showed that operations at a 5-cent fare had caused $12,000 to $15,000 annual loss. The 6-cent fare allowed during the war period was disallowed fifteen months ago.

Can Not Operate at a Loss

The company told the citizens that operations would be continued if it could be done without loss. It was willing to waive any claim to a profit. It also agreed to operate under a franchise which the city might draw up, if the company was relieved of paving cost and maintenance of track excepting rails, ties, joints, etc., making up the track structure proper. The desire was for a twenty-year contract subject to discontinuance of operation on thirty days notice from either party. It was to be understood that, under this franchise, the company would assume the obligation of repairing all paving injured through carrying on its own construction work.

At the last meeting of the City Council in May the company proposed an ordinance to continue service thirty days under the terms just mentioned and at a 7-cent fare. The Council proposed an ordinance authorizing continuation of service for thirty days under the old terms of a 5-cent fare and the usual paving obligation. The company refused.

The same night the Council introduced a resolution calling for paving of certain streets in the city. Under the resolution property owners were to pay for paving from curb to track, the city to pave the street intersection and in and between the tracks. The city was to pay for all paving cost of the track, but not for rails, ties, joints, etc. The idea of this resolution was to bring a test case to determine whether the statutes of the State of Kentucky can relieve a company of the paving obligation in making a new franchise contract. No such paving case has heretofore come up for settlement. Whatever procedure is adopted by a city must continue for ten years, and the state law provides that a city must reserve the right to cause the traction company to pave between and 18 in. outside the tracks.

It is the exact interpretation of what a city "may" do under this law that remains to be settled. Where an agreement already covers obligations regarding the track paving the Railroad Commission cannot relieve the company of obligations under the agreement. As the Court of Appeals has not yet passed on the law the whole matter is in the air.

Only two out of 257 people approached refused to sign a petition asking the company to restore service.

The Frankfort Bus & Truck Line Company, with two regular buses and one spare, has been trying to serve Frankfort's population of 10,000. It started operation on June 11 with a 5-cent fare, but after five days went to 10 cents, with four tickets for 25 cents.

Chicago Wage Arbitration Hearings to Begin June 25

Arbitration of the wage dispute between the Chicago Surface Lines and the Chicago Elevated Railroads and their employees will begin on June 25. Hearings before the arbitration boards probably will be held in the City Council chambers in the city hall and will be open to the public.

The arbitrators chosen at a joint conference of the interested parties and Mayor Dever in his office in the city hall are:

For the public, Francis X. Busch, corporation counsel of the city of Chicago. He was named by Mayor Dever as the umpire or "third man" on the boards and his selection was approved by both sides.

For the unions, Maclay Hoyne, former state's attorney. He served on the arbitration board that settled the wage controversy after the strike of 1915.

For the surface lines, James M. Sheean, attorney. He likewise served as a member of the board in 1915.

For the elevated railroads, William A. Morrow, attorney.

The cases of the surface and elevated employees will be heard separately. Corporation Counsel Busch, as "umpire," will sit on both boards and Mr. Hoyne, representing the union men, will also serve on both boards.

Both sides signed an agreement to abide by the awards of the arbiters. The wage scale fixed will run for two years from June 1.

Home Rule Campaign Fails

Despite Governor's Urging Legislators of Tennessee Reject Proposal to Restore Local Control

The effort in Tennessee to abolish the Public Utilities Commission is quiescent for a time, but is by no means dead. This is the opinion of observers of the recent attack on the utilities law in the sixty-third Legislature.

The move to abolish the commission and to return to home rule was urged by Governor Alf Taylor, the Republican incumbent, before the session of the Legislature two years ago and became one of his principal campaign points in offering himself for re-election. On the eve of the November election of 1922, Governor Taylor was most pronounced in declaring he would force the repeal of the act. He accused his Democratic opponent, Austin Peay, Clarksville, of evading the issue. The Governor's boast was that he would restore to the municipalities their right to enter into contract.

Governor Taylor went down to defeat as did also one of Governor Taylor's appointees to the commission, W. N. Beasley, Halls, who during the election campaign promised to lower all the utility rates in the state to pre-war levels.

Commission Issue Raised Again

With Governor Taylor's defeat and the inauguration of Governor Peay, the public utilities act became a renewed issue when the new Governor in his inaugural speech repeated his pledge to restore the right to contract to the municipalities of the State.

While bills looking toward this end were introduced in both houses of the Legislature in the first week of the session, no action was taken on the floor of either house until after the recess. As the Tennessee Legislature convenes for only seventy-five days, all discussion of public utility matters came in the closing days of the session.

Immediately on the recommendation of the Legislature, Governor Peay summoned the city officials of the nine larger cities of the State to learn their views on the present utility act, and he formulated his program accordingly. There was, of course, a conflict of opinion among the municipal officers as to what would be best or how state authority could be asserted over the utilities in event the act was repealed. On the adjournment of this conference Governor Peay announced that there had been a unanimous declaration for the repeal of the act, and that a committee had been delegated to draw up a

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measure to this end. When Governor Peay reassembled the city officials, however, more than a score of cities protested against the repeal of the act, saying that they had found the Public Utilities Commission of the greatest benefit and help in regulating their utility affairs.

Despite this Governor Peay, on March 20, sent to the Legislature an urgent message, and the only special message of the session, advocating the immediate repeal of the act. The House by a majority of seventy-four to thirteen had already voted to repeal, and the Governor's action was expected to coerce the Senate to similar action. This focused the entire fight on the Senate, where the bill was tabled by a vote of eighteen to eleven, thus practically killing the effort to repeal the measure.

Little sentiment was displayed for the repeal previous to the Governor's message, and at the hearing before the public utilities committee of the Senate few representatives of the cities appeared to urge favorable action.

The Mayor and the city attorneys of both Memphis and Chattanooga advocated repeal, while the officials of both Nashville and Knoxville, the two other larger cities, took an opposite view.

MAYORS ADVOCATED REPEAL

A committee for the city attorneys conducting a rate case against the Cumberland Telephone & Telegraph Company were unanimous in defending commission rule, and the bill to repeal was reported for rejection.

On the tabling of the measure, a new bill was offered by Senators A. B. Anderson and W. H. Washington, suggesting an amendment to the present law, increasing the personnel of the commission to five and adding a special lawyer to serve as counsel for cities and consumers wishing to protest against utilities. This passed the Senate, but in the press of the final days of the session it was not brought up for consideration by the House.

Several evasive bills were offered to take the larger cities from the commission's control, but these, too, met defeat.

Trial of Striking Employees July 10

Col. William J. Donovan, United States Attorney for the western district of New York, announces that a special session of the Federal court will be convened in Buffalo beginning July 10, with Judge John R. Hazel presiding. The special term was called to hear the trial of State Senator Robert C. Lacey and striking employees of the International Railway, Buffalo, charged with conspiracy in connection with the dynamiting of the Buffalo-Niagara Falls high-speed electric train last summer, in which many persons were injured. Two of the prisoners are also charged with perjury in connection with the case. The men will be defended by attorneys representing the Amalgamated Association.

$5,500,000 Electrification Project at Boston

It is estimated that it will cost the city of Boston $4,500,000 to carry out the provisions of the so-called Dorchester transit bill, the passage of which was referred to briefly in the ELECTRIC RAILWAY JOURNAL for June 9. This does not include expense for equipment totaling another $1,000,000.

The Dorchester transit bill is calculated to give the people of Dorchester rapid transit on Boston Elevated trains as far as Fields Corner, with surface car connections from that point as far as Welles Avenue, over what is at present the Shawmut branch of the New Haven road.

The bill provides that the city of Boston shall finance the entire project, paying the cost of extending the tunnel beyond Andrew Square, changing the railroad tracks on the Boston division and procuring this right-of-way for the Elevated; defraying the cost of land taking and damages and new track equipment, and purchasing the Shawmut branch outright from the New Haven and Old Colony roads at a price not to exceed $1,000,000. (The Interstate Commerce Commission has estimated the physical valuation of the Shawmut branch as $1,050,000).

The bill states that after the city has acquired the property it shall be leased to the Boston Elevated at a rental rate of 4½ per cent a year, "upon the fair and reasonable cost, as determined by the Public Utilities Department of the premises and equipment." But it is stipulated that, though the rental shall be not less than 4½ per cent, it shall in any event be one-half of 1 per cent more than the rate of interest the city has to pay on its bonds. The one-half of 1 per cent profit a year accruing to the city is intended to go into a sinking fund, which, in the end, it is anticipated, will amortize the principal. Mr. Ufford has estimated that the city can discharge the entire cost in 40 years.

The method of financing is the same followed in the acquisition of subways by the city and rental to the Elevated.

Apparently the only direct expense to be borne by the Elevated will be the purchase of new cars. At the company offices, it is estimated that 40 new tunnel cars will have to be provided at a probable expense of $20,000 each, totaling $800,000. As additional surface cars may have to be furnished for the run beyond Fields Corner, the total expense to the Elevated might reach $1,000,000.

The principal physical changes decreed in the bill are:

1—Extension of the Dorchester tunnel from its present terminus a few hundred feet beyond Andrew Square so that tunnel trains will come to the surface to the west of the tracks of the Boston division of the New Haven road. This is to bring the tracks under Boston and Power Street and Dorchester Avenue, thus avoiding grade crossings.

2—Use by the Elevated of the railroad right-of-way on the Boston division of the New Haven road from Dorchester Avenue to Harrison Square where the Shawmut branch begins. The railroad tracks are to be moved over toward Dorchester Bay, and the Elevated trains will run over the present location of the New Haven tracks. Shelters or stations for Elevated passengers must be provided at Columbia Road and Savin Hill Avenue and at such other points as may be agreed upon between the Elevated and the Public Utilities Department.

3—Erection of a terminal at Fields Corner, where the Dorchester tunnel trains will be looped or run dead in, for the return trip to Harvard Square.

4—Use by the Elevated of the Shawmut branch from Fields Corner to Welles Avenue or beyond to serve Milton for single car service connecting with the new rapid transit line.

Commission Rules on Deferred Maintenance and Property Appraisal

The Public Utilities Commission of the state of Tennessee recently handed down a decision involving three technical points in the application of the Nashville Railway & Light Company for increased rates.

The first question presented was whether the commission's order of Dec. 31, 1920, should be construed as allowing the company to compute the return on its property from April 1, 1920, or from Dec. 31, 1920. The commission said the latter date was the one intended.

The second question referred to the method of handling the expenditures for deferred maintenance under the order of Dec. 31, 1920. The commission ruled that the proper method was to credit the sum monthly, beginning April 1, 1920, with an amount equal to the excess of the actual expenditures of the company for maintenance during each month over and above an amount equal to 10 per cent of the operating revenue for each month. This sum is not to includes charges to maintenance accruals to renewals and replacement reserve, with monthly payments on the deferred maintenance account to be deducted from the earnings of the company under the rate of return prescribed by the previous order. This account must be wiped out by April 1, 1924, the commission held, regardless of the net earnings of the company over 6½ per cent.

The third question settled was whether the expense of the appraisal of the property of the company made in 1920 and the cost of the traffic survey completed in 1921 should be amortized over a period of years. The commission held that the cost should be spread out over a period sufficiently long to allow the company to pay it at the rate of $1,000 per month, beginning April 1, 1920, and the cost of the traffic survey at the rate of $500 per month, beginning Jan. 1, 1921.

Wages Under Discussion

A new wage agreement on the Berkshire Street Railway, Pittsfield, Mass., is under discussion, the yearly contract having expired June 1. The union has presented its case, but the terms desired have not as yet been made public. It is stated, however, that the request is for a substantial increase over the present scale.

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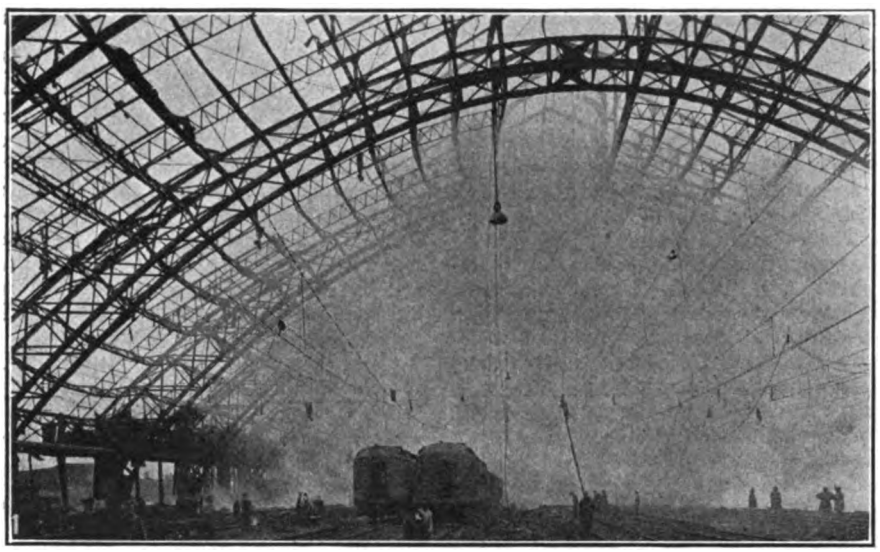
Electric Service Restored Quickly After Philadelphia Fire

Fire which started under the track floor of the Broad Street station trainshed of the Pennsylvania Railroad at Philadelphia just before midnight on Sunday, June 10, wrecked the entire track floor and the huge trainshed and destroyed a large amount of baggage and railway property in the story below the track floor, including the power plant, which supplied heat and power to the station building. The terminal and office building lying east of the trainshed, was not injured. The size and rapid spread of the fire resulted from the antiquated construction of the station, built partly in 1881 and partly in 1893.



View Showing General Havoc Wrought by Flames

With the central point of the Pennsylvania System out of service through the fire, work to restore traffic was taken in hand immediately and with admirable energy. New signaling and dispatching wire lines were run outside the trainshed even while the fire was still in progress, the West Philadelphia and North Philadelphia stations were made terminal points, and crews started to repair overhead conductor wires at the west end of the station to permit electric traffic to be resumed at the earliest moment, using the platform extensions and sheds outside the main shed. By Tuesday morning, thirty hours after the outbreak of the fire, work was actively in progress building new platforms on the wrecked steelwork of the trainshed floor, and as the views herewith show, by the following morning several of these platforms were in service. Before this, stairs had been built for direct access from the street level to the surviving platform extensions west of the shed, and these went into service even on Monday.

At 11:45 p.m., June 10, when the fire was discovered, the entire station traffic of 529 trains daily was paralyzed. By 5 a.m., Monday, arrangements had been made for trains to terminate at North Philadelphia, West Philadelphia, Thirty-first and Chestnut Streets, and (for the Atlantic City trains) Camden, abandoning bridge train service from the coast. Conductor-wire reconstruction was so rapid that before four o'clock Monday afternoon electric service was resumed from the west end of the station shed to Paoli and Chestnut Hill, this service being made complete by midnight. By Thursday, June 14, normal steam-train service on two branches was resumed from Broad Street station, and bridge train service was resumed, terminating at West Philadelphia. Within seventy-two hours after the discovery of the fire, 246 trains, or nearly half the total, had been restored and nine of the sixteen tracks were available.

Pamphlet Will Inform Public

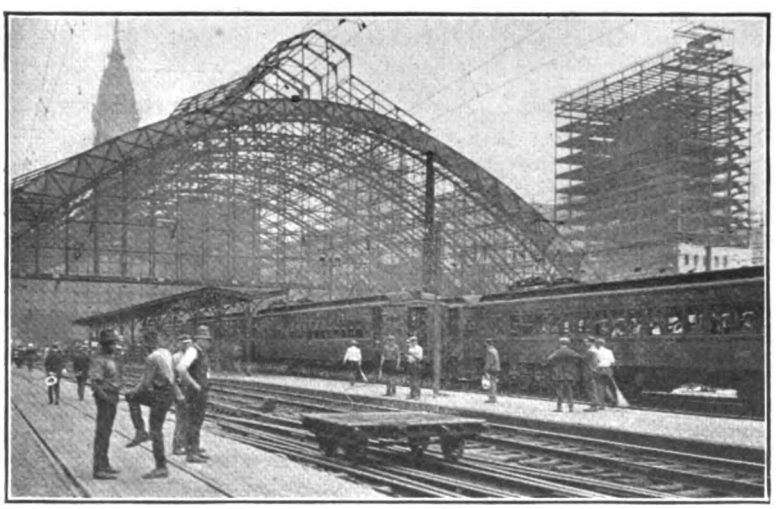
The Omaha & Council Bluffs Street Railway, Omaha, will keep its patrons informed through *Street Car Topics*, a small four-page publication which will be distributed twice a month. The first issue already has been circulated. Copies are placed in tin boxes which have been fastened within easy reach of passengers. In a foreword of the first issue the company states that the aim will be to place before those who ride in street cars facts bearing on various phases of street car operation and service. Further, the foreword says that to attain maximum service at minimum cost harmony and co-operation are necessary with a utility, its patrons, and the public officials charged with the duty of regulating the utility.

Service Being Improved in Schenectady

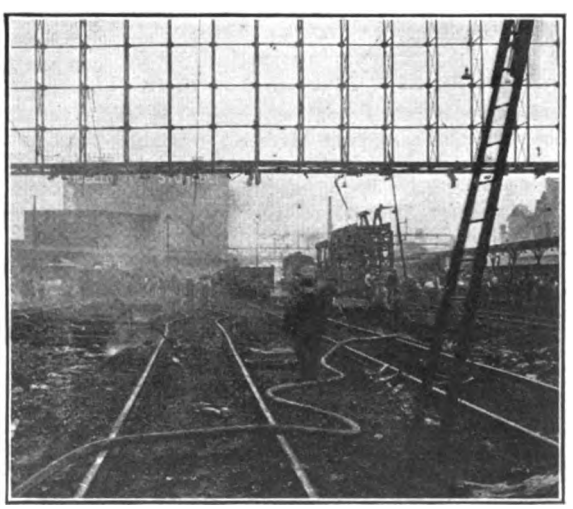
The Schenectady strike situation remains practically unchanged. The Schenectady Railway has extended its service to nearly all city lines and is now going ahead with the work of gradually building up a permanent force. While service is being maintained, there is little riding on the cars. Cars are being operated until midnight with no further disorders.

The interurban service is being maintained with a fair degree of patronage, the cars being manned by the old employees.

The State Industrial Commission adjourned its inquiry during the week ended June 23 subject to the call of the chairman. It is expected the members of the commission will render a report of their findings as to the cause of the strike in a week or ten days.



Electric Trains Being Dispatched from Point Outside of Train Shed



Crew of Tower Car Repairing Overhead Wires

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Arbitration on Detroit Municipal Wages

The request of the employees of the Detroit Department of Street Railways for a 20 per cent wage increase and several changes in the existing working conditions will be arbitrated. The city will name an arbitrator, who will sit with Judge Edward J. Jefferies, the representative of the men, and they will appoint the third member of the board.

The present pay for platform men is $5 for an eight-hour day. The readjustment of schedules is to eliminate inequalities in runs and to bring the employees nearer to the average eight-hour day asked.

A somewhat similar action was taken by employees of the Detroit United Railway in asking for a 20 per cent increase in pay and the uniform readjustment of wages and working conditions on the Flint, Mount Clemens, Monroe and Ann Arbor divisions. At the first meeting between company officials and representatives of the employees methods were planned looking toward an agreement.

More Action on Dallas-Denton Interurban

The second attempt by legal action to prevent the laying of the line of the Dallas-Denton interurban on Fairmount Street in Dallas, Tex., has been begun by property owners on this street. In former litigation, recently decided by the State Supreme Court adversely to the property owners, an injunction was obtained in the District Court of Dallas County restraining the city from passing an ordinance giving the Texas Interurban Railway authority to lay its tracks on Fairmount Street. This was carried through the Appellate Courts to the Supreme Court, and there the court decided adversely to the property owners. Upon this decision the city passed the ordinance granting the Texas Interurban Railway the right to lay its tracks on Fairmount Street, and work was about to begin when the new action developed. The litigation is holding up the electrification of the Missouri-Kansas-Texas road from Dallas to Denton.

The Engineer in Public Affairs

Developing participation by engineers in public affairs was strongly evident at a meeting held in St. Paul, June 8-9, of the executive board of the American Engineering Council of the Federated American Engineering Societies. General round-table discussion revealed that local groups in many sections of the country are taking a constructive part in solving community problems. This local effort embraces traffic, smoke abatement, water supply, city planning, state and municipal legislation relating to engineering matters and related subjects. The committee on transportation is considering ways and means whereby the Federated American Engineering Societies may be of constructive service in relation to the transportation problem of the nation. The committee on storage of coal reported that its plans had been perfected and that the survey was well under way. Sub-committees are being formed in some eighty centers and each member society has been requested to designate a member on each sub-committee.

Mayor Will Approve Fare Ordinance in Seattle

Salary warrants of the railway employees of the Seattle Municipal Railway, which were due on June 11 and held up for two days, on account of the refusal of the Seattle banks to cash them, are to be paid by the transfer, as a loan, of $125,000 from the city light fund, provided for in an emergency ordinance which was passed by the City Council.

The increase in fare to the rate of 8⅓ cents three weeks earlier than expected will in all likelihood result in greatly aiding the Council in meeting the next railway pay warrants on June 25, and will also make easier the way for negotiations with the trustee of the railway bondholders for a modification of the purchase contract.

The immediate increase of the fare is also expected by city officials to influence the attitude of the bankers in future emergencies. Chairman Blaine of the finance committee states that the present difficulties of the railway and the fact that the system will be approximately $800,000 behind by Dec. 31 are largely due to the four months' experiment with the 5-cent fare.

Request of Minneapolis Men Refused

Horace Lowry, president of the Twin City Rapid Transit Company, Minneapolis, Minn., has refused the request of trainmen through their organization for a restoration of the wage schedule to 60 cents an hour from 53 cents, the rate which has prevailed since Jan. 1, 1922.

The employees based their request on increased cost of living, increase in pay by other railways, obligation of the company to maintain the 60-cent rate as long as the fare is 6 cents and the better financial condition of the company as evidenced by the recent declaration of a dividend at the rate of 6 per cent per annum as opposed to the 4 per cent rate which has been in effect for some time.

The company replied that living costs were greatly reduced from 1920 to 1922, but that the maximum rate of pay was continued to Jan. 1, 1922. The drop in living costs from 1920 was 19.5 per cent, while the pay reduction was only 11.6 per cent. Only ten of the fifty railways comparable to the Twin City Lines have increased wages. The company said that it had been necessary to cut common dividends for the last five years below a fair return on capital.

Provision of Kansas Law Fixing Wages Declared Unconstitutional

The Kansas Industrial Court Act has been held unconstitutional by the United States Supreme Court in so far as it permits fixing of wages.

The court held, in a suit brought by the Charles Wolf Packing Company, that the drastic regulation attempted by the Kansas act on the principle that certain industries are affected with the public interest, is clearly invalid under the Fourteenth Amendment to the Constitution.

Under this guise of "public interest" employers and labor have been required to submit differences to the Industrial Court for compulsory arbitration. Thus the court has fixed wages.

The state has also used the Industrial Court to keep prices of essentials—food, clothing and fuel, chiefly—at reasonable levels. The court's action was based chiefly on that section of the Kansas law which forbids workmen the right to strike.

Chief Justice Taft delivered the court's opinion, which was unanimous. Mr. Taft concluded:

> We think the Industrial Court act, in so far as it permits the fixing of wages, is in conflict with the Fourteenth Amendment and deprives the plaintiff of its property and liberty of contract without due process of law.

Arbitrary Deflation Would Be Unwise

It is the general consensus of opinion of the research committee of the National Monetary Association, as announced at its recent meeting, that the economic and monetary affairs of the world are in such a disturbed state that the formulation of any specific plan for stabilization at the present time is extremely difficult, especially in view of the wholly anomalous distribution of the world's monetary stock of gold.

There was general agreement that any arbitrary attempt toward deflation or a return to any fixed pre-war standard was at the present time unwise and likely to bring about far more disturbance of business and industrial conditions than could compensate for any possible gain.

Union to Erect Building in St. Louis

The local division of the Amalgamated Association for St. Louis, Mo., has purchased the entire frontage on the west side of Grand Boulevard between Bell Avenue and Windsor Place for a modern office building. The purchase price of the ground alone is said to have been $100,000.

The proposed building will contain stores on the ground floor with offices and meeting halls for various local unions in the upper stories. A feature will be a large auditorium. Unions now housed in other structures are expecting to seek quarters in the new building of the carmen.

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News Notes

Wage Agreement Being Negotiated by Interborough.—Preliminary discussions have begun between officials of Interborough Rapid Transit Company, New York, and representatives of employees with a view to extending or modifying the existing wage agreement which expires June 30. Present wage schedules were accepted by the employees in July, 1921, to be effective for one year. The period of the agreement was extended in July, 1922, for twelve months to June 30, 1923.

Receives Policies as Gifts. — Three hundred employees of the Tri-City Railway, Rock Island, Ill., received as a gift from the company insurance policies in the Traveler's Life Insurance Company effective for the current year. They were in amounts corresponding to the length of service. To qualify for a policy one must have been in the employ of the company six months. The policies contain a disability clause ineffective after the policy holder reaches the age of sixty years. Those who have been employees of the company for ten years received policies in the sum of $1,500.

Wage Increase Sought.—The Cincinnati street car men's union has sent a formal notice to the Cincinnati Traction Company seeking an increase in wages for the 1,700 employees. The increase sought averages 17 cents an hour. The present pay of motormen and conductors is 43, 45 and 48 cents an hour. The present agreement expires on July 1. If no agreement is reached the matter will be settled by arbitration as provided for in the contract between the traction company and its employees.

Men Adopt Real Slogan.—"He who does only what he is paid for is paid for only what he does." This motto has been posted in the carhouse of the Springfield (Mo.) Traction Company. At various times the men adopt mottoes to be posted in the shops to encourage them to do their work. Usually the signs pertain to methods of "safety first." For the year 1923 the motto will be placed in conspicuous places in the carhouse and shops to remind the men of their true value to the company and their duty toward themselves.

Seeks Franchise Approval.—Application was filed with the Public Service Commission on June 8 by the New York State Railways asking for the approval of a franchise granted to the company by the city of Utica to operate an extension of its present street railroad lines along James Street in the city of Utica. The proposed extension will start from the present track on James Street and extend in an easterly direction to St. Vincent Street, connecting with a loop upon private property. A franchise was granted by the city on May 7, 1923.

Paving Obligation Will Be Argued.—Judge E. S. Morris has taken exception to the ruling of Judge N. B. Hunt, who recently passed judgment for the Henderson Traction Company to the effect that the company was not liable for street paving between the rails and 12 in. on each side of them and an immediate appeal was granted to the Court of Appeals. Judge Morris will go to Frankfort to hear and argue the case when the higher court sets a date for same. The City Commissioners are anxious to get a final hearing as early as possible so they will know how to proceed in awarding contracts for street paving this summer.

"All Aboard" Appears.—*All Aboard* is the clearing house through which all news of the various departments of the United Electric Railways, Providence, R. I., will pass. This monthly pamphlet made its debut on June 1 and will appear each month in the interests of the employees. In the first issue A. E. Potter, president and general manager, tells what he thinks a company publication should do and urges all to send in contributions and suggestions for betterment of service, etc. Six years ago the employees of this company had their own paper, which was known as *The Trollier*.

Discharge of Employee to Be Arbitrated.—The employees of the Middlesex & Boston Street Railway, Newtonville, Mass., will not strike because of the discharge of William Rowse, a motorman, whose car was in collision with another. Judge Pierce of the Supreme Court, after a lengthy hearing on June 15, denied a preliminary injunction asked for by the company, and said that he agreed with James H. Vahey, counsel for the union, that a disputable question was involved that should be settled by arbitration. Pitt F. Drew, who represented the railway, announced that he would abide by the decision of Judge Pierce, and that the company would arbitrate.

Home Rule Urged for Wisconsin.—Home rule or the local regulation of the rates and services of electric light and power, railway, gas, telephone and other public utility properties by the cities in which they operate instead of by the Railroad Commission was recommended in an address by Arthur A. Bentley, Mayor of LaCrosse and president of the League of Wisconsin Municipal Cities, at its twenty-fifth annual convention of that organization in this city. Mr. Bentley said that the control of utilities by the Railroad Commission was to a degree right in principle, but in actual practice many cities of the state have found that it sometimes works a grave injustice to the small taxpayer.

Transit Conferences Started. — Conferences between the New York Transit Commission and a committee named by the Board of Estimate have begun and will continue until the difficulties in the way of the construction of new subways have been removed or until it is evident that there is no hope of agreement between the two bodies. No conclusions were reached but the six men went over the maps and routes of the lines proposed by the Mayor and by the Transit Commission. Routes on which there is little disagreement include the Brooklyn crosstown and Washington Heights lines, and hope was expressed that an agreement might be reached to start construction.

Saving Power in Dallas. — The power-saving campaign conducted by the Dallas Railway continues and gratifying results are shown, according to Richard Meriwether, vice-president and general manager. C. J. Crampton, in charge of employment and safety, is authority for the declaration that one motorman became so enthusiastic over the power-saving drive that on a long coasting trip he called back to his conductor, "Pull down the trolley, Ed, and save the wheel." George I. Plummer, superintendent of traffic, told the men that, regarding the power-saving campaign, another source of power loss is stopping, or rather starting, in a curve. He advised trying to coast around all curves and make stops clear of same.

Grants Temporary Injunction.—Federal Judge John R. Hazel in Buffalo has issued a temporary injunction upon application of counsel for the International Railway restraining the Collector of Customs at Niagara Falls from forcing the traction company to suspend service over the upper steel arch bridge at Niagara Falls Sundays, holidays and between sundown and sunrise. The temporary restraining order is effective until June 25, when arguments will be heard by the court to make the injunction permanent. The reason advanced by the government is that the International has failed to obtain a special permit required under the 1922 tariff law. Such a permit would enable the company to unload passengers and merchandise at the American end of the two bridges at the prohibited hours.

Proposed Vote on Trolley Rehabilitation.—The new board of Aldermen of Goldsboro, N. C., in their first regular session, ordered an election to see whether the city should spend $35,000 to equip and put the Goldsboro Street Railway in operation. This is the second time within a year that the same resolution was passed, the old board several months ago ordering such an election, which was never called. The rehabiliation of the Goldsboro property has been referred to previously in the ELECTRIC RAILWAY JOURNAL. It was announced early in the year that the people would vote in about six weeks to decide whether the city would put the car system in operation again. At that time it was stated that the city had about $35,000, which was realized from the sale of the old power plant, and that the city was holding the money as a sort of trust fund. Later, it was said that the amount of money to be used for the rehabiliation of the property had been increased to $40,000.

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Foreign News

One-Man Car Experiments in England

The working of an experimental one-man car on the London United Tramways for the past year has proved so successful that the tramway companies are engaged in the conversion of several ordinary cars to the one-man type. St. Helens Town Council is about to try a car of the same design. It is a single-deck car, seats thirty-four passengers and is divided into two compartments, one of which is for smokers.

Cost of Road Surface Maintenance

For many years tramway authorities in Great Britain have agitated against the injustice of the law, which is set forth in the tramways act of 1870, which imposes on them the work and the cost of maintaining the street paving between the rails and tracks. When the law was passed horse cars were of course the rule, so that there was a justification for the arrangement. But electric cars do not wear out the road surface at all, and since the advent of the auto tramway authorities are bearing the ever-increasing burden of repairing surfaces which are smashed up by heavy motor lories and buses.

The latest effort to obtain relief has also resulted in failure. The London County Council recently applied to the Ministry of Transport for a grant from the national road fund (which is derived from the taxes on automobiles) for road surface maintenance. The reply is that the Ministry has no power to give financial assistance from the road fund for such a purpose. It was of course never intended that the road fund should help tramway authorities; its disbursements go to general road maintenance. That, however, does not lessen the growing hardship from which the tramways are suffering.

London Underground Railway Improvements

While the work of construction for extensions and improvements on the London Underground Electric Railways is going on merrily, and while the bills in Parliament to authorize further extensions are having a smooth passage, detailed improvements are being put in hand almost from day to day. One of the latest announcements is that a contract has been placed with John Mowlent & Company for £67,784 for escalators at Tottenham Court Road station. There are now two separate stations at Tottenham Court Road, one for the Central London line on the street level and one for the Hampstead line which is below the road surface. The former station is to be abandoned (with the consequent loss of the existing lift facilities) and the Hampstead line booking hall made common for the passengers of both lines.

Considerable improvements will be made here by way of enlarging this common booking hall to accommodate the traffic which will result. The Hampstead line lifts will also be abandoned and will be superseded by escalators which will convey passengers direct to the platforms of both Central London and Hampstead line stations. Passimeters will be installed in place of the existing booking office. The scheme of reconstruction also provides for a stairway connection from the site of the existing Central London booking hall to the new improved booking hall and circulating area beneath the roadway.

The merging of these two stations into one and the provision of escalators will enable passengers to reach the platforms in a much shorter time than at present. The fact that the escalators will take passengers right to the platform levels will also be welcomed as it entirely eliminates the traversing of long corridors after leaving the lifts.

Subway and Tramway Purchases Approved

A Parliamentary Commission sitting in Glasgow on April 10 granted an order to the Glasgow Corporation conferring powers on the corporation to purchase the Paisley tramway undertaking and the Glasgow Subway undertaking. Both of these formerly belonged to and were worked by private companies. They will now be worked as parts of the Glasgow tramway system. As already announced, the corporation had come to agreements for the acquisition of both the Paisley tramways and the subway, but it was only recently that legislative sanction was obtained. There was one point of much more than local interest before the Parliamentary commission. This was in reference to the subway, which is an underground railway forming a circle and worked by cable haulage. The corporation proposes to electrify it. On behalf of the municipality it was stated that the Ministry of Transport maintained that the subway was a railway and that it ought to be dealt with as such by the corporation. The latter's reply was that it was merely an underground tramway, and the suggestion that it should be managed as a railway was viewed with apprehension by the corporation, having regard to the fact that a railway was subject to an elaborate code of regulations involving a great many obligations imposed appropriately on a railway but entirely out of place in the case of a small undertaking like the subway. For working the subway the corporation would use its own tramway staff, but if it was made a railway the enterprise would require a separate staff and the corporation would become to all intents and purposes a railway company. It was also pointed out that the tramways were part of the common good of Glasgow, and the proposal was that the subway should be purchased on the security of the common good. Unlike municipal tramways in other towns, there was no power to fall back on the local rates to make good deficiencies, and if the subway was treated as a separate unit it was not possible to see how to deal with either a deficit or a surplus. The commissioners decided that the subway should be taken over on the footing of a tramway and not as a railway. The commission also refused an application by the Ministry of Transport for power of control of tramway fares. Certain tramway extensions sought by the corporation were approved.

$5,000,000 for Escalators

It is estimated that the cost of providing escalators or moving stairs now arranged for at numerous London tube railway stations will amount to nearly £1,000,000. The escalators will take the place of lifts and have the double advantage of greater carrying capacity and the saving of passengers' time. Two new contracts for the installation of these contrivances relate one to Moongate Street Station, where the foundation company will put them in at a cost of £42,574, and the other to Shepherd's Bush Station, where Messrs. J. Cochrane & Sons will install the moving stairs at a cost of £21,709. Moongate Street is a dense city station, while Shepherd's Bush is suburban.

Ticket Selling Machine a Success

The London underground railway companies are so satisfied with the new automatic ticket-issuing machines at Victoria Station that they propose to introduce a similar arrangement at Waterloo Station. A device has been fitted which enables a warning bell to be rung in the station booking office when the stock of tickets in the machines is running low. All the machines are electrically operated and a clever arrangement permits of their refusing money if the machine is out of order or the stock of tickets is exhausted.

Central Office Under Construction

Rapid progress is being made with the construction of new central offices at St. James' Park Station for the London underground electric railway companies. The new offices, which have an area of about 45,000 sq.ft., are being constructed immediately over the tracks of the Metropolitan District Railway and are built upon massive girders weighing, altogether, 400 tons. There will be six stories and when complete the building will accommodate a staff of approximately 400. The work will be completed during 1923.

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Financial and Corporate

St. Louis Company Does Better

United Railways Reports Surplus of $513,091 for 1922, Compared with $303,045 for 1921

Rolla Wells, receiver of the United Railways, St. Louis, Mo., reports net income of $513,091 for the year ended Dec. 31, 1922, as compared with $303,045 for the year 1921. The statement of earnings of the company is as follows:

UNITED RAILWAYS, ST. LOUIS
CONSOLIDATED INCOME AND EXPENSE STATEMENT FOR THE YEARS ENDED DEC. 31

	1922		1921
Operating Revenue			
Revenue from transportation:			
Passenger revenue	$19,701,598		
Special car revenue	29,694		
Express revenue	8,826		
		$19,740,118	$19,498,946
Revenue from other railway operations:			
Station and car privileges	$176,705		
Rent of equipment	1,908		
Rent of buildings and other property	16,334		
Sale of power	28,490	223,437	159,604
Gross operating revenue		$19,963,555	$19,658,551
Operating expense and charges			
Current operating expense:			
Way and structures	$1,268,788		
Equipment	1,505,824		
Power	2,099,256		
Transportation expense	6,535,401		
Traffic expense	23,630		
Injuries and damage reserve	1,197,813		
General and miscellaneous	764,796		
Depreciation reserve	1,500,000		
	$14,895,508		
Taxes	1,845,723		
Total operating expense, depreciation and taxes		16,741,231	16,768,915
Income from operation		$3,222,324	$2,889,635
Non-operating income			
Rents—Less: Taxes and expenses	$8,796		
Interest on deposits	13,540		
Interest from investments	180,282		
Miscellaneous	213	202,831	216,349
Gross Income		$3,425,155	$3,105,985
Other Deductions			
Interest on funded debt	$2,339,807		
Interest on receiver's certificates	294,000		
Interest on mill tax judgment	143,779		
Interest on notes payable	109		
Amortization of discount and expenses on receiver's certificates and extended funded debt	108,229		
Income tax on bond coupons	23,414		
Bank services—payment of bond coupons, etc.	2,725	2,912,063	2,802,939
Net income for the year		$513,092	$303,046

Mr. Wells, in his comments, has gone into the work of the company for the year at considerable length. A statement by him of the capital expenditures made during the year shows that the total additions amounted to $1,065,939. This sum was divided among the several grand divisions as follows: Way and structures, $366,779; equipment, $564,352; power, $134,804. Against this were total deductions of $107,104, as follows: Way and structures, $69,349; equipment, $107,104. This left the net additions for the year at $958,832.

The total mileage of the system (in single track) on Dec. 31, 1922, was 460.93. In 1922 the company reconstructed 23.54 miles. A table contained in the report shows that since 1904 the amount of track reconstructed, renewed or extended was 491.41 miles for the nineteen years, or more than the grand total of mileage of the company at present.

It is impossible here to do more than touch upon some of the high spots of the report. Among other improvements four automatic substations were installed during the year. Mr. Wells says that the year 1922 was one of great activity in the shops of the company. The number of passenger cars owned at the end of 1922 was 1,579, of which 1,400 were motor cars and 179 trailers. Fifty new cars of the so-called 777 type were completed during the year, making a total of 101 cars of this type completed and in service. In this connection it is interesting to note that ten of these cars were provided with independent air compressors, replacing the old storage air equipment. An analysis of the work order made in connection with the construction of these cars in the company's own shops showed that more than 1,100 different items of material were used in the manufacture of this type of car.

The receiver says that 665 cars were equipped with Economy meters. They were installed on all cars operating from the Park, Jefferson and Geyer and the De Baliviere and Neustead stations. He explains that it was expected that the installation would be completed early in 1923 on cars operating from all stations. In discussing the installation of the meters the receiver said:

> Total investment for installing meters and other necessary equipment was estimated at $105,800, operating cost of instruction and clerical force for first year $15,100, making a total expenditure for the first year of $120,900. Based on results already shown, and on average energy cost for years 1921 and 1922, annual gross saving in power cost would be $189,900, or a net saving of some $69,000 at end of first year of complete equipment. Besides the tangible saving in power, indications are that cars are being operated more safely and that greater care is taken on the equipment, which should make a further saving in maintenance of electrical equipment and in brake-shoe and wheel wear.

Reference is made by the receiver to the status of the valuation case before the Missouri Public Service Commission. He said in this connection that a tentative valuation would be handed down before mid-summer. As noted in the ELECTRIC RAILWAY JOURNAL for June 9, this has since been done. The valuation is of course tied in with the matter of rates. In discussing the rate adjustments the receiver said:

> On June 30, 1922, the Missouri Public Service Commission issued an order extending the present 7-cent fare to Aug. 1, 1922; on Aug. 24 a supplemental order was issued extending said fare to Dec. 31, 1922; on Dec. 26, 1922, an order was issued extending the 7-cent rate of fare until such time as the commission should issue its order in the valuation case.

The accompanying statement shows the principal traffic statistics of the company for the years 1922 and 1921.

	1922	1921
Revenue passengers	286,076,475	282,447,190
Transfer passengers	152,261,868	150,562,354
Total passengers	438,338,343	433,009,544
Percentage of revenue passengers using transfers	53.22	53.31
Average fare per passenger (including transfers)	4.49c	4.49c
Average fare per revenue passenger	6.89c	6.89c
Passenger car-miles	44,229,300	44,229,210
Revenue passengers per car-mile	6.47	6.39
Total passengers per car-mile	9.91	9.79

The necessity of analyzing work orders and accounts more in detail had been realized for some time, the receiver says, and in devising the new system, considerable thought was given to the problem of working out an accounting scheme that would not only take care of the stock records but would supply information for the general books and for detail analysis of work orders. Mr. Wells says that these ends have been accomplished, without duplication of work, by the aid of Powers accounting machines, consisting of a punch machine, sorter and printer tabulator. A card which contains all data required is punched for each charge and for each credit. These punched cards are sorted mechanically by catalog number, account number, work order number, etc., depending on the class of information desired, and are then run through the printer tabulator, which furnishes printed lists, with totals, which lists are used as a posting medium for general books and subsidiary records. Mr. Wells says that this

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system, at a very reasonable expense, has enabled the company to insure accuracy in work order costs and to get much desirable information which would have been very expensive and difficult to obtain otherwise.

The burden of taxation which the company bears is strikingly illustrated in a detailed statement of the amount set up on this account during 1922. In addition to direct taxes of $1,808,692, the company expended $477,992 for street paving, and furnished free transportation for the police and the firemen of St. Louis. The total of taxes and street paving costs for the year 1922, was $2,355,061, or 0.823 cents per revenue passenger, as compared with 0.791 cents per revenue passenger in 1921.

During the year 1922 the average distribution of power on a kilowatt-hour basis was as follows:

	Per Cent
Purchased water power	55.9
Purchased steam power	27.4
United Railways' plants	16.7

The prolonged coal strike of 1922 made it necessary for the company to supplement the use of coal in the receiver's power plants with some other form of fuel. After careful investigation it was decided to install fuel-oil burning equipment, and ten boilers at the Central power station and ten boilers at the Northern power station were equipped with oil burners and the necessary auxiliary apparatus, such as storage tanks and pumps. For a period of thirty days the majority of the power supplied by the receiver's plants was generated by oil. The oil burning equipment is being held for future emergencies.

International Seeks to Establish $96,539,185 Value

Additional evidence was heard during the week ended June 16 by the Public Service Commission in the rate proceeding pending before the commission in an attempt on the part of the city to have the 5-cent fare re-established on the local lines of the International Railway, Buffalo. Three witnesses were sworn by Coleman J. Joyce, counsel for Mitten Management, Inc., which operates the local and interurban lines of the International. The company is seeking to establish its valuation at $96,539,185 for the entire system.

The witnesses included Charles Hansel, consulting engineer for the Pennsylvania and the Reading Railroads; William K. Myers, vice-president of finance of the Philadelphia (Pa.) Rapid Transit Company; George W. Fuller, consulting engineer of Summit, N. J., former member of the Pennsylvania Public Service Commission. These men constitute the valuation committee of the International. They estimated the cost of engineering and superintendence at $2,225,195; preliminary promotion costs prior to construction, $885,295; administration and legal expenses, $2,065,688; taxes during construction, $515,000; working capital, materials and supplies, $1,457,544.

Ford Gets $2,000,000 Detroit City Issue

Short-term notes for $2,000,000 have been issued by the Detroit City Comptroller to Henry Ford and Edsel B. Ford to finance extensions to the municipal railway and to finance city expenditures for equipment. The notes bear interest at 4 per cent and will provide funds until city tax money begins to come in on July 15.

According to a statement of Clarence E. Wilcox, Corporation Counsel, the legislative act increasing the bonding limit of the city of Detroit did not change conditions so far as the prospects go for financing the city with funds obtained in New York. The New York buyers are not disposed to purchase bonds unless the municipality issuing the bonds has a net bonded indebtedness well within a fixed percentage of the assessed valuation.

The Michigan Legislature has increased the bonding limit of the city of Detroit so as to enable the expenditure of $80,000,000 for subways. In view of the fact that Detroit is now close to the 7 per cent limit, any further large bond issues will probably be sold only to private capitalists.

Holders of Illinois Traction Preferred to Receive Extra 1 per Cent

The regular quarterly dividend of 1¾ per cent, at the rate of 6 per cent per annum, will be paid on the preferred stock of the Illinois Traction Company on July 2. An additional amount sufficient to make the combined payment equivalent to 7 per cent per annum for the quarterly period ending July 1, 1923, will be paid to shareholders who exchange their Illinois Traction preferred stock for the preferred stock of the Illinois Power & Light Corporation.

Payment in adjustment of such amount will accompany the certificates of 7 per cent cumulative preferred stock of the Illinois Power & Light Corporation issued in exchange. The certificates will be dated July 2, 1923, or thereafter for exchanges subsequent thereto. It is contemplated that dividends on the 7 per cent cumulative preferred stock of the Illinois Power & Light Corporation will be declared regularly at the quarterly periods payable Oct. 1, Jan. 1, April 1 and July 1 of each year. This stock will have full voting power, a privilege which the holder of the Illinois Traction preferred did not enjoy.

The Illinois Power & Light Corporation has issued a thirty-two-page booklet descriptive of the company and illustrative of its properties.

Plan of Key System Transit Announced

The financial plan of the Key System Transit Company which will take the place of the present San Francisco-Oakland Terminal Railways, will be as follows: common stock, $3,300,000; 7 per cent preferred, $6,100,000; 7 per cent prior preferred, $8,350,000; Oakland Railway notes, $2,500,000; general and refunding 6 per cent mortgage bonds, $1,121,000; general and refunding 5 per cent mortgage bonds, $6,417,000; first mortgage bonds, $2,500,000; divisional 6 per cent bonds, $465,000.

The East Oakland Railway, a subsidiary of the Key System Transit Company, will issue $250,000 in bonds in exchange for underlying issues outstanding.

	Latest	Month Ago	Year Ago	Since War High	Since War Low
Street Railway Fares* 1913 = 4.84	June 1923 **6.92**	May 1923 **6.88**	June 1922 **7.04**	May 1921 **7.24**	May 1923 **6.88**
Street Railway Materials* 1913 = 100	May 1923 **173**	Apr. 1923 **175**	May 1922 **166**	Sept. 1920 **247**	Sept. 1921 **156**
Street Railway Wages* 1913 = 100	June 1923 **210**	May 1923 **208**	June 1922 **211**	Sept. 1920 **232**	Apr. 1923 **207**
Steel—Unfilled Orders (Million Tons) 1913 = 5.91	May 31 1923 **6.98**	Apr 30 1923 **7.29**	May 31 1922 **5.25**	July 31 1920 **11.12**	Feb. 28 1922 **4.14**
U.S. Bank Clearings Outside N. Y. City (Billions)	May 1923 **15.58**	Apr. 1923 **15.00**	May 1922 **13.08**	Mar. 1920 **18.54**	Feb. 1922 **10.65**
Business Failures Number	May 1923 **1,467**	Apr. 1923 **1,638**	May 1922 **1,775**	Jan. 1922 **2,722**	May 1922 **1,467**
Liabilities (millions)	**31.77**	**51.66**	**48.21**	**105.7**	**31.77**

Conspectus of Indexes for June, 1923

Compiled for Publication in this Paper by

Albert S. Richey
Electric Railway Engineer
Worcester, Mass.

	Latest	Month Ago	Year Ago	Since War High	Since War Low
Eng. News-Record Construction costs 1913 = 100	June 1923 **220.7**	May 1923 **216.7**	June 1922 **166.6**	June 1920 **273.8**	Mar. 1922 **162.0**
U.S. Bur. Lab. Stat. Wholesale Commodities 1913 = 100	May 1923 **156**	Apr. 1923 **159**	May 1922 **148**	**May** 1920 **247**	Jan. 1922 **138**
Bradstreet's Wholesale Commodities 1913=9.21	June 1 1923 **13.38**	May 1 1923 **13.67**	June 1 1922 **11.90**	Feb. 1 1920 **20.87**	June 1 1921 **10.62**
Dun's — Wholesale Commodities 1913 = 120.9	June 1 1923 **191.4**	May 1 1923 **192.9**	June 1 1922 **170.0**	**May 1** 1920 **263.3**	July 1 1921 **159.8**
U.S. Bur. Lab. Stat. Retail food 1913 = 100	May 1923 **143**	Apr. 1923 **143**	May 1922 **139**	June 1920 **219**	Mar. 1922 **139**
Nat. Ind. Conf. Bd. Cost of living 1914 = 100	**May** 1923 **160.3**	Apr. 1923 **159.1**	May 1922 **154.9**	July 1920 **204.5**	Aug. 1922 **154.5**

*The three index numbers marked with an asterisk are computed by Mr. Richey, as follows: Fares index is average street railway fare in all United States cities with a population of 50,000 or over except New York City, and weighted according to population.

Street Railway Materials index is relative average price of materials (including fuel) used in street railway operation and maintenance, weighted according to average use of such materials. Wages index is relative average maximum hourly wage of motormen and conductors on 105 street and interurban railways in the United States, operating more than 100 passenger cars each, and weighted according to number of cars.

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Number of Passengers on Sacramento Lines Increase

The accompanying table from the annual report of the Pacific Gas & Electric Company for the year ended Dec. 31, 1922, shows the progress made by the Sacramento Street Railway in the matter of total passengers carried and gross revenue. It is stated that largely as a result of the installation of a number of one-man cars the company was enabled to conduct its railway operations without loss of efficiency upon a somewhat more profitable basis than for some years past.

COMPARATIVE STATISTICS OF SACRAMENTO STREET RAILWAY FOR LAST DECADE

Year	Miles of Street Railway Track	Cars Owned	Total Passengers Carried	Car-Mileage	Car-Hours	Average Passengers per Day	Gross Revenue
1912	40.0	62	11,926,098	2,301,342	276,438	32,674	$547,187
1913	42.0	60	12,508,744	2,469,745	301,930	34,270	572,913
1914	42.9	60	12,256,142	2,481,968	303,263	33,578	556,908
1915	43.1	66	9,485,490	2,684,508	294,739	25,988	425,338
1916	43.9	66	10,044,428	2,919,041	299,873	27,519	442,303
1917	43.9	66	10,616,953	3,069,408	313,040	29,088	491,021
1918	43.9	70	11,331,864	3,067,599	312,439	31,046	534,068
1919	43.9	70	14,079,372	3,228,306	331,704	38,574	671,105
1920	44.1	76	15,770,295	3,210,112	332,895	43,206	753,028
1921	44.2	76	16,021,805	3,380,119	349,840	43,895	779,639
1922	44.1	76	16,075,231	3,171,580	329,737	44,042	799,192

Auction Sales in New York.—At the public auction rooms in New York there were no sales of electric railway securities this week.

Fight Against Remaining in Receivership Lost.—The Eighth Avenue Railroad and the Ninth Avenue Railroad, New York, have lost their fight before the United States Supreme Court against remaining in the hands of Job E. Hedges, receiver of the New York Railways, by decision of the highest court.

Dividends Declared. — The Duluth-Superior Traction Company has declared two dividends of 1 per cent each on the 4 per cent cumulative preferred stock for the quarters ending March 31, 1923, and June 30, 1923, both payable July 2 to holders of record on June 15. In April of this year two dividends of 1 per cent each were paid.

Common Stock Dividend Increased.—The Eastern Texas Electric Company, Beaumont, Tex., has declared a quarterly dividend of $2.25 a share on the common stock and the regular semi-annual dividend of $3 a share on the preferred, both payable July 2 to holders of record June 20. Previously $2 a share quarterly was distributed on the common stock.

Service to Grove City Stopped.—Service on the Orient-Grove City branch line of the Indiana, Columbus & Eastern Traction Company stopped at midnight on June 16 in accordance with orders of the Federal District Court and the Ohio Public Utilities Commission. Application to halt service was due to loss in revenue attributed by the company to "unregulated bus competition."

Property Sold for $135,000.—The Slate Belt Transit Company's property, operating at Nazareth, Bangor and Allentown, Pa., has been sold at receiver's sale to Joseph T. Hambleton, representing the reorganization group. The purchase price was $135,000 for the right, title and interest of the company's franchise, etc. Cars and second and third mortgage bonds were sold in various groups for from 25 cents to $1 each.

Change in Name Made.—Shareholders of the Public Service Corporation of Quebec, a subsidiary of Shawinigan Power, have ratified by-laws providing for changing the name to the Quebec Power Company and increasing the capital from $3,000,000 to $10,000,000. Of this $4,000,000 will be preferred. This company is expected to absorb the Quebec Railway, Light, Heat & Power Company which it now controls.

Loss of $1,232 for Three Months.—The United Traction Company, Albany, N. Y., for the first quarter of 1923, reports railway operating revenues amounting to $905,674 and operating expenses $738,240. From the gross income of $180,540 there were total deductions, including rent for leased roads, interest on funded debt, other deductions, etc., of $181,773. This leaves the company with a net corporate loss for the period ended March 31 of $1,232. The corporate deficit at the end of the period amounts to $3,419,475.

Ratified Stock Increase Proposal.—The stockholders of the Louisville Railway have ratified a proposal to increase the authorized capital stock from $20,000,000 to $35,000,000. Amended articles of incorporation to this effect were filed by the company on June 1. The increase in the authorized stock is to make it possible for the company to hold stock of affiliated transportation companies, including its new $200,000 bus division. It may also hold some stock in certain rail or water transportation companies from which it receives freight tonnage.

Bridge Line Passes Dividend.—The stockholders of the Manhattan Bridge Three-Cent Line, Brooklyn, N. Y., have been informed by letter that the dividend payment due at this time will not be paid. There is $450,000 common stock outsanding on which 5 per cent annually has been paid since 1919. The passing of the dividend was decided upon as a measure for conserving the cash position of the company until such time as disposition has been made of the claims likely to arise out of the accident on the line on May 1, referred to in the ELECTRIC RAILWAY JOURNAL for June 9, page 978.

Stockholders Authorize Exchange.—The stockholders of the Broadway & Seventh Avenue Railroad, New York, N. Y., have voted to issue 11,000 shares of no par common to take the place of the present common stock. It is proposed to exchange the new stock for old $100 par common on the basis of one share of new no par common for each share of outstanding common, and provision was made to exchange the outstanding $100 par preferred stock for new common on the basis of one and three-quarter shares of new common for each share of preferred stock outstanding. The directors have likewise been empowered to issue two shares of the new no par common for each $100 face value of the notes of the company outstanding.

Preferred Stock Offered. — Spencer Trask & Company are offering at 93½ and accrued dividend to yield about 7.50 per cent, $1,500,000 of Consolidated Power & Light Company's 7 per cent cumulative preferred stock. The Consolidated Power & Light Company directly and through its subsidiaries owns and operates without competition, the entire electric power and light and electric railway business in Huntington, W. Va., Roanoke and Lynchburg, Va., and surrounding communities, as well as the gas business in Ironton, Ohio, Ashland and Catlettsburg, Ky., and the intermediate territory. The proceeds of this issue are to be used in part to provide funds for the purchase and installation of a new 20,000-hp. unit at the Kenova generating station necessary to meet the demands for electric power and service from the manufacturing industries in and about Huntington.

Shareholders at Montreal Reported Restive.—Pointed suggestions to shareholders of Montreal Tramways & Power Company are being distributed anonymously in Montreal and are believed to be a step toward breaking the long endured silence as to the exact position of the company. This has been a sealed book to the public for years. The circular is an open letter to the president and directors giving notice that an extraordinary general meeting of the company should be called. The letter in outlining the objects to be considered, deals with the points that everyone would like answered, profit and loss account, balance sheet, also appointment of a shareholders committee to inquire into the affairs of the company. According to the *Financial Post* the fight is against E. A. Robert, president, whose genius conceived the arrangement under which control of fares and earnings rests with a commission under the city while management remains with the private ownership. No one is disposed, says the *Post*, to deny Mr. Robert credit for this work, but he is considered as rather apt to disregard the rights of minority stockholders. Stockholders of the Montreal Tramways & Power Company have felt that he has failed to treat them properly during the past few years. He has given them no information that would enable them to judge of the value of their holdings.

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Traffic and Transportation

Stops a Problem

Detroit Department of Street Railways Concerned Over Growing Menace of Accidents

A construction program and stop plan have been suggested by Ross Schram, assistant general manager of the Detroit Department of Street Railways, to reduce traffic accidents and speed up automobile and railway traffic. The plan includes the construction of 500 traffic safety zones annually with loading points for street cars three blocks apart instead of one and two blocks apart as at present.

Most drivers are content to average 20 m.p.h., which is a reasonably safe rate, but as traffic is constantly held up the tendency is to speed to make time. The license bureau for three months has been issuing drivers' licenses at the rate of more than 300 a day. Therefore, if steps are not taken to assure a fair average speed for vehicles, accidents would appear bound to grow in number. The stopping of street cars does more to prevent a sustained average speed for motor vehicles than any one other factor.

Skip Stop Plan Desirable

The D. S. R. is prepared to adopt at once a three-block stop plan on its entire system; that is, it will make stops spaced at an interval of three average length blocks. In addition to this the department would be willing, in its own interest and that of the public, to co-operate with the Department of Public Works to the extent of financing and building not less than 500 safety zones each year.

It is the plan that these safety zones will not be of the raised concrete type, but rather on the order of the post and chain type now being tried at Woodward Avenue and Kitherell Street. Plans for an improved type of zone of this kind have been made.

It is stated by Mr. Schram that the proposed stop plan would reduce the running time on the railway lines from two to five minutes and add only one-half block to the distance to be walked by pedestrians to reach a car stop. Moreover, adoption of the new plan would result in a saving of approximately $100,000 a year in the cost of operating the street cars.

Six-Cent Fare in East Cleveland

East Cleveland, a suburb of Cleveland, with a population of 30,000, ceased to have a 5-cent fare on June 19, although Cleveland riders continue to pay only a nickel. For the next five years East Cleveland car riders will pay a cash fare of 6 cents. Tickets will, however, be sold at the rate of nine for 50 cents, with a penny charge for a transfer ticket without any rebate.

Unlike Cleveland, East Cleveland does not have a service-at-cost franchise arrangement with the Cleveland Railway. Instead it operates on a five-year price agreement with an ordinance that specifies minimum service and calls for arbitration in the event that the city and company cannot agree upon an equitable fare rate for a five-year period. Almost a year ago the Cleveland Railway insisted upon a 6-cent fare for East Cleveland riders and a board of arbitration granted this rate, to become effective on June 19, the day of the expiration of the first five-year franchise period.

Litigation Ends in Salt Lake City Over One-Man Cars

The operation of one-man cars in Salt Lake City by the Utah Light & Traction Company has become a reality. The company's employees have withdrawn their objections to them, and the city ordinance prohibiting the use of such cars has been repealed. Beginning June 3 one-man cars were placed in operation on six of the company's routes, and additional ones will be operated in the near future. Ultimately, it is stated, about 50 per cent of the cars in operation will be converted to the new system. An increase in wages of 5 cents an hour has been granted by the company to the operators of these cars. The service on the lines on which they are operated will be increased from 33 to 50 per cent.

For some time past the Utah Light & Traction Company has had several of these cars in operation. However, each car has been in charge of two men, pending the outcome of an action brought by Salt Lake City against the traction company to test the validity of the city ordinance requiring each car to be operated by two men. This action has now been dismissed and the ordinance repealed. The case started last November with the arrest of one of the company's employees for operating a car with only one man. Complaint was filed in the City Court, the company was found guilty and fined $25 by stipulation of both parties. The company appealed the case to the Third District Court in order to test the jurisdiction of the city in this case. The demurrer of the company set forth that there was no public offense and that the court had no jurisdiction, but only the Public Utilities Commission had power to rule in this case.

The repeal of the ordinance was by unanimous vote of the city commissioners, all opposition to the one-man cars having been withdrawn on the part of the company's employees, and those of the public who opposed them having failed to continue their objections.

Shriners Ride Electric Way

Pass and Solicitation Under Busmen's Noses Got 90 per Cent of Shriners' Rides for Electric Railway

Like hawks espying their prey from afar, a group of New York "rubberneck" busmen descended upon the Shriners' convention at Washington in the week of June 4 fully resolved to snatch all possible business away from the Washington-Virginia Railway, in whose territory many of the gatherings were held. So confident were they that they came down with some twenty to thirty vehicles and posted barkers at the entrance to Shrine Park to din the delegates with the news that they could ride into Washington for 50 cents and get a return trip to their Pullman car hotels for $1.

Had the innocent Shriners known that the busmen had no authorized or definite stands in Washington, the invaders would have carried practically no traffic at any time. At first, they did have a little success because they stationed themselves at the park entrance, which was just out of sight of the Washington-Virginia tracks. Their triumph proved of short and profitless duration. A couple of leather-tongued railway men supplied with batches of weekly passes soon drove them from the field. When these electric ride salesmen began to explain that unlimited, transferable riding could be obtained between Alexandria and Washington for $1.60 a week the message got under the fez at once, with the result that some 1,500 passes were sold.

Passes a Sales Leader

Nor is that all of the story. The passes really served as a sales leader because the dashing tactics of the railway management got everybody to talking about the electric railway service and its general superiority. Thus the 1,500 passholders proved to be a nucleus around which gathered a much larger sale of cash fares at 24 cents and round-trip fares at 40 cents. In fact, the company estimates that it got 90 per cent of the business.

As for the invaders, by the second day the leader of the busmen had become so obnoxious in his desperate effort to get business that he was disposed of by the simple method of having him arrested as a public nuisance. From that time on his cohorts retreated from the field to pick up a little sightseeing travel before scuttling back to Harlem.

Discuss Railway Discontinuance

The Colorado Utilties Commission and the Trinidad Electric, Transmission, Railway & Gas Company are discussing the question as to whether or not the company may discontinue its electrically propelled street cars. The company is not running its street cars, and motor buses are taking care of the traffic. The company maintains that it has been unable to make receipts meet operating expenses for several years and that last year it lost $24,000.

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Passenger Service Details Under Public Relations Head

All matters pertaining to passenger service, including sale of tickets, has been taken over by the department of public relations of the Indiana, Columbus & Eastern Traction Company, according to an announcement from headquarters in Springfield, Ohio. This change will permit W. S. Whitney, former general passenger and freight agent, to devote his entire attention to the freight business of the company. Ticket sales, advertising and publicity will be handled directly henceforth by the public relations department. A statement says:

> The department of public relations will, through publicity, seek to better our relations with the traveling and shipping public; through advertising create a demand for passenger service, and through the sale of tickets, close the contract. From then on it will be up to the transportation department "to deliver the goods."

Under this co-ordinated plan, officials pointed out, the department can direct its publicity and advertising to fit in with the sale of tickets, so that a campaign may be conducted more efficiently than if the separate departments handled the work as heretofore. Arthur V. Bland is in charge of the department.

Fewer Car Riders in Buffalo

Jitney competition in Buffalo is responsible for a big falling off in passenger revenues on the local lines of the International Railway for the first quarter of 1923. Figures filed by the company with the Public Service Commission show passenger revenues and car riders for the three months ended March 31 as follows:

Quarter Ended	Passenger Revenues	Passenger Fares
March 31, 1920	$2,339,079	43,768,267
March 31, 1921	2,575,664	40,057,144
March 31, 1922	2,505,683	38,536,723
March 31, 1923	2,111,520	32,324,064

The claim is made by the municipal authorities in the rate proceeding pending before Commissioner Pooley of the Public Service Commission that unpopularity of the management of the International, growing out of the strike last July, is responsible for the falling off in the number of car riders and passenger revenue.

Extra Charge if You Ride Late.—The Indianapolis Street Railway, after June 30 next, will charge a fare of 10 cents a passenger for its owl cars. The commission granted the company an increase of 5 cents on its plea that the old rate was unprofitable.

Prohibits Jitney Soliciting.—The City Council of Columbia, S. C., recently passed an ordinance prohibiting jitneys from running through the principal business streets soliciting passengers. The fare on the jitneys is 10 cents and on the cars of the Columbia Railway, Gas & Electric Company 7 cents.

Seven-Cent Fare Likely.—Des Moines is to have a 7-cent fare by July 1 if the stabilizing account is increased by $20,000. The sum of $22,270 was added during April, it was announced. The fund now is in excess of $130,000 and the franchise granted the company calls for $150,000. When that sum is reached the company must reduce the fare from 8 to 7 cents per passenger.

Will Seek Six-Cent Fare Continuation—The Dallas Railway, Dallas, Tex., does not expect nor want the 5-cent fare restored in Dallas when the one-year extension of the 6-cent fare privilege expires on June 27. The company has already notified the City Commission that it will ask for a continuance of the 6-cent fare after June 27, and it is expected that the grant will be made by the city for another year. In return for the grant of increased fares for another year, the company will be asked by the city to make improvements and betterments in its service.

One-Man Cars Operate.—Six one-man cars are now in operation on the lines of the Columbia Railway, Gas & Electric Company, Columbia, S. C. Two-man cars are also being operated. The new cars are light and are equipped with various safety devices; they are being well patronized and are easy riding and do not make so much noise as the larger and heavier vehicles. Before putting them in operation the company published in the local daily papers large advertisements calling on the public to patronize the street cars and "bank the difference."

Will Try Pass Plan.—The Sacramento Northern Railroad was granted authority on June 9 by the State Railroad Commission to adopt the weekly unlimited pass system of fares. The plan already is in effect in several southern California communities. The Sacramento Northern Railway will apply the plan in Sacramento, Chico, Vecino, Barber, Chapmantown, Mulberry, Marysville, Yuba City and between Marysville and Yuba City, where it operates local car lines. It will not be effective on the Sacramento-Swanston line. The plan, it is specified, is experimental and is to be tried during the period beginning immediately and ending Nov. 25.

Wants Seven Cents.—E. W. Oliver, general superintendent of the Niagara, St. Catharines & Toronto Railway, St. Catharines, Ont., has sent an ultimatum to the town of Merriton declaring that he will recommend to the executive of the federal-owned road the surrendering of the existing franchise unless the company is granted a 7-cent fare on the local line and is guaranteed protection against buses and jitneys. The franchise in question will not expire for six years. Mr. Oliver protests that the franchise is burdensome, imposing very stringent conditions as to fares and paving. He proposes a new franchise for the railway company under which rehabilitation is promised, the company to pay for everything in excess of what it would cost the town if the tracks were not there.

Allows Fare Increase.—The application of the Fishkill Electric Railway to increase its fare was granted by the Public Service Commission on May 28. The old rate of fare had been 6 cents in the city of Beacon and extending to a zone limit in the hamlet of Glenham, with two 5-cent zones extending from there to Fishkill Village. The through rate for these two zones was 8 cents. The new rate combines these last two zones into a single 7-cent zone and changes the rate in the city of Beacon to the zone limit in Glenham to a 7-cent fare. There was no public opposition to these changes. The Public Service Commission, however, made a careful study of the conditions before granting approval.

Subject to City Regulation.—The Texas Legislature has passed a bill known as Senate Bill No. 45, which has for its purpose the regulation of motor trucks and jitney lines operating for hire on public roads and authorized streets. Suburban and interurban railways to operate motor trucks or jitney lines for transportation of passengers in incorporated cities and towns are subject to regulation by said cities and towns and within 5 miles thereof under regulation by commissioners' courts of the county. The law amounts practically to an extension within a 5-mile zone adjacent to municipalities of franchise rights held by transportation companies within said cities and towns.

Securing Names for Petition.—Jitney owners and operators are securing names to a petition asking for a referendum vote on the agreement, in the nature of a city ordinance, with the Birmingham Railway, Light & Power Company which goes into effect on July 1, and which puts the jitneys off Birmingham's downtown streets. Heads of the jitney men's organization claim they have 6,000 names signed to the petition, and that they will get the required number. Under the law 15,000 names of legal voters must be signed to the petition before a referendum vote can be called. As the agreement, or ordinance, goes into effect July 1, city officials are of the opinion the jitney men will not be able to secure the required number of names in time to call the election.

One Stop in Safety Zone.—On the recommendation of Captain James McDowell of the Police Traffic Department, each car of the Los Angeles Railway will make only one stop for loading and unloading passengers in the safety zone. When a car is standing at the front of the safety zone, waiting for the traffic signal to proceed, and two following cars stop behind in second and third position, they will load and unload passengers. The second and third position cars will cross the intersection without a second stop. This is considered an important step in speeding up service in the downtown district. This group movement of street cars at downtown intersections became effective on June 12. The plan under which it is being operated was described in a recent publication of the railway.

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Legal Notes

FEDERAL COURTS—*Ordinance Held Not to Fix Maximum Fares Beyond Power to Change.*

An ordinance granting a street car franchise was passed in 1919 and fixed the fare for the first twelve months at 6 cents. It was provided, however, that at the end of that and each succeeding twelve months period the company should submit a statement of its receipts and expenditures and should return to the city any excess over expenses and a reasonable return on the investment. The fare should then be reduced to only that necessary to provide a reasonable return, and that the valuation of the company's property may be appraised in a manner prescribed in the franchise. It was held that this franchise does not show a contract binding on the company to accept the rate of fare prescribed for the first year as a maximum fare for the life of the franchise, that the company retained its right after the first year to a reasonable return on the value of its property used in the public service and that it was not prevented from attacking an ordinance fixing the same fare for subsequent years. [City of Paducah, et al., vs. Paducah Railway, 43 Sup. Ct. Rep., 335.]

CALIFORNIA—*Doctrine of "Last Clear Chance" Defined. Duty at Stops.*

To make a defendant liable, under the last clear chance doctrine, it must appear that the defendant was not only aware of the danger in time to have avoided the injury, but must have known that the plaintiff was oblivious of his danger and unable to avoid it, and further that the defendant failed to exercise ordinary care to avoid the injury.

An instruction that it was the duty of the motorman and conductor to make sure, by looking to see, that plaintiff had alighted from the steps of the car, and if the jury found that either or both of them neglected to perform such duty, and in consequence plaintiff was injured, etc., verdict should be for plaintiff, was not erroneous, as assuming that the car had come to a stop and was again started before plaintiff had alighted, especially where other instructions clearly submitted such issue to the jury. [Gainer vs. United Railroads of San Francisco, 208 Pacific Rep. 1013.]

GEORGIA—*What Are Tracks?*

"The word 'tracks' means the space included between the outside edges of the outside rails of each line," according to the Supreme Court of Georgia, "and is not dependent upon the length of the cross ties." This case came up in a paving suit brought by an abutting property owner against the City Council of Augusta. [Rowland vs. City Council of City of Augusta, 113 Southeastern Rep., 2.]

INDIANA—*Contract Requiring Company Constructing Crossing Over Railroad to Pay Expenses of Repairs Held Void.*

A contract between a railroad company and a traction company, whereby the railroad company granted permission to cross its tracks at a street intersection in consideration of the traction company's agreement to pay all expenses incurred by the railroad company in repairing and renewing the crossing after its construction by the traction company, held void as against public policy and without consideration, since the traction company had the right to cross the railroad, and it was the absolute duty of each company to keep its own track in repair. [Terre Haute, I. & E. Traction Co. vs. Ross, 138 Northeast. Rep. 90.]

IOWA—*Street Railway Not Obliged to Maintain Safe Landing Place.*

The duty which the law imposes upon an ordinary railroad to provide and maintain a safe place for landing its passengers has no application to a street railway, its duty in such case being limited to the selection of a reasonably safe place for passengers to alight. The relation of passenger and carrier terminates the moment the passenger descends from the street car to the street. [Morris vs. Omaha & C. B. St. Ry., 187 Southwest. Rep., 510.]

MINNESOTA — *Mandamus Requiring Street Railway Company to Permit Examination of Books Cannot Be Avoided on Grounds Specified—City Can Also Examine Books of Holding Company.*

After the entry of judgment for the issuance of a writ of mandamus requiring a street railway company to permit the representatives of a city to inspect the books and papers of the company in connection with a valuation and the establishment of rates of fare, compliance with the command of the writ cannot be avoided on any of the following grounds: (1) That application for the inspection should have been made to the Commission instead of to the court; (2) that such an application had been made to and denied by the Commission; (3) that the proposed inspection was not relevant to the inquiry before the Commission; (4) that the city had an adequate remedy in the ordinary course of law; or (5) that the judgment and writ went beyond the findings. The city representatives should also be permitted to inspect the stock books of the holding company, as facts tending to throw light on the ultimate questions to be determined by the Commission are relevant. [State vs. Minneapolis Street Railway, 191 Northwest. Rep. 1004.]

MISSOURI—*In Collision Between Car and Delivery Wagon, Railway Held Liable for Injury to Helper on Wagon, Though Driver Was Negligent.*

In this case the driver of the delivery wagon and his helper were seated on the front seat when the delivery wagon was crossing the track, and the helper (the plaintiff) warned the driver of danger but was assured that everything was all right. Negligence was charged against both the chauffeur and the motorman, but the court held that the plaintiff had fulfilled his duty by warning the chauffeur. The owner of the delivery wagon, a bakery concern, was held not liable because the driver and the helper were fellow servants. [Rowe vs. United Railways of St. Louis, 247 Southwest Rep. 443.]

NEW YORK—*City Cannot Provide for Establishment and Operation of Bus Lines on Established Routes, Except in Compliance with Statute.*

Where there was no lack of adequate transportation facilities on a bus line as established, except for a short distance, and there was no demand or necessity for a line, and no possibility of maintaining one, there was no emergency; but, even if there was an emergency, the city of New York was not authorized to provide for the installation and operation of buses on established routes by private individuals, without compliance with the law relative to grants of franchises, consents of property owners, etc. [Kingsbridge Railway vs. City of New York, 198 New York Sup. 135.]

NEW YORK—*Franchise with Privilege of "Renewal" on Revaluation Held to Give Absolute Right to Renew.*

Where a franchise to a street railway company was granted for ten years, with a privilege of renewal for an additional period of fifteen years on a fair revaluation of the franchise, the original grant gave an absolute right to the additional period, and proceedings for the determination of the revaluation for the additional period were not governed by Greater New York Charter, Secs. 72, 73, 74, as section 74, providing that this act applies to renewals or extensions, refers to renewals or extensions beyond the terms of the original grant.

Where such a contract provided for the appointment of appraisers, and stated that, if the annual rate was not fixed within the specified time, the company shall pay the old rate until the new rate is determined, that company could prevent, by appropriate proceeding, the city from unduly delaying the appointment of the city's appraiser. [Manhattan Bridge Three-Cent Line vs. City of New York, 198 New York Sup. 49.]

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Personal Items

Messrs. Dahl and Menden Head Brooklyn Company

Financier and Lawyer Heads Executive Committee of Successor to B. R. T. as Chairman—Engineer Long with Road Has Been Made President in Charge of Operation

Gerhard M. Dahl, a leading figure in the reorganization of the Brooklyn Rapid Transit Company, was elected on June 14 chairman of the executive committee of the board of directors of the successor company, the Brooklyn-Manhattan Transit Corporation. At the same time William S. Menden, who had been general manager for Receiver Lindley M. Garrison, was elected president of the company. Mr. Dahl, because of his position, will be the executive head of the system, but Mr. Menden will deal with all the problems of operation. He will consult with Mr. Dahl on the larger questions of policy, and everything affecting the company that is to come up to Mr. Dahl will do so through Mr. Menden.

G. M. Dahl

It is Mr. Dahl's desire to operate the system in a way that the public will be satisfied or as nearly satisfied as is humanly possible. This is a mighty big job and Mr. Dahl realizes it. He also knows that no system in the world can handle the peak loads of rush-hour crowds comfortably. As a point of contact for carrying out his program of keeping in touch with the public Mr. Dahl will have the advice and help of the three representatives of the public elected to the board of directors under the plan for the reorganization of the company as approved by the New York Transit Commission. So far as the attitude of the company toward the city is concerned, Mr. Dahl has said publicly that he assumes the city officials will endeavor to co-operate with the officers of the company.

This in short summarizes the attitude of the new head of the company to the problem of public relations. It is a statement of policy, but it represents the personal attitude of the head of the system toward matters of this kind in every instance in which he has had to do heretofore. In it is bound up the creed which attracted attention to Mr. Dahl in his post some years back as railway commissioner of Cleveland, when affairs there under the service-at-cost plan were largely in the making, and again brought him to public attention in connection with the handling of the affairs of the New Orleans Railway & Light Company. He it was who went to New Orleans, secured the co-operation of local banking interests and then set about the work of rehabilitation which culminated in the successful reorganization of the company as the New Orleans Public Service, Inc.

To say Mr. Dahl did the lion's share of the work in connection with the New Orleans reorganization does not mean much to those unfamiliar with that situation unless something is said about the extent of the chaos out of which the company there was lifted. At one time in the affairs of the New Orleans Railway & Light Company it appeared that the property had fallen heir to all of the ills that could possibly come to any utility. The public was disgruntled with the company, the city officials were at loggerheads with the management, the employees were restive and self-assertive, and the physical property was nothing if not at low ebb. Out of this tangle Mr. Dahl and those associated with him in arranging the reorganization were able to save something for the security holders and to put through an arrangement for operation in the future that would seem to preclude any possibility of the company ever again falling into disrepute.

In the handling of this work and also in the work which he has done in connection with the reorganization of the Brooklyn Rapid Transit Company Mr. Dahl has been able to bring to the problems confronting him long experience in the law and in the handling of public utility problems as operator, banker, and public official. He was born on June 8, 1876, at Fort Howard, Wis. He was educated in the public schools at Stoughton, Wis., and at the University of Wisconsin and was graduated with the degree of LL.B. in 1896. After being out of college one year he returned to the university in the fall of 1897 and took elective work until the spring of 1899. He then practiced law at Waupaca, Wis., from August, 1898, to September, 1901. He was city attorney of Waupaca later and then practiced law at Stevens Point, Wis., from September, 1901, to November, 1906. He was also district attorney of Portage County, Wis., from 1902 to 1906.

In the latter year he moved to Cleveland, Ohio, where he practiced law from Nov. 1, 1906, until January, 1910, when he was appointed street railway commissioner to represent the city of Cleveland. He continued to act in this capacity until Jan. 1, 1912, when he moved to New York to become vice-president of the Electric Bond & Share Company, which position he resigned on Jan. 1, 1917, to become vice-president of the Chase National Bank. He continued with the Chase National Bank until Jan. 1 of the present year, when he entered the investment and banking house of Hayden, Stone & Company.

W. S. Menden

Aside from the positions which Mr. Dahl holds with the Brooklyn-Manhattan Transit Corporation and the New Orleans Public Service, Inc., he is a director of the Alabama Power Company, the Alabama Traction, Light & Power Company, the Chase National Bank, the Lehigh Power Securities Corporation, the Duquesne Light Company, the Philadelphia Company, the Pittsburgh Utilities Corporation and others.

Mr. Menden, the president of the new company succeeding the Brooklyn Rapid Transit Company, has at last rightfully come into his own. It is indeed difficult adequately to describe Mr. Menden. He is the quiet, unassuming type of executive. The first impression of him is that he is inclined to be distant. This is only partly true. He is candid but not condescending. He had to submit to being photographed for the newspapers in connection with the announcement of his election as president, but he did it as a duty and not as a desire. This doesn't mean that there is anything of the fatalist about the man. Neither does it mean that he is indifferent to the interests of the public. It merely means, as Mr. Menden sees

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it, that the interest of the public is in the accomplishments of the organization of which he is a part rather than in the man himself.

ENGINEER IN CHARGE OF SUBWAY WORK

The statement handed out to the newspapers reviewing Mr. Menden's career was doubtless prepared by Mr. Menden himself, for it contained merely the barest outline of the work of the man. Mr. Menden's service with the companies in Brooklyn dates back to 1905. Edwin W. Winter had recently taken charge of the work of rehabilitation after the passing of the Rossiter régime. Mr. Menden had made a name for himself as chief engineer of the Metropolitan West Side Elevated Railroad, Chicago, and he was selected to become chief engineer of the B. R. T., as principal engineering assistant to Mr. Winter. It soon became evident that Mr. Menden combined the rare qualities of both the engineer and the executive, and so in 1907 in addition to his duties as chief engineer he was appointed to the position of general superintendent, and the following year was made assistant general manager.

After the dual subway contracts were signed, in 1913, Mr. Menden was appointed chief engineer of the New York Municipal Railway Corporation, and as such directed for the company the work of constructing and equipping the rapid transit lines provided for in the contract with the city. In October, 1918, he was made chief engineer and assistant to the president of the Brooklyn Rapid Transit Company. Early in 1919 Mr. Menden was appointed assistant general manager for the receiver of the Brooklyn Rapid Transit Company and since October, 1919, he has held the position of general manager for the receiver.

Mr. Menden has, of course, been happiest when engaged in the important work of planning for and carrying out the extension and improvement of the system with which he has been identified. This has been almost a continuous performance since his connection commenced with the company, but the work has varied from time to time in its intensity. The great bulk of the rapid transit construction had been carried to completion previous to the appointment of the receivers for the company in 1918, but the receiver on his own account spent approximately $26,000,000 on the lines for new construction and the purchase of equipment during his incumbency. At the same time approximately $1,600,000 was expended on the surface lines for track reconstruction, car reconstruction, and new cars. Furthermore, the receiver spent out of earnings upward of $3,700,000 on the construction of the Williamsburg power plant.

PRESIDENT'S RECORD RECOGNIZED

All of this vast engineering and construction work was carried out under the direction of Mr. Menden and his election to the presidency is a mark of appreciation on the part of the new financial interests in the company of his very competent handling of both the engineering and management problems of a system of more than 700 miles of track, on which the revenue passengers on the rapid transit lines alone have increased in number from 280,295,291 in 1918 to 459,049,609 in 1922, and on the surface lines from 320,370,316 in 1918 to 465,865,137 in 1922. This is only a very small part of the whole story, but it is sufficient to indicate that Mr. Menden has long been the real "power behind the throne" in Brooklyn. That fact has now been recognized publicly.

RECEIVER PRAISED MR. MENDEN

In the report of the receiver to the court Mr. Garrison paid tribute to Mr. Menden with these words:

> I desire to take this occasion to acknowledge the help I have received from the services of the general manager, William S. Menden, and the able heads of the different departments. At every stage of the practical operation of the properties I have found them wise, competent and able. Under their operation of the property during the entire receivership period upward of 3,500,000,000 passengers have been carried by the system without serious accidents, and upward of $31,000,000 has been spent in new construction and betterments.

Mr. Menden was born in 1868 at Evansville, Ind. He was graduated from the Rose Polytechnic Institute, Terre Haute, Ind., in 1891 with the degree of civil engineer. He started work in the railway business in 1892 as rodman in the engineering department of the Metropolitan West Side Elevated Railway at Chicago, Ill. He remained with the Chicago Elevated Lines until 1905, serving in various capacities and finally as chief engineer of the system. As stated previously Mr. Menden resigned his connection at Chicago in 1905 to accept the position of chief engineer with the Brooklyn Rapid Transit System.

Mr. Feiker Joins Society for Electrical Development

F. M. Feiker, formerly vice-president of the McGraw-Hill Company, Inc., publisher of the ELECTRIC RAILWAY JOURNAL and more recently on leave of absence as special agent to the Department of Commerce at Washington, will after his return from Washington be associated with the staff of the Society for Electrical Development, 522 Fifth Avenue, New York City. As a result of the appointment of Mr. Feiker the various branches of the electrical industry served by the society will secure the benefit of his broad experience and background, for he will be available to act as a special counselor to engineers, manufacturers, central stations, jobbers, contractor-dealers and publishers, and his special training and wide knowledge in the engineering, publishing and public relations fields of many industries qualify him eminently for such consulting work. Mr. Feiker will retain a consulting relation to the McGraw-Hill Company, Inc., and he will continue in a similar capacity his relation to the problems of personnel and organization of the Department of Commerce at Washington.

New Commission Appointments in Missouri

Gov. Arthur M. Hyde of Missouri has appointed two more lawyers to the Missouri Public Service Commission. The new appointees are Thomas J. Brown, Republican, of Charleston, Mo., and R. M. Musser, Democrat, Plattsburgh, Mo. Mr. Brown's term expires on April 15, 1929, while Mr. Musser is to fill out the unexpired term of Hugh McIndoe, Joplin, who died several weeks ago. The term of office under this appointment expires on April 15, 1925.

J. P. Holt, former road master of the abandoned line of the Interurban Railway & Terminal Company, Cincinnati, Ohio, is now engineer of maintenance of the Cincinnati, Georgetown & Portsmouth Railway. He succeeded E. J. Jones, who has accepted a position in the maintenance department of the Cincinnati Traction Company.

Obituary

C. C. Baldwin

Chauncey C. Baldwin, for more than twenty years connected with the Standard Underground Cable Company at Perth Amboy, N. J., died on June 7, 1923, aged fifty-seven, after a brief illness. He had been one of the outstanding figures in the copper rolling and wire drawing industry for many years. His connection with the Standard Underground Cable Company dated from 1902 as superintendent and manager of its metal departments at Perth Amboy, including its copper melting furnaces and equipment for the production of copper and brass rods and wire, tubes, weatherproof and magnet wire products. In 1916 he was elected a vice-president of that company, which position he held at the time of his death.

John A. Kurtz

John A. Kurtz, chairman of the Missouri Public Service Commission, died suddenly on June 17 at the Jefferson City Country Club, where he had been playing golf with Attorney-General Barrett, Noah W. Simpson, until recently a member of the commission, and R. Perry Spencer, general counsel of the commission.

Mr. Kurtz succeeded William G. Busby as chairman of the commission on April 15, 1921. He was appointed by Governor Hyde for the full term of six years.

On May 28 Hugh McIndoe, a member of the commission, was striken with internal hemorrhages and died within an hour.

During Mr. Kurtz's connection with the commission many important rate cases were decided, notably the recent decision as to the rate-making valuation of the property of the United Railways, St. Louis.

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Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Union Scale of Wages of Labor

A bulletin relating to the union scale of wages of labor throughout the United States as of May 15, 1922, and showing comparison with preceding years has just been issued by the Department of Labor. The bulletin embraces returns from sixty-six leading industrial cities and states the scale in twelve groups of industries embracing ninety-one trades and occupations, which reported an aggregate membership of 861,893. In the average for all trades taken collectively the hourly wage rate on May 15, 1922, was 6 per cent lower than on May 15, 1921; 69 per cent higher than in 1917, 93 per cent higher than in 1913, 104 per cent higher than in 1910 and 115 per cent higher than in 1907.

The average rates of wages per hour as of May 15, 1922, for the country as a whole for a few typical occupations were: Bakers 89.1 cents; bricklayers, $1.164; building laborers, 71.4 cents; carpenters, 97.3 cents; inside wiremen, $1.042; painters, $1.009; plasterers, $1.173; plumbers, $1.043; freight handlers, 65.1 cents; blacksmiths, 84.5 cents; machinists, 76.7 cents; iron molders, 74.6 cents; compositors, newspaper, day work, $1.004.

The average rate per hour May 15, 1922, for all building trades combined was 96.3 cents; for chauffeurs, teamsters, and drivers, 55.7 cents; for granite and stone cutters, $1.062; metal trades, 74.6 cents; printing trades in book and job offices, 89.2 cents; newspaper offices, $1.036, and for all trades covered by the report, 85.8 cents.

As compared with May 15, 1913, the rates per hour on May 15, 1922, showed an increase of 167 per cent for bakers, 68 per cent for bricklayers, 114 per cent for building laborers, 83 per cent for carpenters, 90 per cent for inside wiremen, 99 per cent for painters, 74 per cent for plasterers, 68 per cent for plumbers, 96 per cent for freight handlers, 98 per cent for blacksmiths, 93 per cent for machinists, 92 per cent for iron molders, and 76 per cent for compositors, newspaper, day work.

Swiss Electrification May Be Completed in 1928

The general management of the Swiss Federal Railways has submitted a report to the board of directors, which has been approved by the latter, regarding the electrification of these lines.

A report to the Department of Commerce at Washington states that if the Federal Assembly will approve the program of acceleration for this work and vote a subsidy of about $12,000,000 to assist in defraying the expense involved all the principal lines of these railways will be electrified at the end of 1928—in all, 950 miles. There are 250 miles already electrified, and electrification work is in progress on 240 miles additional. The cost of this work will be about $150,000,000, of which approximately $60,000,000 was spent from 1907 to the end of 1922.

It is estimated that as soon as the traffic density shall have attained that of 1923 the electrical operation of these lines will not be any more expensive than steam operation with coal at $12 a ton. Should the traffic density surpass that of 1913 the cost of electrical operation will relatively decrease and will equal steam operation at a cost price of coal of only $9 a ton.

Destructive Fire at Plant of Columbia Machine & Malleable Iron Company

A serious fire occurred in the shops of the Columbia Machine & Malleable Iron Company, 169 Chestnut Street, Brooklyn, Thursday afternoon, June 21. The one-story structure on Chestnut Street was badly damaged and several of the small frame buildings adjacent were destroyed.

When a representative of the ELECTRIC RAILWAY JOURNAL talked with the officials of the company Friday morning they were unable to give any accurate estimate as to the extent of the loss. They stated, however, that reconstruction would begin immediately and that they hoped to have the greater part of the plant in operation within a week or ten days. Special effort will be made by the officials of the company to give deliveries on rush orders as soon as possible.

Fifty New Cars to Be Purchased for Brooklyn

The expenditure of more than $1,750,000 on new equipment and improvements for the new Brooklyn-Manhattan Transit Corporation, the successor to the Brooklyn Rapid Transit Company, was voted by the directors at their first meeting on June 18. Of this amount $1,250,000 will be for the purchase of fifty new cars. About $580,000 will be expended for cables and substations. The new cars will be ordered at once for delivery during the coming fall. They are to be of the type now in use.

Under the plans for reorganizing the B. R. T. $5,000,000 was provided for improvements, and this is the first expenditure from that sum. No other expenditures for improvement are to be made until a careful plan has been worked out.

The expenditure for cables, equipment and substations was explained in a statement that read in part:

> On account of the increase in service on certain lines of the company, particularly in South Brooklyn, it is necessary to provide additional substation equipment, including an additional substation building and equipment on the Sea Beach line at Avenue T.

Other improvements included feeder cables, new rotary converters in power houses and additions and alterations to the King's Highway substation.

Retail Food Price Goes Up

The retail food index issued by the Department of Labor through the Bureau of Labor Statistics shows that there was an increase of two-tenths of 1 per cent in the retail cost of food to the average family in May, 1923, as compared with April, 1923. In May, 1923, the index number was the same as in April, 1923, 143.

Shares Offered to Westinghouse Employees

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has announced a plan whereby all employees may participate in the purchase of a new issue of 20,000 shares of common stock to be paid for on the deferred plan at $53 a share (par value $50). Each employee may subscribe for one to twenty shares of stock and pay for it in ten consecutive monthly installments. No interest will be charged on the deferred subscription payments. When the final payment on each stock subscription becomes due, dividends at the rate declared and paid on the company's common stock after Aug. 1, 1923, when the plan goes into effect, will be credited to the account of each subscriber.

This plan will in no way interfere with the insurance saving fund now in force. In the latter plan the employee by depositing 2 per cent of his salary in a 4½ per cent interest-bearing savings fund obtains additional insurance up to $1,500 over the $500 given by the company after six months' service. Subscription rights are for the benefit of the employee and are not transferable.

Metal, Coal and Material Prices

Metals—New York	June 19
Copper, electrolytic, cents per lb.	15.075
Copper wire base, cents per lb.	18.00
Lead, cents per lb.	7.25
Zinc, cents per lb.	6.25
Tin, Straits, cents per lb.	40.75
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$5.875
Somerset mine run, Boston, net tons	2.75
Pittsburgh mine run, Pittsburgh, net tons	2.05
Franklin, Ill., screenings, Chicago, net tons	1.80
Central, Ill., screenings, Chicago, net tons	1.625
Kansas screenings, Kansas City, net tons	2.625
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.	$7.75
Weatherproof wire base, N. Y., cents per lb.	19.00
Cement, Chicago net prices, without bags	$2.20
Linseed oil (5-bbl. lots), N. Y., per gal.	$1.15
White lead, in oil (100-lb. keg), N. Y., cents per lb.	13.125
Turpentine, (bbl. lots), N.Y., per gal.	$1.05

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Rolling Stock

Abilene Street Railway has purchased a new one-man all-steel car, which has already been put in operation.

Eureka, Calif.—The contract for furnishing the Eureka Street Railway with 20 tons of car wheels has been awarded to the Griffin Wheel Company. The amount is $67 a ton.

Brooklyn-Manhattan Transit Corporation, successor to the Brooklyn Rapid Transit Company, has included in a program of improvements just announced the purchase of fifty new cars for use in rapid transit service.

Lima & Defiance Railroad, Lima, Ohio, will place an order about July 1 for three passenger and two baggage cars. These cars are to be gasoline propelled. The seating capacity of the passenger cars will be forty-four.

Northwestern Ohio Railway & Power Company, Oak Harbor, Ohio, has purchased four new steel passenger cars, costing $16,000 each. They will be received some time this month to be used between Toledo and Bay Point.

Philadelphia Rapid Transit Company, Philadelphia, Pa., ordered on June 1 nine trackless trolleys. The builder is the J. G. Brill Company. Electrical equipment will be furnished by the General Electric Company. Specifications follow:

Seating capacity	30
Style of seats	5 longitudinal, 4 cross
Type of control	K
Type of motors	G. E.-258
Length of route	5.8 miles
Length of body over vestibules	23 ft. 2½ in.
Width over all	7 ft. 6 in.
Type of tires	Overman

Durham Public Service Company has placed an order for four cars to be delivered on Sept. 1. The specifications of these cars are as follows:

Builder of car body	P. A. Thomas
Type of car	Passenger, four motor
Seating capacity	52
Total weight	27,000 lb.
Bolster centers	17 ft.
Length over all	39 ft. 1½ in.
Truck wheelbase	5 ft. 2 in.
Width over all	8 ft. 2½ in.
Height, rail to trolley base	10 ft. 5½ in.
Body	Steel
Interior trim	Birch
Roof	Arch
Air brakes	Westinghouse Traction Brake
Car signal system	Faraday
Control	Westinghouse K-35
Curtain fixtures	Rex.
Curtain material	Pantasote
Fare boxes	Johnson
Wheelguards	H. B. life guard
Gears and pinions	Nuttall, helical
Lightning arresters	Westinghouse
Motors	Four Westinghouse No. 510, 35 hp.
Seats	Hale & Kilburn
Seating material	Birch
Slack adjuster	None
Trolley base	Ohio Brass Company
Trucks	Taylor, R. H. Double truck
Ventilators	Railway Utility Company double exhaust
Wheels	26 in., C. I.

Track and Roadway

Los Angeles Railway has completed the double tracking of Temple Street to Willowbrook Avenue. The line is now in operation. Work started recently on the Olive Street track between Fifth and Sixth. New ties, ballast and rail will be installed.

Brantford, Ont.—The City Council has authorized electric railway repairs and improvements costing $40,000.

Hutchinson Interurban Railway, Hutchinson, Kan., expects to pave Washington Street from Fourth Avenue to Fifth Avenue.

San Francisco-Oakland Terminal Railways will spend a total of $240,000 on track reconstruction along Telegraph Avenue. Work on the track in Oakland, between Fifty-fourth Street and the Berkeley line, will cost $140,000. An additional $100,000 will be required to reconstruct the track in Berkeley as soon as the city completes its paving work on the avenue.

El Paso & Juarez Traction Company, El Paso, Tex., will extend its railway system in Juarez. An amended concession has just been granted this company by the Mexican Government, under the provisions of which the company has obligated itself to build a new steel and concrete bridge across the Rio Grande, connecting Juarez will El Paso. The proposed structure will cost about $200,000.

San Antonio, Tex.—Construction of the proposed interurban electric railway between San Antonio and some point in the Lower Rio Grande Valley will be started as soon as the survey which is now being made is finished and the right-of-way obtained, according to V. H. Williams, Dallas, who is largely interested in financing the project. The road will be about 225 miles long. Mr. Williams and associates have purchased a large bed of lignite in McMullin County, close to the route of the proposed road, and will build an electric power plant there, using the lignite for fuel.

Power Houses, Shops and Buildings

Illinois Power & Light Company, Peoria, Ill., in view of the rapidly increasing demand in the field of electric power and light, will install approximately 100,000 hp. in or near existing stations and will later construct one or more super-power houses.

New Orleans Public Service, Inc., has awarded a contract to the Phoenix Utility Company, New York, with branch offices at New Orleans, for the construction of several projects involving an expenditure of approximately $600,000. The contract was on the cost plus basis. The work includes construction of a reinforced concrete building 63 ft. x 151 ft., substation at Polymnia and Baronne Streets, estimated at $300,000; remodeling and extending the boiler house at Market and South Peters Streets, estimated to cost $100,000; construction of three oil storage tanks at cost of $50,000 each and remodeling and extending several substations.

Trade Notes

Osgood Bradley Car Company, Worcester, Mass., has begun work on a contract for thirty trolley cars for the Boston Elevated Railway, which when completed will represent an outlay of approximately $500,000. They are double-truck safety type surface cars.

A. R. McLean announces the opening in Norfolk, at the Board of Trade Building, of his own business, engaging in general secret service work for steam and electric railways as well as for other corporations. The business will be known as the McLean Secret Service Bureau. On June 1 Mr. McLean resigned as general manager of the Corporation Service Bureau, Cleveland.

Uehling Instrument Company, Paterson, N. J., manufacturers of CO_2 recorders and draft and vacuum gages, has just made two important agency appointments, namely, Amsler-Morton Company, Fulton Building, Pittsburgh, for western Pennsylvania, and John A. MacDowell, 2039 Railway Exchange Building, St. Louis, for eastern Missouri and southern Illinois. H. R. N. Johnson, who formerly represented the Uehling Instrument Company in Minnesota and the Dakotas, has joined the W. P. Nevins Company, 120 South Ninth Street, Minneapolis. This company is now the official Uehling representative in the territory mentioned.

New Advertising Literature

Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., has just issued Vol. III, No. 3 of its electrification data series, dealing with the Chilean State Railway electrification. The booklet, which contains twenty pages and is amply illustrated with photographs and drawings, explains the problem that the Chilean Railway officials had to solve.

Detroit Underfeed Stoker Company's level fuel bed multiple retort underfeed stoker is illustrated and described in detail in the new bulletin "Built on Advanced Engineering Principles," just published by the manufacturer. Among other subjects it covers the practical application of principles of combustion in the design and construction of a high-duty machine to meet modern requirements.

Graver Corporation, Chicago, has just issued a booklet on its Zeolite and hot process methods of water softening. Analyses of raw water and water softened by both processes are given and points of comparison between the two methods are included. Attention is also called to a number of bulletins descriptive of Graver water softening and purification equipment. These include such topics as water supply for horizontal and vertical pressure-type filters; hot process, continuous, Zeolite, and intermittent water softeners.

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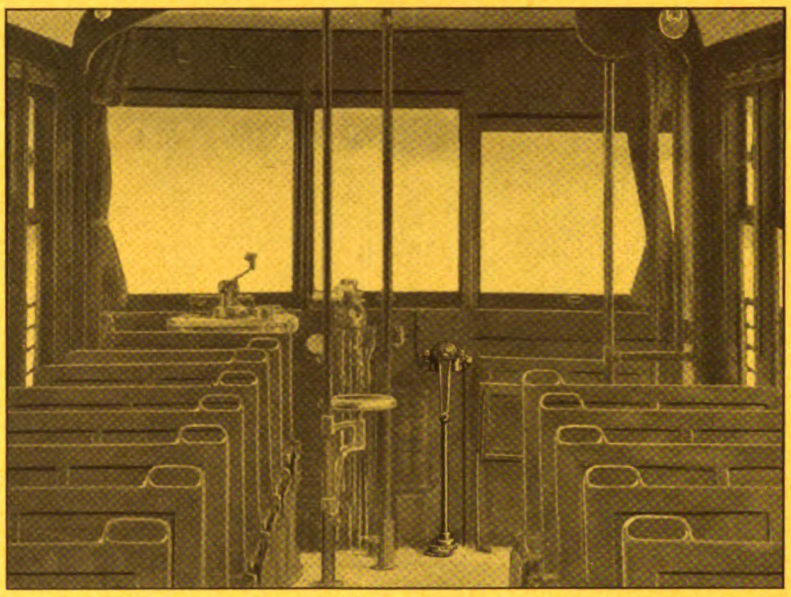
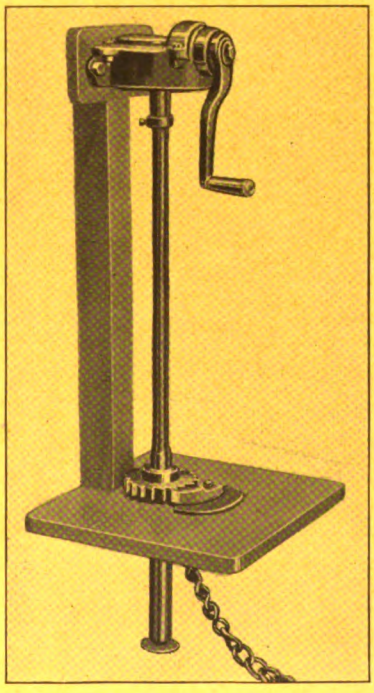
Where the Brill Vertical Handle Brake Fits In



For both large and small platforms and all classes of service



The single vertical handle of the Brill Vertical Handle Brake particularly adapts it for platforms so equipped that the economical use of space is highly important. While this brake was specially developed for use on Birney Safety Cars, its effectiveness in quickly taking up the slack in the brake chain and applying the brakes is responsible for it being specified on the larger types of cars. Sold with or without staff.

THE J. G. BRILL COMPANY
PHILADELPHIA, PA.
AMERICAN CAR CO. ST. LOUIS MO. — G. C. KUHLMAN CAR CO. CLEVELAND, OHIO. — WASON MANF'G CO. SPRINGFIELD, MASS.

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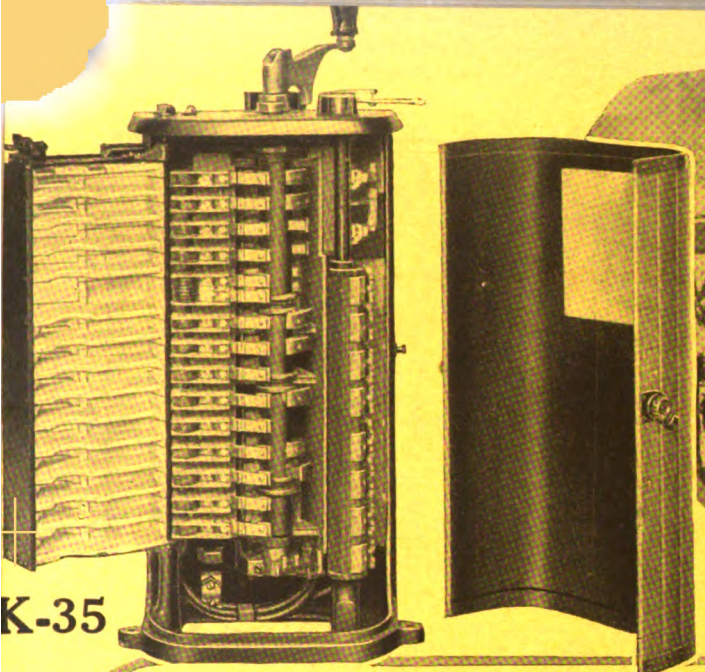
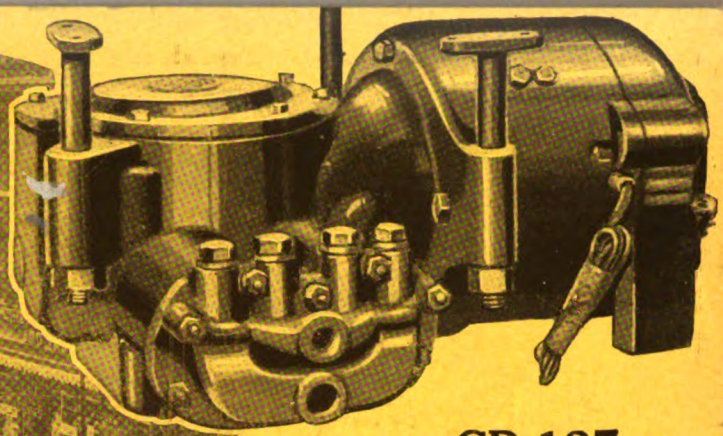


K-35

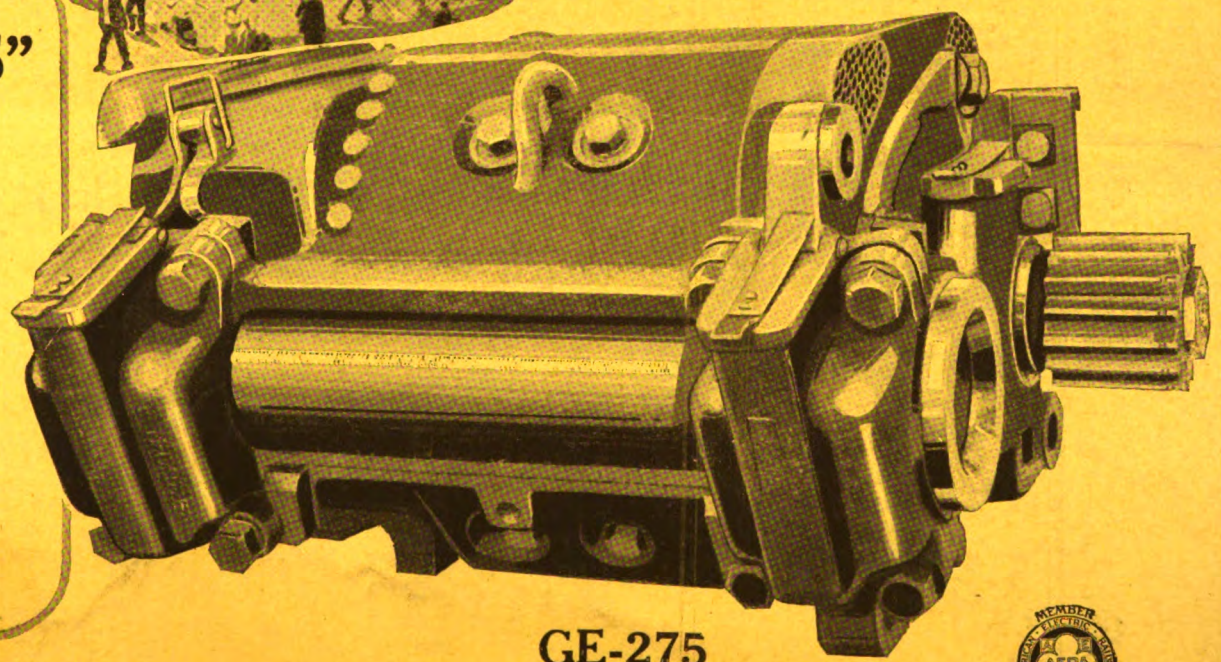


CP-127

Chicago also specifies "GE-275"

A repeat order from the Chicago Surface Lines for 400 GE-275 Motors—the same motor which figures in Philadelphia's record-breaking car order—makes a total of 766 GE-275 Motors for that system. The operation of the 366 motors of this type, ordered by the Chicago Surface Lines last fall, was so successful that "GE-275" was specified for 100 new cars.

As in Philadelphia, "K" Control with Line Breakers was selected and the Air Brakes are also "G-E", with CP-127 Compressors and type ML Governor.



GE-275

General Electric Company
Schenectady, N. Y.

GENERAL ELECTRIC

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ELECTRIC RAILWAY JOURNAL

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MAKE CARS COAST 6 TIMES AS FAR

We Have the Proof—Demand It

STAFFORD ROLLER BEARINGS

STAFFORD ROLLER BEARING
CAR TRUCK CORPORATION
LAWTON MICHIGAN
"IT ROLLS THE FRICTION AWAY"

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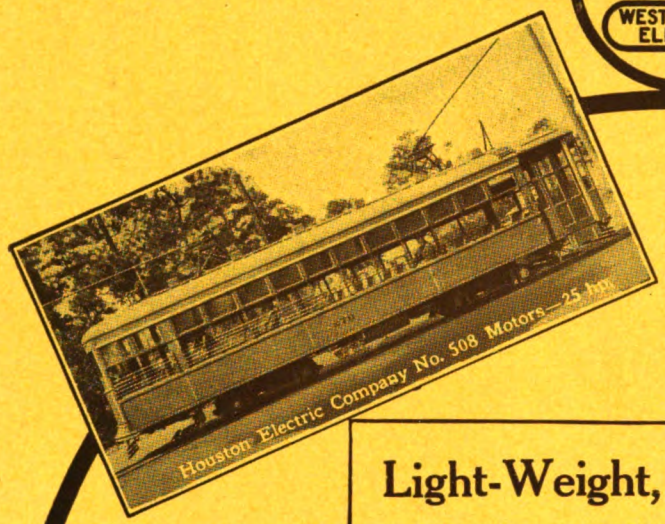
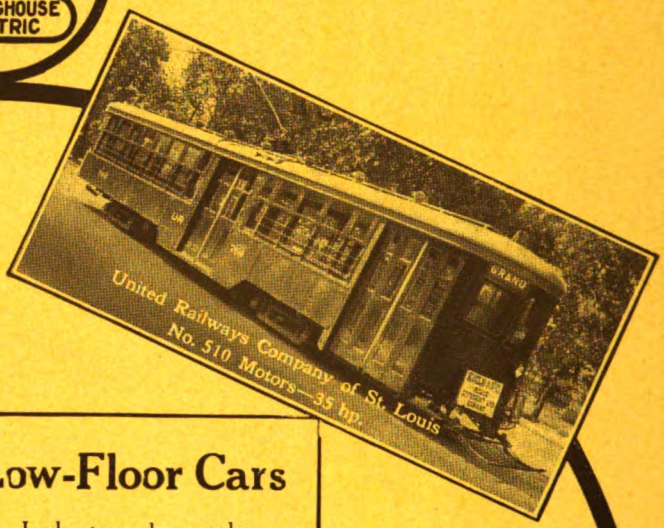




Light-Weight, Low-Floor Cars

The Electric Railway Industry demands rolling stock capable of efficiently transporting great masses of people in short periods of time. Light-weight, low-floor cars, which may be operated by either one or two men and which may be arranged to operate as single cars or in trains of two or three cars, are meeting the exacting requirements in many of our large cities.

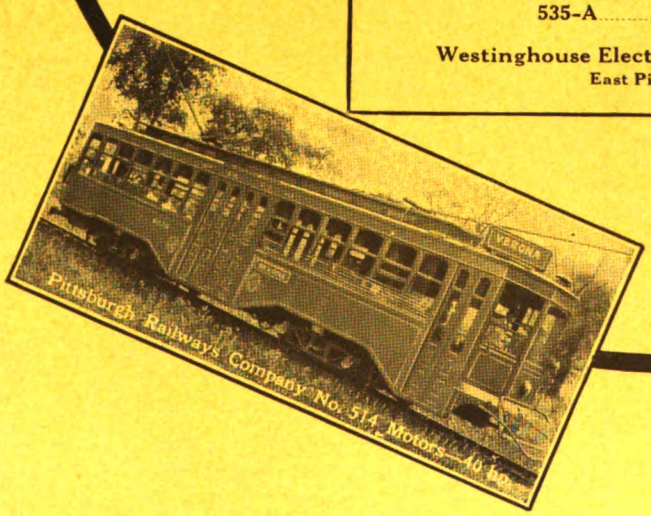
The necessity of rapid acceleration and high-schedule speeds makes it very important that the proper size of motor unit is applied.

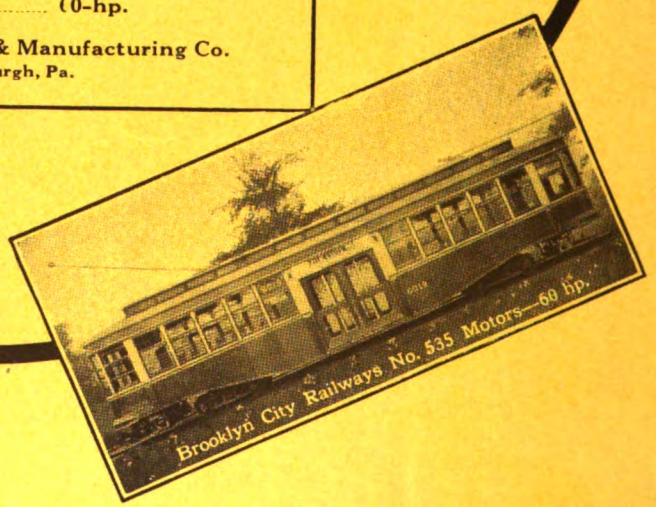
Standard Westinghouse Motors are designed to meet a wide range of service conditions. Let us assist you to select—

A MOTOR FOR YOUR SERVICE:

508-A	25-hp.
510-A	35-hp.
514-A	40-hp.
535-A	60-hp.

Westinghouse Electric & Manufacturing Co.
East Pittsburgh, Pa.





Westinghouse

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New York, Saturday, June 30, 1923

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Company, Inc.

HENRY W. BLAKE and HARRY L. BROWN, *Editors*

Volume 61
Number 26

Re-Equipping to Save Money

RECENTLY a story appeared in this paper which gave the engineering, operating and economic considerations involved in the decision to scrap the fifteen-year old a.c. cars of the Indianapolis & Cincinnati Traction Company and re-equip the property with modern d.c. motored cars and automatic substations. This was all in preparation for extending the line 75 miles on through to Cincinnati. But if this extension should never be made, the change to modern equipment will result in a saving in operating expenses equal to 14 per cent return on the additional investment on the basis that no more business is done than in 1922. The re-equipment of the present property is therefore a good paying proposition even without the further advantages that will accrue to the road, such as the ability to give much more reliable service in new, attractive, better riding cars, which will bring more patronage.

Of course few railways have the opportunity to make so radical a change as was made on the I. & C. from a.c. to d.c. operation, in a case where the a.c. installation was a misfit, but there is nevertheless a sufficient inducement to make careful consideration of re-equipment important. To replace d.c. motors and cars twenty years old, and more, with modern cars of lighter weight and with more efficient motors will produce savings estimated to run from 8 to 12 per cent on the additional investment. In city service, if the saving resulting from more car-miles per car-hour is included, this will run the return up to 15 to 20 per cent. Adding to these savings the merchandising value of new cars makes re-equipment quite worth while.

Making Secure the Investment in the I. & C.

THE Indianapolis & Cincinnati Traction Company was one of those interurban lines whose continued financial success was a matter of doubt. It operates out of one good terminal city into farming communities, and hence must depend almost entirely on local patronage, as it does not run to any other commercial center. In view of the increasing use of the private automobile and the competition of motor buses, this local travel has diminished so that it has recently been scarcely adequate to support the railway even to the extent of paying operating expenses and fixed charges.

The re-equipment of the present property alone would enable the railway to carry on somewhat longer, but would not make its financial position secure. The completion of the plan of the company, however, to go forward promptly with the extension of the line to connect Indianapolis with Cincinnati, will place the property in an altogether more favorable position as to earning capacity per mile of line. That will add to the present limited local business the commercial travel that is attracted readily to frequent, high-speed, comfortable transportation between two important cities. Such transportation, if the cities are 50 to 100 miles apart, is in no serious danger from automobile and bus competition.

Thus it may be said that it is much more than an ambition with Charles L. Henry, president, to push through to completion the original idea behind the incorporation as indicated by the company name.

Under-Insurance Is a Common Fault

MUCH has been published on the method of determining valuations of railway physical property for rate-making purposes, but little on the method and need of making valuations of this same kind of property for fire insurance purposes. Nevertheless, neglect of this matter will nearly always result in serious consequences, if the property is of much value and should happen to be destroyed by fire.

The value of a building for fire insurance purposes is not the same usually as that at which it is carried in the balance sheet as an asset. It may also be quite different from the value at which it is held in a rate case or for taxation purposes. But it can be very definitely defined. It is the sum at which in each year the building can be replaced or another building as good for the purpose may be erected. This means, of course, that its value for fire insurance purposes varies from year to year with fluctuations in the cost of building construction.

Conservative railway financial managements often take pride in the large amounts which they charge off yearly for depreciation of their physical property. For the stockholder this policy has many points of merit when this policy is applied to the balance sheet, but the experience of the last few years shows that it may be and probably is absolutely wrong if applied to the amounts at which this same property is insured. Thus if a carhouse was built ten years ago for $200,000, its cost of replacement today might be double that sum, while if a system of charging off 3 per cent a year on the original cost for depreciation was followed it would be represented in the balance sheet at only $140,000. Here is a difference of $260,000 which the company would lose if the building was destroyed by fire. Obviously the same principle applies to other parts of the equipment.

It is somewhat strange that on a great many properties the work of handling fire insurance seems to be conducted on a different basis than are other parts of the business. For these, the advice of experts within or without the organization is sought. But the business of caring for the fire insurance is often turned over to a clerk, and the policies are taken out through a

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local agent for no other reason than that he happens to be a friend of one of the officials of the company. This is all right if he earns his premiums, but to do so he ought to make sure that the company's risks are fully covered and that it is taking advantage of all practicable opportunities to reduce its rates by the introduction of fire preventive measures.

Utility insurance is quite a special study in many respects, which points to the value of placing insurance matters in the hands of some one like a general agent who is particularly equipped and experienced in this class of work. When dependence is placed solely in the average local agent, the railway company may easily be subject to great losses or to unnecessary high rates through lack of competent advice in securing adequate protection and in pursuing ways and means to reduce the risk and the cost.

Would Use Even a Tragic Accident for Political Capital

MAKING political capital of a tragic accident would seem to be about the lowest form of human enterprise. Yet that is about what New York's Mayor did on the occasion of the disaster on the Brooklyn-Manhattan elevated line in the heart of Brooklyn last Monday when two cars fell off the structure, killing eight and injuring eighty. After a cursory glance at the splintered timbers where the cars left the structure, he promptly announced that rotten guard timbers were responsible for the accident. By contrast, engineers and other experts long trained in the science of construction and railroad operation have withheld their judgment pending the disclosures of thorough investigation.

The Mayor declared he would write the Governor demanding the removal of the Transit Commission, his favorite victim of attack, as this condition existed with its knowledge and consent. He indicated also that the accident would probably never have occurred if his traction program had not been killed at the recent legislative session. Fortunately, all of the local newspapers have severely criticised his attitude.

So far as can be ascertained to date, it appears that whatever the condition of the guard timbers was, they performed their function, as the truck which was derailed was kept on the structure. If the sudden lurch of the car body, resulting from the truck suddenly turning crosswise of the track, was responsible for breaking the king-bolt and throwing the body off the track, then no structure short of a high wall would have saved the cars from falling to the street. The traction company is co-operating in a thorough study of the causes, for, naturally, it is most vitally interested in bringing out any facts that can be used in devising ways to prevent a recurrence of an accident which will probably cost the railway a million dollars or more.

Principles of Utility Regulation Are Restated in Illinois Case

IN A CLEAR-CUT decision in the case of the West Suburban Transportation Company, appellant, vs. the Chicago & West Towns Railway Company, appellee, the Supreme Court of Illinois has defined the purposes of a public utilities commission and has declared its willingness to intervene in cases where these purposes are not carried out. Of course, there is nothing absolutely new in principle in what the court says in this case. The whole idea of public utility regulation in this country is built around the theory that a utility whose rates and service are regulated will be protected against competition to the extent that a new company will not be permitted to supply a similar service in the same territory unless that service is a matter of convenience and necessity to the public. Neither is it entirely without precedent that the courts should intervene even in matters of judgment on the part of the commission as to what condition of affairs is meant by convenience and necessity.

It is in defining these terms that the Illinois Supreme Court decision, just rendered, is particularly clear. "Whether the public convenience and necessity require the establishment of a new transportation facility," it says, "is not determined by the number of individuals who may ask for it." Even a considerable number of people, the court goes on to point out, might be convenienced by the new transportation enterprise, but this does not mean that it would be either a convenience or a necessity to the great body of the public. In fact, the court intimates if the amount of traffic taken by the competing bus line should so affect the existing trolley company that it would have to reduce its service or increase its fare, the interest of the public as a whole would be jeopardized.

It is well that these principles of public utility regulations should be restated by the court every so often. While fundamental in their soundness, it should be remembered that utility regulation is not so very old in this country, and that its principles may be lost sight of by, or perhaps are unknown to, each new crop of politicians. It is for this reason that their restatement by a body like the Supreme Court of Illinois is refreshing.

Good Maintenance Important in Improving Public Relations

AT THE recent convention of the National Electric Light Association much time was devoted to the discussion of how to better public relations. Several speakers referred to the importance of service as the fundamental on which good relations can be built, and the need for providing the best of service at all times. Of course, it is not possible for the customer to see the maintenance departments at work, except in some few instances; but they are always behind the scenes, and much of the success of the utility depends on the character of work done by these essential departments.

Much emphasis has been laid on methods of reducing the costs of maintenance, due to the straits in which the railways have been for the past several years. Unfortunately in some cases the costs have been reduced to the point where service has suffered. A few equipment men have overlooked the seriousness of failures during the rush hour. While sometimes it does not mean a great loss in revenue, other cases can be cited where failures have caused regular riders to seek other means of transportation or to walk, either for the one day, or, if breakdowns are too frequent, to get away from the use of the railway's service permanently.

The best is usually the cheapest, and if attention is paid to keeping all parts of the property maintained in the best manner, the total net revenue at the end of the year is likely to be greater, even though more money actually has been spent in its upkeep. Penny-wise methods usually turn out to be pound-foolish, and their use should be discouraged, even though the immediate cost may make a small saving look tempting.

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New Philadelphia Cars Will Have Many Modern Devices

Sample Single-End Car of Which 385 Will Be Built for Philadelphia Rapid Transit Company

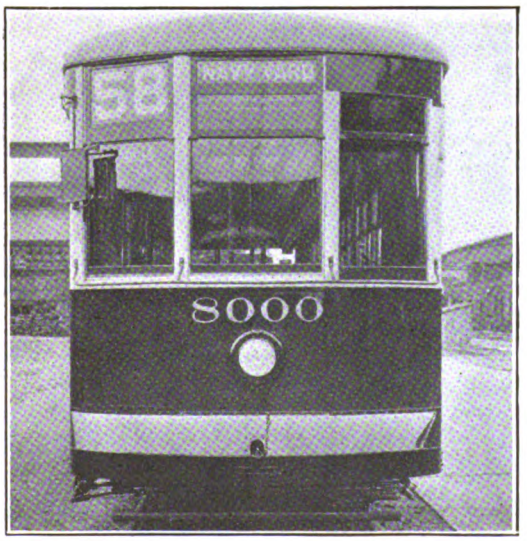
Single-End Type Is Designed for Either Two-Man or One-Man Operation—All of the New Cars Are to Be Equipped with Safety Devices—The Cost of the New Rolling Stock Will Be $6,500,000

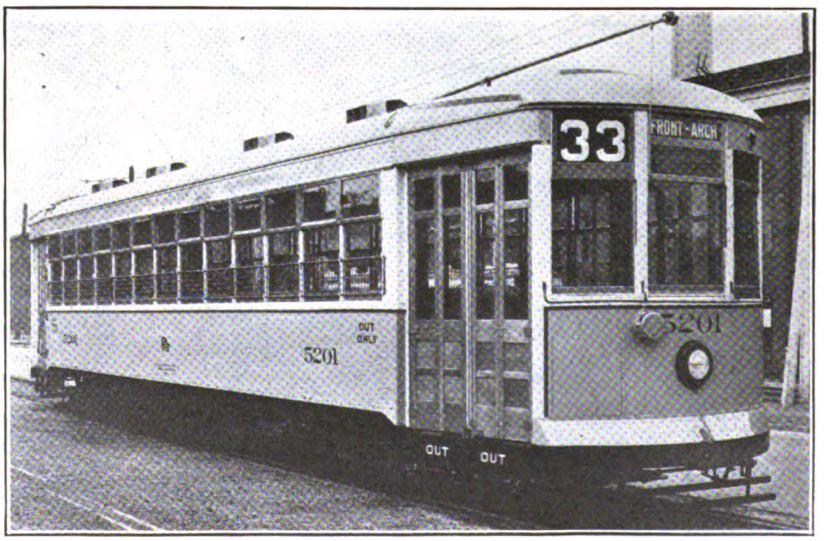
THE outstanding feature of the 520 passenger cars recently purchased by the Philadelphia Rapid Transit Company will be the completeness of the auxiliary equipment. Practically all of the latest devices for use on electric railway cars have been embodied in the design. This large purchase includes 385 single-end cars such as shown in the accompanying illustration of car No. 8000, similar in type to the modified near-side cars now in service, and 135 double-end cars which are a modification of the so-called "Hog Island" type. Car No. 5201, also pictured, is an example of this design. These two sample cars are the only units which have yet been completed.

On the single-end car, sliding center doors and a double step in the well inside the car body will replace the folding door with a single step in the well and a folding step outside, used on the earlier type. It is expected that a reduction in the number of accidents will result from keeping these doors within the lines of the car instead of opening outward where they can be smashed by a passing vehicle. This feature is of particular importance in Philadelphia because of the narrowness of the streets. Moreover, it is hoped by the company to speed up the unloading process by having a larger well inside the car, where more people can assemble in readiness to alight.

All of the cars are to be equipped with standard safety car devices. National pneumatic door interlocking devices will be used as an additional safeguard, with a signal light in front of the motorman to indicate to him when all the doors have been closed. When the 8000-type car is used for two-man operation, passengers will enter at the front and leave by the center door, as in the older cars. Under these circumstances the center doors will be controlled by the conductor stationed on the right-hand side of the aisle immediately in front of the well. This control is similar to that now used on the other cars of the Philadelphia Rapid Transit Company. The pneumatic door engines have their valves mechanically operated by the conductor through a system of rods and bell cranks.

When the car is used for one-man operation, passengers may enter and leave by the front doors, or they may enter at the front and leave by the center door, in which case the center door is opened and closed from the motorman's position. These operations are all controlled by the engineer's valve handle, as in the standard





135 Double-End Cars of the Type Shown at the Right Are on Order. Note New Location of Destination Signs in This View and in End View of Single-End Car Shown at Left

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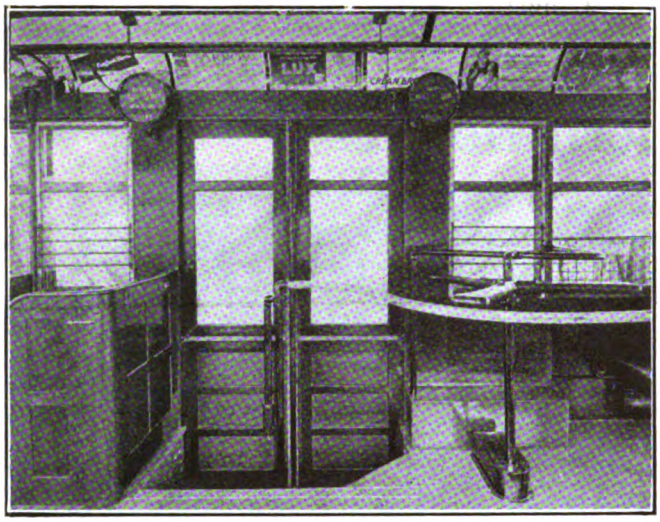
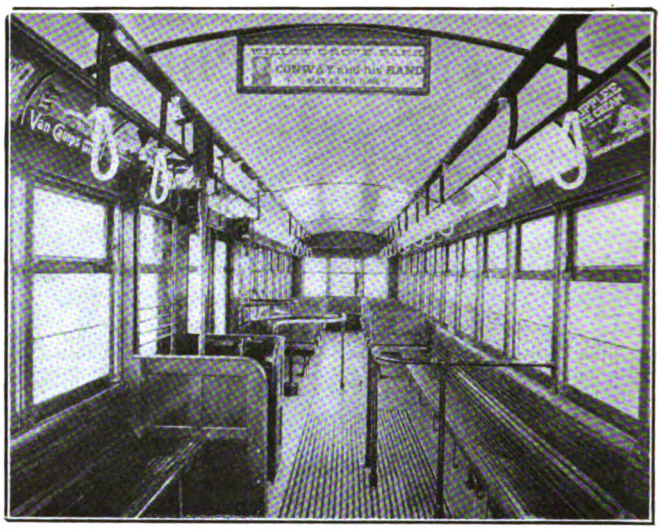


The Top Step Is Shortened Because of the Turnstile



Standard Seating Arrangement for Single-End Cars

safety car practice. In order that door operation may be suited to the use to which the car is put, a selector valve has been placed in front of the motorman immediately below the engineer valve. The position of the selector valve handle determines whether both doors at the front are opened or whether one door at the front and those at the center are opened by the door-opening movement of the engineer's valve.

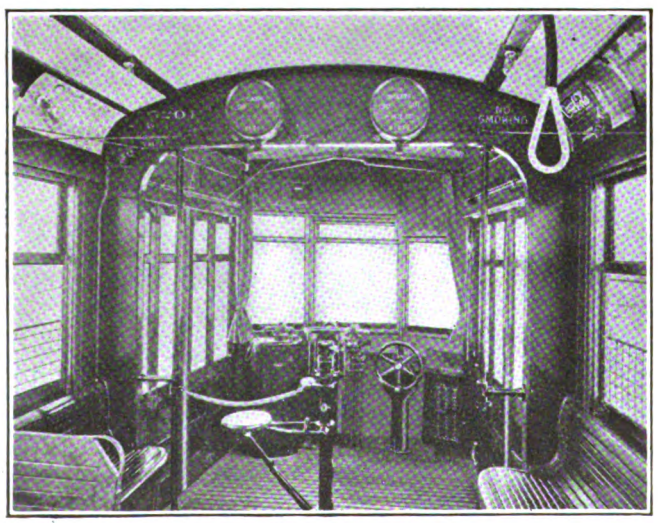
Consideration is now being given to the question of locating a turnstile of the Syracuse type at the center exit of the car. This device will be used when the car is operated by one man as a front entrance and center exit car or vice versa. For experiment the turnstile in the sample car has been placed just in the rear of the well. In case the car is to be used in two-man service with a conductor, one of the three turnstile arms may be dropped, so as to leave the exit passage free. The position of the turnstile near the well at the center of the car, as shown in the accompanying illustration, is such that it introduced an element of danger in that it distracted the attention of passengers from the step, so that they might fall as they left the car. In order to eliminate this danger, the floor has been mitred to cut off the corner of the well near the turnstile so that a passenger can pass entirely by it before it is necessary to take a step down. Universal safety treads will be used on the steps.

Great flexibility of operation is possible with the car so designed. It is adapted to any kind of service. However, the normal operation will be with two men on heavy city runs, or with one man for lighter traffic as a front-entrance, center-exit car. The cars will always be used as single units and never coupled into trains.

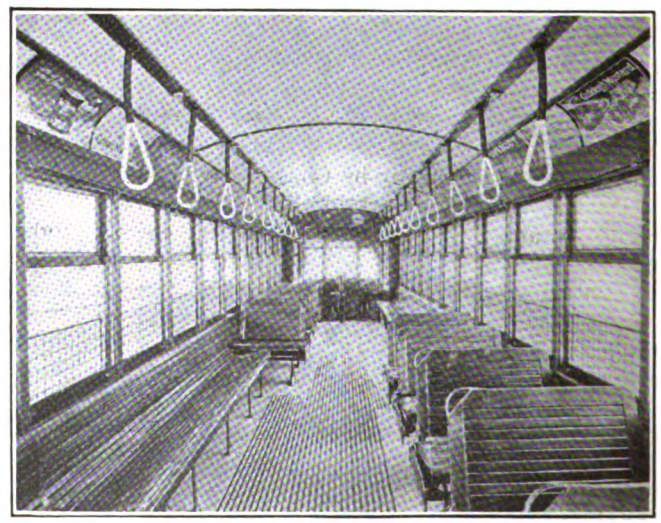
The seating capacity of the new single-end car will be fifty-three, which is greater by two than that of the present cars. The general seating arrangement will be the same as in the present cars, and the increase will be effected by moving back the rear bulkhead. Although this will decrease the capacity of the curved seat at the rear of the car, nevertheless it will make possible the installation of two additional cross-seats. The Brill "Cleveland" type of seat will be used. This is of wooden slat construction, which the Philadelphia Rapid Transit Company believes to be the most economical and sanitary type of seat.

Artificial lighting will be accomplished by two rows of small unshaded electric bulbs. These are arranged in line with and between the hand straps, approximately over the center line of the cross-seats.

The straps themselves are to be the Buffalo handholds. The grip is of white enameled metal and is suspended from the car roof by a chain. Around the chain is a piece of thick rubber tubing which gives a certain amount of stiffening and prevents the strap



A Selector Valve Is Located Below the Engineer's Valve



New Seating Arrangement in Double-End Car

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flopping around when the car is in motion. The car signal system will be the Faraday type-E with contact bases. The interior metal trim of the car is to be bronze statuary finish, while the wood work is cherry. The Lucas system is used for interior and exterior finish. The roof will be the arch type with Agasote headlining finished with white Anglo-American enamel. Double-faced Pantasote will be the curtain material.

Hunter signs will be used. In this respect the new single-end car shows a slight variation from previous designs. The name of the destination point will be shown in the center front window instead of being immediately below the large route number in the right-hand window. The route number, however, will remain in the present location.

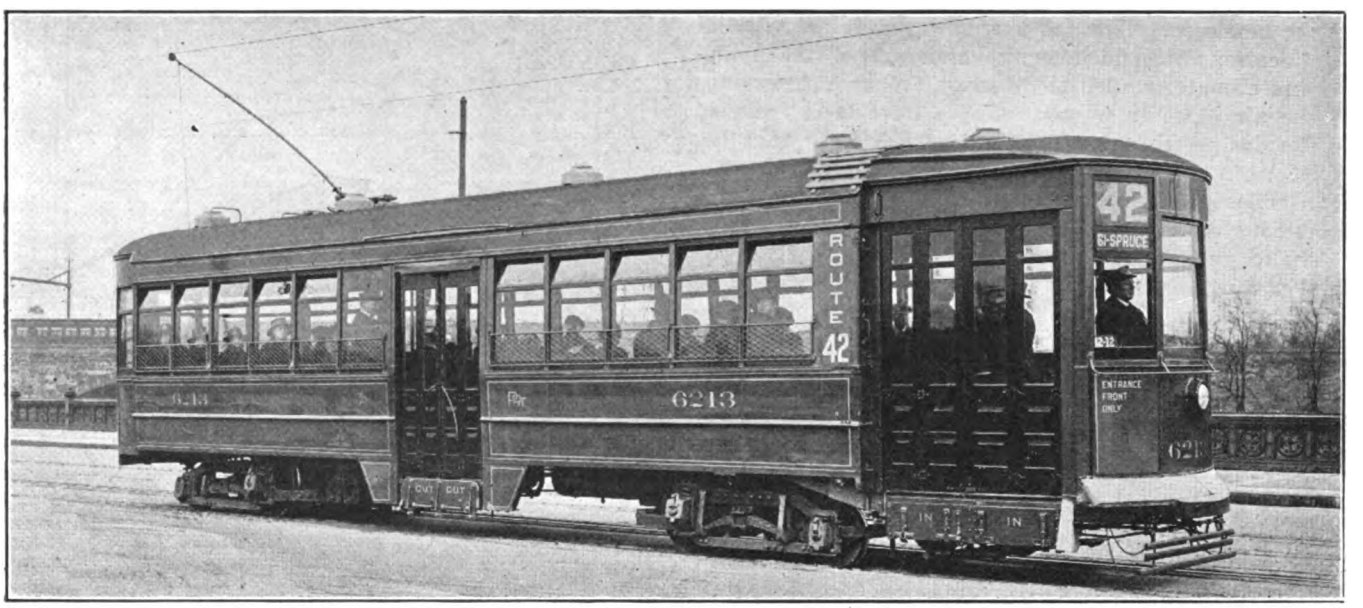
The new car will have on each side one more window than the old car. Window posts will be of the Brill "Renitent" type, which holds the sash under compression, yet permits its easy removal. The sash is held firmly in place when raised to any desired height. The latter feature is considered by the company to be of great importance, as many accidents have occurred in the past on account of windows dropping upon the arms of seated passengers. This type of window is not a novelty in Philadelphia, having been used on some of the more recent cars. The upper portion of the sash in every second window is to be hinged at the bottom and may be dropped inward slightly in order to afford ventilation, although roof ventilators also will be used. The latter are of the Garland C-1 Jr. type. The car will be heated electrically by Consolidated car heaters.

Although the framework of the new 8000 car is composed of standard-sized members, nevertheless a slight reduction in weight has been effected, the total being only 34,000 lb., as compared with 37,000 lb. for the present car. The over-all length of the car is 45 ft. 6 in., and the over-all width 8 ft. 6 in. The height from rail to trolley base is 11 ft. ½ in. Steel framing is employed throughout, and the sides are of sheet steel, being straight instead of paneled as on the near-side cars. The floor is of wood, the aisle being reinforced with hardwood strips, and at the front end has a slight ramp so that any moisture which accumulates will run down onto the front platform. This in turn is sloped slightly toward the door, thus insuring the motorman a dry place on which to stand.

General Electric K-68 control will be used on the new cars. By means of a ratchet attachment a line switch beneath the car opens with any reverse movement of the controller. Economy meters also will be installed, as this is standard Philadelphia Rapid Transit practice. The air-brake equipment is made by the General Electric Company, while the hand brake is of the Peacock staffless type. Carnegie steel wheels and axles are to be used, the drivers having a diameter of 28 in. and the trailers 22 in. Each car will be equipped with two General Electric No. 275-A outside hung motors, and Tool Steel gears and pinions. Trucks will be Brill No. 39 E-2, having helical and elliptical springs. The cars will be equipped with Kalamazoo trolley wheels and harps, O-B trolley catchers and Imperial headlights.

THE DOUBLE-END CARS

As already stated, the new double-end cars of the 5200 type differ only slightly from the previous design of double-end car, first introduced by the United States Shipping Board during the war period for service to the Hog Island shipyard. The new cars, however, will have this important difference, that one-half of the seats are to be transverse instead of all being longitudinal. There will be altogether ten cross-seats in this car, arranged in two groups of five each, one on the front left-hand side and the other on the rear right-hand side, with a longitudinal seat opposite each group.



On Present Cars the Center Door and Step Open Outward

Another difference from previous types of double-end cars is that the 5200-type car will be equipped with only two motors instead of four. This can be done because it is not intended that the car shall haul a dead trailer, as has been the practice in the past with some of these cars. The motors themselves and most of the other equipment on the car are the same as already described for the single-end car.

Safety car devices and pneumatic door control will be installed on the double-end cars. A selector valve similar to that on the single-end car will be used on the 5200 type, although the door operation will naturally be different on a double-end car. The 5200 type will be slightly

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heavier than the 8000 type, having a total weight of 35,000 lb., somewhat less than the present double-end cars.

There will be a marked difference in appearance between the new double-end cars and the single-end cars. In accordance with standard practice in Philadelphia, the double-end cars are to be painted orange in color in contrast to the green of the single-end cars. This is done in order that the public may know at a glance whether an approaching car is of the front-entrance, center-exit type or of the rear-entrance and front-exit type.

Shortly after the completion of sample cars of the new types at the Brill works, where all of the cars are being built, a committee composed of employees of the Philadelphia Rapid Transit Company, Chairman Mitten and President Dunbar made an inspection. A close examination was made of the car and all its working parts by both the employer and employee committeemen, in order that those who operate the cars and those who maintain the cars in the shop should have an opportunity to make suggestions.

Pneumatic control plays a large part in the operation of the new cars. This feature, however, is not without complications inasmuch as the moisture of the Philadelphia climate is such as to cause frequent freeze-ups of the air pipes in winter. There have been included in the design, therefore, enough cooling coils that the moisture in the air may be condensed harmlessly rather than collect at joints in the pipe and freeze up with disastrous results.

The magnitude of the order may be judged from the total cost, which will be $6,500,000. Many automatic and labor-saving devices have been included in the design, and it is felt by the company that the new cars represent a distinct improvement over any others now in service in Philadelphia.

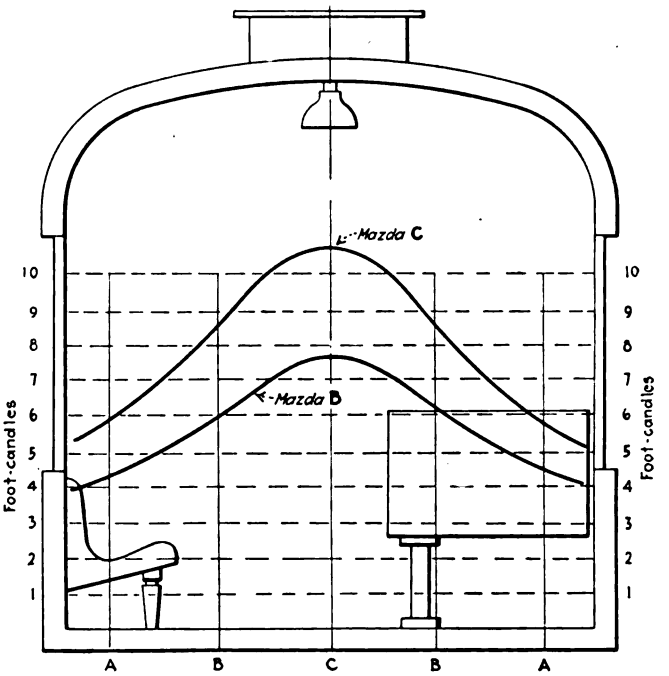
Future Development of Car Lighting

Standards Are Steadily Rising to Follow Industrial and Commercial Practice—The Gas-Filled Incandescent Lamp Is Being Studied

THE passage of laws in several states requiring that the injurious glare from unshaded electric lights shall be eliminated in industrial plants may foreshadow a similar demand for shaded lamps in railway cars. When such a time comes there will have to be a radical change from the customary lighting practice of the present day. The many small unshaded 25-watt lamps will probably have to be eliminated and a smaller number of large lamps with modern reflectors used in their place.

The experience of railway engineers indicates that the 94-watt Mazda B lamps used five in series with center lighting on many cars average close to 2,000 hours in service, and if voltage variations are not excessive they may even continue to burn for a longer time before failure of the filament. However, these lamps are subject to an unavoidable depreciation in candle-power as the tungsten filament evaporates, and they may frequently be expected to fall to 80 per cent or even less of their initial candle-power before final burnout. Economically it would be well, the manufacturers point out, to remove and scrap all excessively old lamps that have fallen to less than 80 per cent initial candle-power, a condition which may be expected to occur at the end of about 1,500 hours continuous burning.

Tests recently made under service conditions show that the center-deck lighting system with 94-watt lamps was giving only about 60 per cent to 70 per cent of the illumination possible with new lamps of the same rating, and inasmuch as the average illumination with new lamps was about four foot-candles, it can easily be seen why a number of car interiors appeared gloomy. The natural supposition would be, in view of the above facts, that either a larger bulb should be used with the 94-watt lamp, so that the deposit of evaporated tungsten on the inside would be kept sufficiently low to allow good light transmission, or that a higher wattage lamp should be installed initially to provide for this depreciation. In fact, for that very reason, the 150-watt Mazda B



Comparative Intensity of Illumination Directly Under Lamps

lamp does call for a larger size bulb. Such a larger bulb in the vacuum lamp would necessitate changes in reflectors, and does not on that account seem to be the most reasonable solution.

A number of car-lighting tests have recently been made with the object of substituting the gas-filled, or Mazda C, lamp of 75 or 100-watt size for the 94-watt type B lamp. These tests showed that directly under the fixture the C lamp gave nearly 50 per cent more light than the Mazda B, as indicated on the accompanying chart. Midway between fixtures the superiority was not so marked, being only about 20 per cent. Unfortunately, when used five in series on 550 to 600-volt circuits, the failure of a lamp filament in a bulb filled with a mixture of argon and nitrogen usually causes a bad arc, which, backed up by the entire line voltage, may result in the destruction of the lamp base and socket. Car-lighting engineers hope for the satisfactory outcome of research now being carried on to supply a gas-filled lamp suitable for series operations, but the results so far secured have not provided such a lamp and the problem is worthy of considerable thought on the part of railway engineers and lamp manufacturers.

Another alternative which is receiving serious attention is that of reflectors set into the deck of the car. This might be an excellent solution of the car-lighting

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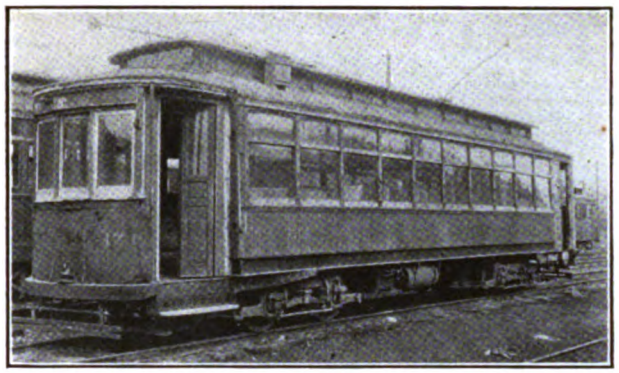
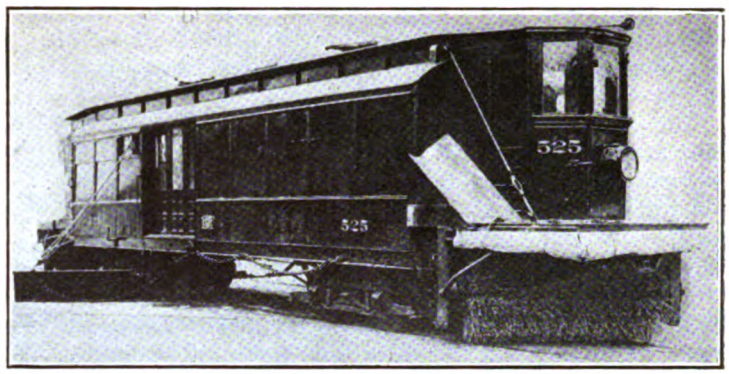




Left—Type of Old Car Similar to That Used for Double-Truck Sweeper. Right—Double-Truck Sweeper with Snow Wing as Reconstructed

problem. A slightly higher installation cost would be balanced by a lower maintenance and breakage cost and would afford better eye protection to passengers. Bare lamps within a few feet of the faces of standing passengers, now very common, are a menace to optical comfort and safety. The all-frosted or diffusing bulb lamps, especially for side deck lighting, may grow in favor as an intermediate step in curing the glare evil.

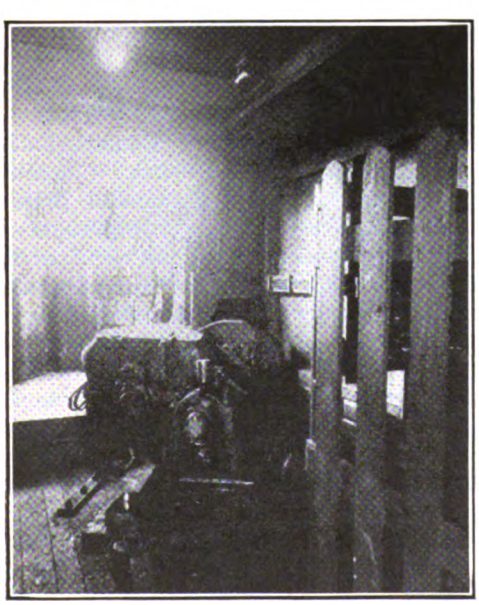
Chainless Sweeper Has Many Advantages

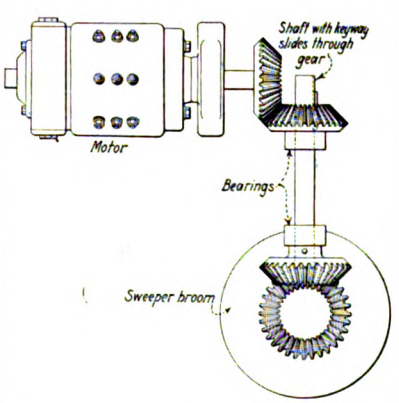
Through Use of Bevel-Gear Drives for the Rotary Brooms, Sprockets and Chains Are Done Away With—A Sliding Shaft Permits Vertical Movement

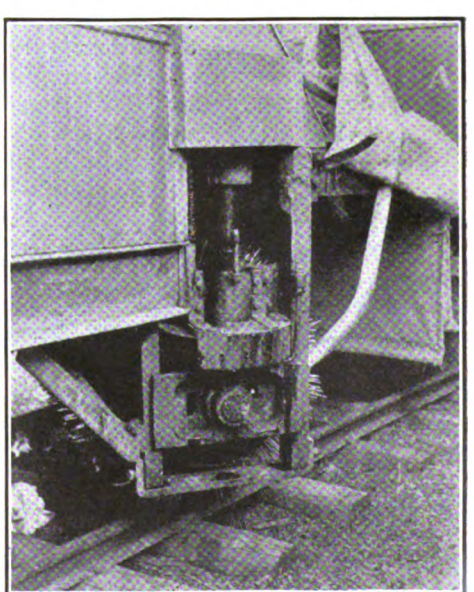
A DOUBLE-TRUCK, chainless sweeper has been built from an old passenger car by the Lehigh Valley Transit Company, Allentown, Pa. Accompanying illustrations show this sweeper as constructed, also an old car of the same type as that used in its construction. The mechanism used for driving the brooms and for raising and lowering them is particularly interesting. The sweeper has brooms at either end and these are driven through bevel gears at top and bottom of a vertical shaft so that no chains or sprockets are used. This type of construction was resorted to in order to get away from the continual annoyance caused by the failure of chains while the sweepers were in service.

At the outside ends the brooms have bearings which are installed in crossheads with guides providing for vertical movement. The crosshead guides are 2-in. x 5-in. steel castings. These are braced securely to the car-body framing, which is reinforced by steel I-beams. Front pipe braces of 2-in. pipe are also provided. The bevel gear on the broom shaft is located just inside one of the pedestals, and a corresponding bevel gear is installed on a vertical shaft immediately above this. The bearings for this vertical shaft also slide in the pedestal, so that the raising and lowering of the brooms causes the vertical shaft to raise and lower at the same time. The bevel gearing at the top end of this vertical driving shaft has bearings fixed to the car body, so that in raising and lowering the broom the vertical shaft with its keyway slides through the top bevel gear. The motor for driving the broom is connected directly to the top bevel gearing, and an individual motor is provided for driving each broom. The various steel castings required for the crosshead guides and the bevel gears themselves were made in the steel foundry of the railway company.

The mechanism used for raising and lowering the brooms consists of a chain attachment to each end of the broom shaft. This passes over a sheave on the car body directly above the broom shaft and thence to additional sheaves located on a shaft just at the end of the car body. This latter shaft has a sheave attachment in the center and is connected through a chain and rod to a brake cylinder, so that by admitting air to this cylinder the various sheaves are rotated and the brooms raised. They are lowered by their own weight. The







Top—Diagram of Geared Drive for Sweeper Brooms

Left—Motor Drive on Inside of Sweeper for Brooms

Right—Crosshead and Guide, Together with Geared Drive

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rods connected to the brake cylinder have holes with side guides so that pins can be inserted after the height is adjusted as desired, and thus the brooms can be held in any desired location.

The sweeper drums as well as the brooms outside of the cane are made much larger in diameter than other sweepers used by the railway. The wooden drum for holding the cane is 20 in. in diameter and the diameter outside the cane is 42 in. As a result of the use of these large diameters long life is obtained from the sweeper cane. During the past winter this sweeper was used during seven severe snowstorms and in about as many light storms. The same cane was used throughout the season without the necessity of replacement, while other sweepers which performed the same service required new cane after every storm, due to the breaking of the cane on account of the small diameter of the drums.

The car is also equipped with side snow wings for cleaning the area adjacent to tracks. One of the accompanying illustrations shows a side wing in position. The raising and lowering of the wing is accomplished by block and rope operated through an opening in the side of the sweeper. Chain attachments are provided for holding it in position and taking the strain of snow removal. These are fastened to the steel side sills. As may be seen by comparing the construction of the sweeper with that of the old car from which it was made, the end cab and mechanism for supporting the broom were added at the end. The center portion is used for carrying tools and for mounting the motors, brake cylinders and resistors necessary in operation. The operation of the brooms and their raising and lowering are controlled from the cab at either end. All wiring is carried overhead, inside the car, so as to keep it dry and thus minimize the danger of short circuiting. The resistors which are mounted inside the sweeper help to keep it heated.

Checking Headway Records in Racine

VARIOUS methods have been described in past issues of this paper of checking Nachod headway records to determine the extent which cars are ahead or behind schedule. A very simple plan for doing this very necessary work has been developed in Racine, Wis., where the city cars are operated by the Milwaukee Electric Railway & Light Company. There are four headway recorders in Racine and their records are checked daily.

A triangular box has been constructed, about 30 in. long, to hold a glass plate of this length and 8 in. wide, or the width of the recorder sheet. A master chart, or one showing the correct spacing of the cars, is laid down on this glass plate and held flat at the edges by brass strips under which it can slide. The headway record is then laid on top of this master chart, and by means of light from a lamp in the box the differences between the times when the cars should pass the time point and their actual times of passing can readily be checked.

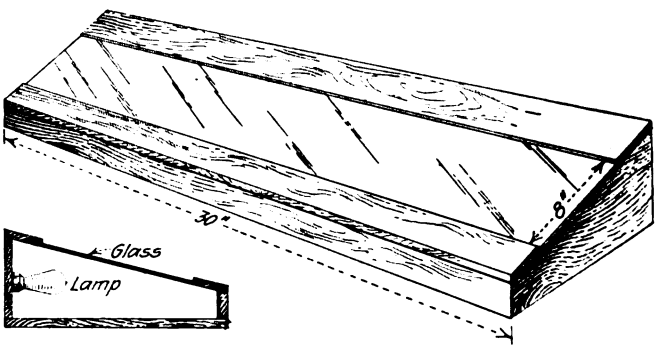
At the bottom of the box is a ruler held by three levers so that it can be raised or lowered on the glass plate yet always remain parallel with the bottom of the box. This simplifies somewhat the work of following through the lines on the record and consequently of checking the figures.

The company keeps a record of all differences between the schedule times and the actual times at which cars pass the time points, as well as the causes for all delays. This record is kept in the form illustrated, which is for January, 1923. A record is also kept of all interruptions to the operation of the recorders, as well as the cause and the total number of minutes delay occasioned thereby. Headway recorders have been found useful not only for checking car headways but also, when set at points on city lines just beyond short route terminals, to determine whether there has been any short routing of long-route cars.

MONTHLY REPORT OF CARS OFF SCHEDULE, RACINE CITY DIVISION, M. E. R. & L. CO., FOR JANUARY, 1923

Compiled from Records of Four Nachod Headway Recorders

Total scheduled car passes				37,286
Total car passes checked				32,621
Per cent checked				87.4
Total early — two minutes or more				89
Per cent early				0.27
Total late — five minutes or more				266
Per cent late				0.82
Total off schedule				355
Per cent off schedule				1.09
			Number	Minutes
Cars ahead of time			89	178
Cars late			266	1,551
Causes of delay:				
Heavy travel	82	450		
Weather conditions	16	97		
Accidents	7	47		
Other cars	37	226		
Total general traffic conditions			142	820
Track	5	31		
Power	34	209		
Rolling stock	20	120		
Transportation				
Total operating failures			59	360
Vehicles on track	3	20		
Bridges	20	120		
Steam railways	27	151		
Total foreign causes			50	291
Late from previous trip			15	80
			266	1,551



Box for Checking Headway Records in Racine

Preventing Grade-Crossing Accidents

IN A RECENT published interview Commissioner Thomas J. Campbell of the Public Service Commission of Oregon suggests that every automobile driver be required to pass a federal test concerning rules of the road, and that every vehicle should be required to come to a full stop before crossing any railroad at grade. The commissioner's suggestions are given weight by a recent check on motorists approaching two obscured grade crossings in the outskirts of Portland. Of 200 drivers observed, fifty-six looked both ways on approaching the crossing, thirty-three looked in one direction only, one hundred and ten gave no indication that they realized that they were crossing a railroad, and one came to a full stop before crossing; this one, however, being a regular stage vehicle, was required by law to stop.

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Financial Aspects in New Orleans Report

Actual Return Being Earned Under Present Operation Is 5.58 per Cent —Decreased Expenses and Increased Earnings Must Be Realized if Allowed 7.5 per Cent Return Is Earned—Estimated Savings Possible Amount to $2,400 a Day—This, Together with Increased Earnings Expected as Result of Rerouting and Better Service, Will Make Possible Full Return, Including a Reduction in Fare, by the End of 1924—Plans Can Be Carried Out with $500,000 New Capital Annually

THE seventh and last section of the report by John A. Beeler for the Department of Public Utilities of New Orleans on the local street car system deals with the financial results that have obtained under the present plan of operation and what may be expected if the recommendations made are put into effect. The past operation of the company is indicated by a condensed statement of earnings and expenses for fifteen years back as shown in Table I. The rates of fare applying during the period for which these figures are compiled were as follows:

5 cents prior to Oct. 10, 1918.
6 cents, Oct. 10, 1918, to Oct. 23, 1920.
8 cents, Oct. 23, 1920, to Sept. 28, 1922.
7 cents, Sept. 28, 1922, to the present time.

The revenue and expenses by years per car-mile and per car-hour are shown in Table II. It will be seen from this table that the expense per car-mile was 39.6 cents in 1922, or nearly three times what it was in the pre-war days. The length of the car ride has not been shortened; if anything, the average rider travels farther. In 1912 the total expense of operating a car for one hour was $1.29; last year it was $3.57. A car now in twenty-two minutes rolls up as much expense as it did in an hour ten years ago.

It is explained that the percentages of expense required by the various operating accounts have not fluctuated greatly. A renewals and replacement account was not provided until 1910 and then only inadequately. Last year $740,000 was charged to this account. This was on a basis of about 3 per cent of the rate base. It was equivalent to 9 per cent of the revenue. The report states that so much remains to be done to put the property in efficient operating condition that this amount may be increased temporarily. Eventually, however, this rate should be more than ample.

The rate base was recently fixed at $25,000,000 and the rate of return agreed upon at 7.5 per cent. To provide for new equipment and other additions the rate base has since then been considerably increased. At the time the report was written, the figures showing the average rate base allocated to the railway department of the company for the year were not available. It is shown that the gross income of $1,707,699 earned in 1922, which includes $51,708 of miscellaneous income, was sufficient to pay 7.5 per cent on a value of but $22,769,000, whereas it is known that the rate base with the new equipment on order is not far from $27,000,000. Assuming it at the latter amount, the rate of return equals 6.32 per cent. The amount lacking to cover the allowed return is $317,301.

During the year 1922 the fare was at the rate of 8 cents until Sept. 28, when the 7-cent rate became effective. The last quarter of the year was wholly on the 7-cent fare basis, and therefore the earnings from operation for this quarter reflect more nearly 1923 conditions. On this basis a gross corporate income of $1,506,057 is indicated, which is insufficient by $518,943 to pay 7.5 per cent on a $27,000,000 rate base. The actual rate earned equals but 5.58 per cent. To pay it in full would require $2,025,000, which is equivalent to 26.3 per cent of the combined operating revenue and miscellaneous income of the railway. The total operating deductions require 80.4 per cent. Reduction of these facts to a simple businesslike statement shows that for each 100 cents received, 106.7 cents are required to meet the outgo.

With the installation of the new plan, two factors of importance will be brought into action. Operation, being more efficient, will effect important savings, and the system, covering increased and well-populated territory, will serve more patrons. The first factor reduces expenses, the other increases revenues. Of the track changes, betterments and improvements outlined in earlier sections of the report, certain ones are properly chargeable to capital account and others to expense. New cars, except when they replace old equipment, should go to capital. Virtually all of the trackwork proposed must go to expense as it does not represent an increase in trackage. It represents the cost of replacing the tracks where they will better serve the city. The cost of the proposed betterments is summarized as follows:

Track changes, including extensions	$1,698,960
Canal street construction	304,000
Loading platforms	25,000
Rebuilding and modernizing 150 small cars	270,000
Other items, including civic improvements	200,000
Total	$2,497,960

These expenditures must of necessity come from the renewals and replacement account. The accruals to this fund on the present basis, 3 per cent of the rate base amount to $800,000 annually. However, the full amount will not be available for the items covered in this plan, as renewals and replacements must be made on other parts of the plant. These expenditures can be provided for out of this account by spreading them over a period of years.

If spread over ten years, annual installments of $250,000 each could be taken from the renewals and replacement reserve to cover the foregoing. At the present rate of accrual, less than one-third annually would be necessary to defray these installments. The interest on the funds advanced to make these betterments would, however, be an additional charge against future earnings. At 7.5 per cent this would average about $93,700 annually for ten years. Another way, and one that would save the interest charge, would be to "pay as you go" by using one-third of the renewals and replacement reserve, augmenting it by any available surplus earned until the expense of the charges is wiped out.

Under the proposed plan, the new capital expenditures

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TABLE I—NEW ORLEANS PUBLIC SERVICE, INC., RAILWAY DEPARTMENT—OPERATING

	1908 Dollars	1909 Dollars	1910 Dollars	1911 Dollars	1912 Dollars	1913 Dollars	1914 Dollars	1915 Dollars	1916 Dollars
Total revenue from transportation	3,900,834.85	3,959,126.83	4,046,313.00	4,158,779.97	4,274,059.57	4,379,919.85	4,374,064.63	4,167,752.55	4,393,367.16
Other street railway revenue	12,103.29	12,017.39	23,465.96	21,092.68	20,967.70	21,232.11	24,442.33	30,482.29	29,409.90
Total operating revenue	3,912,938.14	3,971,144.22	4,069,778.96	4,179,872.65	4,295,027.27	4,401,151.96	4,398,506.96	4,198,234.84	4,422,777.06
Operating expenses:									
Maintenance of way and structures	265,291.85	265,894.42	281,485.42	310,425.42	336,655.93	322,294.18	297,959.38	276,148.10	294,263.99
Maintenance of equipment	447,494.75	397,828.74	384,810.16	322,354.20	335,880.16	366,182.46	324,213.69	323,742.20	341,957.72
Traffic expenses	43,875.94	53,446.86	55,146.45	54,527.97	42,786.03	38,272.51	9,207.55	16,909.51	21,370.29
Conducting transportation	1,317,610.13	1,278,997.08	1,299,480.29	1,389,757.85	1,420,747.09	1,459,985.43	1,466,101.56	1,473,424.40	1,496,431.10
General	273,242.86	276,507.34	279,577.55	316,382.82	260,865.52	252,419.12	243,937.89	252,186.98	283,341.03
Total operating expenses	2,347,515.53	2,272,674.44	2,300,499.87	2,393,448.26	2,396,934.73	2,439,153.70	2,341,420.07	2,342,411.19	2,437,364.13
Net operating revenue	1,565,422.61	1,698,469.78	1,769,279.09	1,786,424.39	1,898,092.54	1,961,998.26	2,057,086.89	1,855,823.65	1,985,412.93
Taxes	332,923.00	329,861.83	344,487.33	361,346.68	373,875.74	478,009.10	498,140.50	493,652.48	484,157.30
Net	1,232,499.61	1,368,607.95	1,424,791.76	1,425,077.71	1,524,216.80	1,483,989.16	1,558,946.39	1,362,171.17	1,501,255.63
Renewals and replacements reserve	.....	.....	112,000.00	85,296.98	53,982.19	103,732.46	147,123.50	123,269.21	173,022.95
Net operating income	1,232,499.61	1,368,607.95	1,312,791.76	1,339,780.73	1,470,234.61	1,380,256.70	1,411,822.89	1,238,901.96	1,328,232.68
Deductions per cent of revenue	68.5	65.5	67.7	67.9	65.8	68.6	67.9	70.4	70.0
Net income per cent of revenue	31.5	34.5	32.3	32.1	34.2	31.4	32.1	29.6	30.0

for the next few years should not be large. The most important single item will probably be the trailer equipment. An average addition of $500,000 per annum should be ample to care for the railways' new capital requirements for the next three years.

Were it possible to install the proposed plan overnight, the annual operating expenses would be reduced $853,817. This is equivalent to 11.17 per cent of $7,742,436, the present rate of operating revenue. The savings expected with the installation of the plan are summarized as follows:

Track maintenance—3.25 miles less track to maintain at $4,000 per mile	$13,000
Maintenance saving on Canal Street track rearrangement	35,000
Switchmen released by electric switches	5,840
Energy conservation—$108.50 daily by use of energy saving devices	39,602
Use of light-weight trailers	93,000
Remodeling 150 small cars into safety cars for one-man operation	273,385
Routing changes save 563 car-hours daily at $2 each	410,990
Total saving	$870,817
Deduct cost of street collectors	17,000
Total net saving	$853,817

As to the time required to make effective the proposed plan of operation, the report comments that if the work is pushed with vigor all of the important track changes, betterments and extensions should be completed or nearly completed by the end of 1923. The remodeling of the cars should proceed immediately, line by line being equipped as fast as practicable. The end of 1924 should see the system working completely under the new plan.

The most important factors affecting revenues are the growth in population, which has recently averaged 7,039 annually, and the extent of the facilities available. The population served will probably be very close to 450,000 in 1925. The present effective main line mileage is 171. Replacing 34 miles of the present ineffective mileage where it becomes effective by better serving the community brings the total up to 205 miles. This should be completed and in operation by the forepart of 1924. That year will receive at least a partial benefit, and the year 1925 should have the full benefit, resulting from the operation of the then wholly rounded out system. With adequate service the riding habit should improve. At least the pre-war average should be maintained.

The estimated revenue for the future, as shown in Table III, is on the basis of 1.6 revenue passengers per capita per mile of effective main line. The savings in operation should be realized, one-third at least during 1923, two-thirds in 1924, and all in 1925. Taxes are estimated at 10 per cent of the gross for each year. Renewals and replacements are based on 3 per cent of the estimated rate base for the year. Miscellaneous income is based on the amount earned during the year 1922. Amortization of interest is averaged over a period of ten years at a rate of 7.5 per cent. Fares are based on the present rate of 7 cents. Under these conditions the results for the years 1924 and 1925 are estimated as in Table III.

The surplus of $408,000 earned over the required

TABLE II—NEW ORLEANS PUBLIC SERVICE, INC., RAILWAY DEPARTMENT — REVENUE AND EXPENSES

CENTS PER CAR-MILE

	1908	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922
Total operating revenue	20.96	21.21	21.41	21.70	21.99	22.21	22.41	21.62	22.19	23.26	27.18	34.33	37.69	47.43	49.55
Maintenance way and structures	1.42	1.42	1.48	1.61	1.72	1.63	1.52	1.42	1.48	1.57	2.00	2.77	3.22	5.21	4.85
Maintenance of equipment	2.40	2.12	2.02	1.67	1.72	1.85	1.65	1.66	1.71	1.96	2.47	4.54	6.44	6.34	6.18
Traffic	0.24	0.29	0.29	0.28	0.22	0.19	0.05	0.09	0.11	0.08	0.02	0.04	0.16	0.02	0.15
Conducting transportation	7.06	6.83	6.84	7.22	7.27	7.37	7.47	7.59	7.51	8.13	11.36	12.85	14.49	16.04	15.11
General	1.46	1.48	1.47	1.64	1.34	1.27	1.24	1.30	1.42	1.64	2.05	1.84	2.60	3.44	4.29
Taxes	1.78	1.76	1.81	1.88	1.91	2.41	2.54	2.54	2.43	2.56	3.46	2.93	3.70	3.93	4.53
R. & R. reserve	....	....	0.59	0.44	0.28	0.52	0.75	0.64	0.87	0.77	0.84	2.05	4.61	3.97	4.46
Total expense	14.36	13.90	14.50	14.74	14.46	15.24	15.22	15.24	15.53	16.71	22.20	27.02	35.22	38.95	39.57
Net operating income	6.60	7.31	6.91	6.96	7.53	6.97	7.19	6.38	6.66	6.55	4.98	7.31	2.47	8.48	9.98

CENTS PER CAR-HOUR

Total operating revenue	187.88	188.45	190.36	194.98	197.10	199.05	200.54	189.94	195.44	207.75	244.78	304.89	331.57	430.41	447.48
Maintenance, way and structures	12.74	12.62	13.17	14.48	15.45	14.58	13.59	12.49	13.00	14.07	18.03	24.57	28.33	47.22	43.83
Maintenance of equipment	21.49	18.88	18.00	15.04	15.41	16.56	14.78	14.65	15.11	17.49	22.19	40.31	56.68	57.56	55.81
Traffic	2.11	2.54	2.58	2.54	1.96	1.73	0.42	0.77	0.94	0.68	0.19	0.37	1.44	0.19	1.38
Conducting transportation	63.26	60.69	60.78	64.83	65.20	66.03	66.84	66.66	66.13	72.61	102.34	114.16	127.42	145.56	136.41
General	13.12	13.12	13.08	14.76	11.97	11.42	11.12	11.41	12.52	14.67	18.44	16.38	22.87	31.21	38.77
Taxes	15.98	15.65	16.11	16.85	17.16	21.62	22.71	22.33	21.39	22.85	31.12	26.01	32.56	35.68	40.85
R. & R. reserve	.....	.....	5.24	3.98	2.48	4.69	6.71	5.58	7.65	6.88	7.59	18.20	40.52	36.00	40.28
Total expense	128.70	123.50	128.96	132.48	129.63	136.63	136.17	133.89	136.74	149.25	199.90	240.00	309.82	353.42	357.33
Net operating income	59.18	64.95	61.40	62.50	67.47	62.42	64.37	56.05	58.70	58.50	44.88	64.89	21.75	76.99	90.15

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REVENUE AND EXPENSES 1908–1922

1917 Dollars	1918 Dollars	1919 Dollars	1920 Dollars	1921 Dollars	1922 Dollars
4,641,689.95	4,962,272.12	6,510,646.24	7,037,744.64	8,813,821.83	8,190,383.28
27,699.89	28,872.56	28,560.59	32,635.16	32,054.56	29,814.60
4,669,389.84	4,991,144.68	6,539,206.83	7,070,379.80	8,845,876.38	8,220,197.88
316,278.23	367,577.82	526,875.19	604,017.54	970,542.53	805,260.72
392,977.79	452,547.16	864,461.00	1,208,721.10	1,182,901.21	1,025,208.81
15,313.29	3,802.32	7,982.63	30,713.32	3,830.15	25,321.71
1,632,017.95	2,086,675.08	2,448,597.16	2,717,029.04	2,991,480.21	2,505,820.06
329,775.50	376,035.65	351,320.30	487,714.18	641,515.37	712,127.39
2,686,362.76	3,286,638.03	4,199,236.28	5,048,195.18	5,790,269.47	5,073,738.69
1,983,027.08	1,704,506.65	2,339,970.55	2,022,184.62	3,055,606.91	3,146,459.19
513,484.51	634,541.77	557,889.51	694,257.09	733,253.23	750,468.32
1,469,542.57	1,069,964.88	1,782,081.04	1,327,927.53	2,322,353.68	2,395,990.87
154,658.46	154,658.46	390,400.00	864,000.00	740,000.00	740,000.00
1,314,884.11	915,306.42	1,391,681.04	463,927.53	1,582,353.68	1,655,990.87
71.8	81.7	78.7	93.4	82.1	79.9
28.2	18.3	21.3	6.6	17.9	20.1

return on the rate base for the year 1924 is sufficient to reduce the fare 0.3 cent for each of the 133,000,000 revenue passengers. This would indicate, provided no valid claim exists against the surplus on account of past deficiencies or for other causes, that a ticket rate of four for 25 cents could be inaugurated during the latter part of the year, probably about Sept. 1, the cash rate remaining at 7 cents.

The surplus of $1,106,900 shown on the 7-cent fare basis for the year 1925 divided among the 147,000,000 revenue passengers would give an equivalent of 0.8 cent reduction for each one. This would indicate that the four-for-a-quarter ticket rate could be maintained throughout the year.

Or under the pay-as-you-go plan, the report continues, by applying the surplus as shown above and utilizing one-third of the renewals and replacement accruals, it is estimated that the entire cost of the installation of the proposed plan could be met by the latter part of 1925. This would save the interest on the ten-year amortization plan, amounting to some two-thirds of a million dollars, during the seven succeeding years, or would simply mean that the initial fare reduction would be postponed for a period of about thirteen months.

TABLE III—OPERATING STATEMENT FOR NEW ORLEANS ESTIMATED FOR 1924 AND 1925, TO SHOW RESULTS OF BEELER RECOMMENDATIONS

	1924		1925	
Operating revenue		$9,431,400		$10,441,300
Operating deductions:				
Expenses	$5,098,600		$5,256,100	
Renewals and replacements	840,000		755,000	
Taxes	943,100		1,044,100	
Amortization interest	93,700		93,700	
		6,975,400		7,248,900
Net operating income		2,456,000		3,192,400
Miscellaneous income		52,000		52,000
Gross corporate income		2,508,000		3,244,400
Allowed return		*2,100,000		**2,137,500
Surplus		$408,000		$1,106,900
Ratio of operating deductions to operating revenue		0.740		0.695

* 7.5 per cent on $28,000,000
** 7.5 per cent on $28,500,000

In considering the possibility of fare decreases, the report states that the enlarged application of the one-man principle of operation is the factor that seems to offer the greatest opportunity for bringing about a substantial reduction to the car rider. It is evident, however, that no mysterious waving of a managerial wand will bring about an early return of the 5-cent fare. There are other ways of reducing the fare, such as cutting operations generally, reducing maintenance of track and equipment and loading the cars heavily. Such temporary expedients as these have all been tried in New Orleans, and the public is familiar with the results. Few, if any, want to see a return to these conditions.

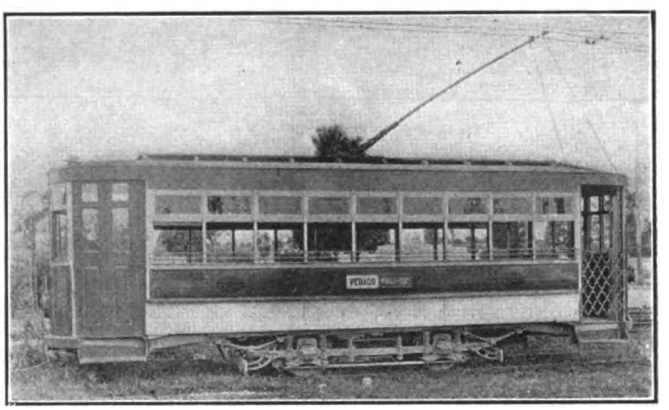
Warning is given that the inauguration of the new plan will not be an easy task. There will undoubtedly be times when the public will be inconvenienced, temporarily at least. The hearty co-operation of the public, however, should be accorded the management in making these changes. When fully completed, the enlarged and improved service will not only be rendered more efficiently and economically, but will be of such a character as to encourage and develop the future growth and welfare of New Orleans.

The Kind of Traction System Serving Havana, Cuba

Single-Truck Cars Are Necessary Due to Extreme Narrowness of Streets with Resulting Sharp Curves—Climatic Conditions Require Special Features of Design

BY OTTO GOTTSCHALK
Engineer of Railway Equipment Department
Havana Electric Railway, Light & Power Company, Havana, Cuba

THE Havana Electric Railway, Light & Power Company, Havana, Cuba, operates an average of 450 cars carrying 375,000 passengers per day. The cars are mounted on single trucks and are arranged for single-end operation. They have a length of 32 ft. over all and a width of 7 ft. 1 in. at the bottom of the side sills. The sides curve outward, which gives a width of 7 ft. 9 in. at the window rest. The interior height from floor to ceiling is 8 ft. 4 in. and the seating capacity is thirty-six passengers.



New Type Cars of Havana Electric Railway

It is necessary to construct all cars within these dimensions due to the narrow streets in the downtown section, many of which have just sufficient width from sidewalk to sidewalk to permit a car and other vehicles to pass. All curves in this section are of very short radius, the minimum being 27½ ft. Standard 4 ft. 8½ in. gage track is used. There are many points where the fenders overhang the sidewalks and in some cases have to be raised to prevent fouling the buildings when cars pass around the curves. An illustrated article giving some of the difficulties resulting from the narrow streets was published in the ELECTRIC RAILWAY JOURNAL for Aug. 26, 1916.

The geographical layout of the city with its narrow streets makes single-track operation necessary for most routes. Most of the streets have been designated as

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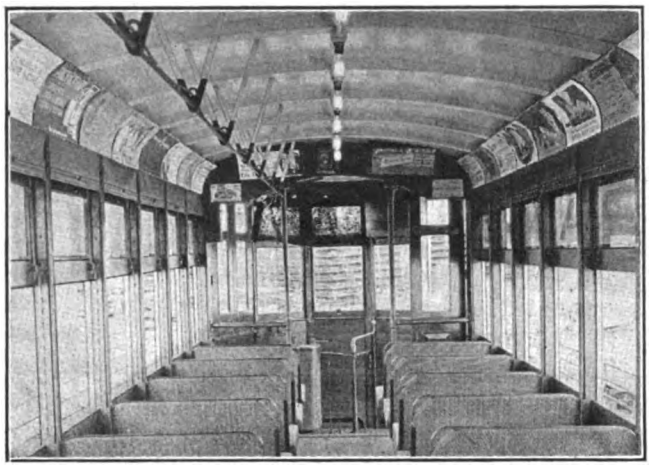
one-way streets for traffic, and operation under these conditions is very severe, particularly with reference to wheels and other truck parts. Both running rails are of the grooved type and few derailments take place regardless of the chipped flanges that sometimes deve'op.

One other serious difficulty that we have to contend with is a double overhead trolley system which results in many trolley pole dewirements at crossings and curves, and also requires the constant attention of conductors when passing these points.

Two types of passenger cars are used. One an old design similar to the single-truck cars with monitor roofs manufactured by the J. G. Brill Company about the year of 1900. This design is being replaced, however, in favor of a new design adopted as standard for all future construction.

A detailed study was made of service conditions in Havana, taking into consideration the tropical climate,



Rattan Covered Seats are Used

comfort of the passengers, durability of the material used, weight, first cost and maintenance requirements before the first car of new design was built. We believe that units transporting passengers for short periods of time do not require a fine interior and exterior finish, but should have a neat, cheerful, comfortable and durable finish with a color scheme that is restful to the eyes after looking at objects exposed to the intense rays of the sun usual during the Cuban summer.

Electric cars of necessity carry all types and classes of passengers and are subjected to constant contact with traffic. Rapid deterioration of wood and iron due to climatic conditions in Cuba is much more pronounced than in the United States. Paints must act as a preservative, and the colors selected must withstand the intense rays of the sun. Lap joints of wood, of wood and iron and of iron alone are used so as to prevent moisture from entering these joints during torrential rains.

The new design was made to conform to the old as much as possible, as employees are less confused and more familiar with the work and a reasonable standard is maintained. Duplicate parts were fabricated and the extra parts were used as samples for future construction, as very few of the railway company's employees understand drawings. The monitor roof of the old design was discarded in favor of an Agasote arched roof and ceiling with no other supporting members except 1½-in. x ⅜-in. T irons. Both front and rear vestibules are inclosed, and doors of a folding hand-operated type are used on the front end. There are no doors on the rear, only a Pantasote curtain with a heavy steel roller being used. The space between seats was increased ½ in. from that used with old type cars, the hand brake was shifted to the center of the platform so as to permit passengers to disembark more rapidly and the aisle space was increased to 26 in., the old cars having an aisle of 17 in. Bulkheads and doors have been done away with and a pipe framework substituted.

These changes in the interior of the car body were made possible by removing the window pockets, bulkheads and monitor roof. Windows are arranged to raise instead of to drop into pockets. The truss rod formerly located in the interior of the car has been eliminated, a solid piece of flat iron ½ in. x 6 in. x 22 ft. being installed between the side sill and the truck sill. This is placed edgewise and the two sills are bolted together through the flat iron. By doing this, the underframe is strengthened and there is less possibility of joined members becoming loose due to oscillation.

The side sheathing consists of No. 16-gage black sheet iron with no other trimming on the interior of the car body. We consider this good practice as it is desirable to have a free circulation of air throughout the car body, to dry out any moisture resulting from a rain storm. There is no necessity for preventing the cold air from entering cars in Havana. On the contrary, it is desirable to have a free circulation of air and our only trouble is to keep the water out of the car and from entering the joints or corners.

Car-body frames are constructed of native hardwood which resists dry rot and insects. However, longleaf pine imported from the United States is used for the platform outriggers. All wood is painted with white lead and linseed oil before joining, iron parts are painted with lead and linseed oil, strips of canvas are soaked in white lead and are applied wet between iron and wood and iron and iron when there is a possibility of water entering. This insures watertight joints. All cars are equipped with cross-seats with cane backs and cushions.

The light wiring runs in conduit down the center of the ceiling, which is painted with a gloss white enamel so as to reflect the light rays. The lighting system is arranged in two circuits, each containing seven lamps. During the period of darkness full line voltage is used and 10 per cent voltage during the daylight. The low voltage causes the lamps to burn at a dull red, which keeps the filament in a flexible condition and eliminates breakage due to vibration. This arrangement increases the life of lamps, eliminates waste of current from short-circuited filaments and also reduces the labor for replacing defective lamps.

Cables from the trolley bases pass through the roof and enter the iron stanchions used as aisle spacers and supports for the bulkheads. Two circuit breakers and the light switch are installed at the operating end of the car. Controllers are of a late type, known as K-39-F. They have individual blowout coils and are arranged so that dynamic braking is obtained by moving the reverse handle to the reverse position. Cars can thus be brought to a stop or under control either on a grade or level track in the event that the motorman loosens his hand brake and has no power for reversing. This also gives a quick and efficient stop without damage to the motors when attempting to avoid a collision by reversing. The exteriors of cars are painted chrome yellow and white, the roofs are painted gray, ceilings are covered with a gloss white enamel and the remaining interior finish is olive green. All cars are constructed in the railway's shops of semi-dried out woods. These cars have had an average life of about twelve years, whereas a steel car would have a life here of hardly more than eight years.

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Carrying Safety to the Public—VIII*

Women Can Play a Large Part in an Organized Safety Campaign—The Lesson for the Mother Is that Her Greatest Duty Is to Teach Safety to Her Children—The Work Can Be Organized Through the Women's Clubs

By C. W. Price
Vice-President in Charge of Public Safety, Elliot Service Company, New York City.

BECAUSE of the fact that women are the natural conservators of human life; because women are the molding influence in the home; because women are coming more and more to take an active part in civic activities, especially along lines having to do with the general welfare of the community; because men instinctively give women the right to speak out and demand that the home and the family be protected; because of these facts women are destined to play even a more important part than men in the future development of community safety. In every community women are becoming alarmed about the accident situation, realizing as they do that the increasing hazards of the streets are literally stalking up to their very doors and threatening the life of their families. This awakened interest on the part of the women needs only to be properly organized and properly led in order to become possibly the most potent single force in arousing public sentiment and bringing about law enforcement.

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This Mother Is Teaching the Most Important Safety Lesson to Her Children

There never was a more propitious time than the present for enlisting the co-operation of women of all classes in an aggressive campaign to eliminate accidents, especially accidents to children.

Of the 14,000 children killed in the United States in 1922 by accident, more than half were babies five years of age or younger. Of those that were of school age at least 95 per cent were not killed at school, or going to and from school, but were killed in and around the homes, largely because they had not been instructed properly and their play had not been supervised properly. These significant facts throw a flood of light upon the whole problem of safeguarding child life. No material reduction in accidents to children will be possible until the fathers and mothers are thoroughly aroused to the necessity of systematically instructing their children in safety and carefully supervising their play. Women should be made to appreciate that the child of today is born into an environment so radically different from the environment of even twenty years ago that it calls for an entirely new set of habits, a new kind of knowledge and discipline not dreamed of twenty years ago before the advent of the automobile. This applies not only to the children of the poor in the more congested districts of our great cities, but likewise to the children in every community and in every walk of life. So serious has the situation become in most cities of any size that mothers are taking their children by the hand and escorting them to and from school in order to make sure that they return home safe in the evening. So recently has this present traffic situation developed, practically in the last ten years, that people have not awakened to the seriousness of allowing the continued existence of such a menace to human life. From present indications it will be only a year or two when in every community public sentiment will have reached the point where some drastic action will be taken. It behooves public utility executives and others interested in traffic safety to take advantage of this awakened public interest and to guide the efforts along sane and instructive lines which have proved successful in other communities.

A prominent police commissioner made the statement

*Eighth of a series of ten articles.

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Escorting the Children Across a Dangerous Street Saves Lives

that if each mother would thoroughly instill the one simple rule into the minds of her children most of the deaths and serious injuries to them on the street would be eliminated. The rule is this: "When I start to cross the street I look to the left, and when I get to the middle of the street I look to the right." The mother shown in the picture on page 1083 has taken her two children down to the curb and is giving them a practical lesson in this simple rule.

Parents must be made to appreciate the fact that just as health instruction has come to be a vital part of the instruction of children in every well-regulated home, so safety must be given the same important place, and thus children will grow up with habits of caution, just as they now grow up with habits of cleanliness thoroughly instilled into their little minds. When safety is thus given an important place in the home life it not only molds the children, but it also influences the adult members of the family, and thus each of the thousands of homes becomes a center of influence to propagate the safety idea.

The progressive women's clubs of today are more and more taking up in a serious and aggressive way matters having to do with the welfare of the community. It has been found from the experiences in many cities that community safety is a subject that appeals to the members of women's clubs, and is a work which women's clubs are peculiarly equipped to promote. In securing the co-operation of all the women's clubs in a community during the initial stage of organizing a community effort it is well to call together their presidents, and to present to them a comprehensive outline of the purpose and scope of the campaign, specifically indicating what the women can do. Each president should be urged to appoint a special committee on safety in her club, and to give safety an important place in the program of activities for the year. Each club should be asked to arrange for at least one special program on safety at which a speaker from the speakers' bureau would present the subject.

Two lines of activity should be urged upon the women's clubs. First the need of devising ways and means of reaching and influencing the mothers properly to train and supervise their children; second, the women's clubs should give their whole-hearted support to the work of safety instruction in the schools. It has been found that when safety instruction is newly introduced into the curriculum the teachers will be encouraged to do more thorough work if they know they may count on the support of the mothers in the community.

The women's clubs can do much in securing proper publicity for safety, especially for safety of the children. The women can also help in securing the active co-operation of the churches and Sunday schools in promoting the safety idea.

The Washington Safety Council has devised a most successful means of encouraging women's clubs to give safety an active place in their programs and to sustain interest in safety throughout the year. This is done by means of a monthly bulletin, each issue of which is sent to the president of every woman's club, citizens'

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The Baby that Mother Has Forgotten

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"Catching On" Has Caused Many Deaths

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association and parent-teachers' association. The bulletin contains a complete analysis of the accident experience in Washington during the previous month, with special emphasis on accidents to children. Four or five stories of the most serious accidents are included. The bulletin also contains interesting new items and suggestions regarding ways and means for promoting safety. Each club president is urged to read this report at the regular monthly meeting. Thus the members are kept informed of the accident situation and are constantly stimulated to action.

Locomotives for New Zealand Electrification

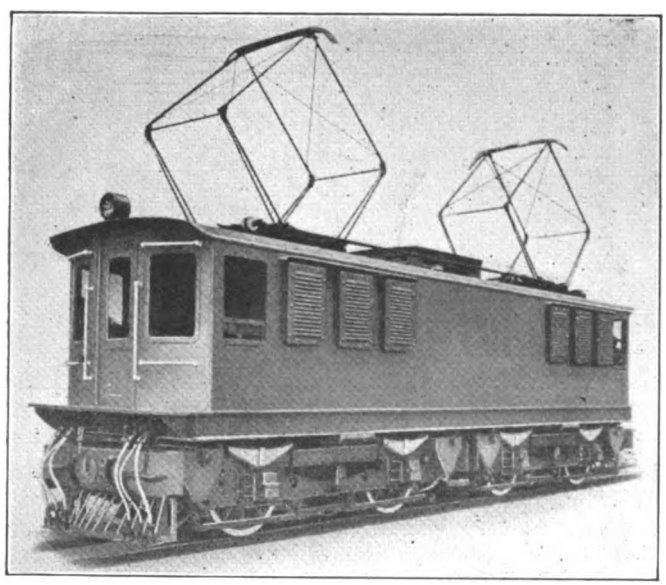
THE Midland Railway, South Island, New Zealand, is electrifying the section through Arthur's Pass on the 1,500-volt d.c. system. Five passenger and freight locomotives, and a battery locomotive for the inspection of the overhead line and repair purposes, are under construction by the English Electric Company, at Preston.

This electrification is through the tunnel under Arthur's Pass which pierces the high range of mountains known as the Southern Alps. The route length now being electrified is 8.4 miles, the total single-track mileage involved being 10.4. The tunnel is 5½ miles long.

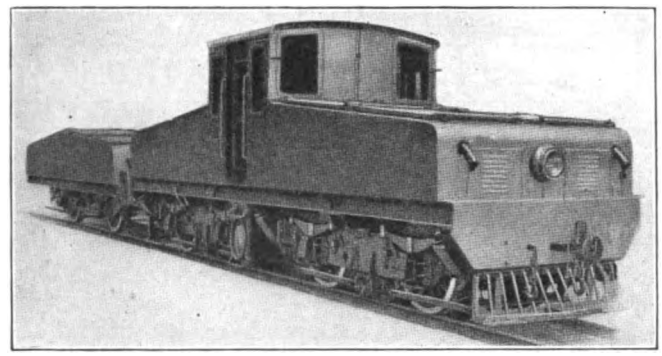
The maximum freight load to be hauled is 280 tons, and the weight of the passenger trains loaded is 128 tons. The service consists of four freight trains and one passenger train each day in each direction, but it is anticipated that this service will be greatly increased in the near future.

The railway is equipped with an overhead contact line, the contact wire being suspended from a double catenary outside the tunnel and a single catenary inside. The messenger wires are of copper and act as feeder cables also.

The locomotives weigh 48 tons and are built for the track gage of 3½ ft. They are 35 ft. 8 in. long over bumpers, and 7 ft. 6 in. wide over all. The truck wheelbase is 8 ft. 9 in. and the wheel diameter 3 ft. 9 in. The four motors have a combined capacity of 680 hp. at the one-hour rating, or 420 hp. continuously. The motors drive the axles through single-reduction spur gearing. They are permanently connected in series pairs. Four types of brake are provided: hand, straight air, automatic air and rheostatic. Provision is made for multiple-unit operation, the control being of the English Electric camshaft type.



Passenger and Freight Locomotive for New Zealand Electrification



Inspection and Repair Battery Locomotive with Battery Tender

A Centralized Store Department

THE purchasing and stores departments of the Detroit Municipal Railway are conducted on a somewhat different basis than on the average electric railway. All purchasing for the railway department, as well as for other city departments, is done through the city department of purchases and supplies, but the railway supply department conducts all follow-up work with the manufacturers of supplies, receives and stores the material, and attends to its distribution among the different departments of the railway.

The main storage yard is at the former track yards of the Detroit United Railway, at Harper and Mount Elliott streets, and this area of 10 acres has been laid out with four distributing tracks, each 800 ft. long. Material is loaded into and out of these yards by steam locomotive cranes, of which the department has two, one of 30 tons capacity and one of 20 tons capacity. The trolley on the four tracks is 40 ft. from the ground so as to be out of the way of the crane booms and is fitted with an over-running contact device and a lead wire which attaches to the street car trolley pole.

A track from the Michigan Central Railroad enters this yard to a ladder track which feeds the four mentioned storage tracks. Plans for a central storehouse are under consideration.

In addition to the duties of storekeeping, the stores department in Detroit also does all the hauling of coal and ashes for the other departments, even including the hauling of ashes for the power department, and rails, paving materials, etc., for the construction gangs of the track department. For this purpose it has six locomotives and fifteen flat cars and will shortly add to this equipment two Differential motor cars and two Differential trail cars. It has its own crews for the operation of these cars, and they work on three shifts to insure twenty-four-hour service. Mounted in the cab of every locomotive is a map of the system so that these cars can go to any point in the minimum time.

An important part of the work of these trains and of the department as a whole is the collection, sorting and sale of scrap. A classification for scrap with eighteen main heads, each having two or more subheads, has been worked out. These classes are based upon a study of the kinds of scrap which can be sold at the best terms direct to the user rather than through a middleman.

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The Readers' Forum

Sixty Weeks of Pass Riding

TERRE HAUTE, INDIANAPOLIS & EASTERN TRACTION COMPANY
TERRE HAUTE, IND., June 21, 1923.

To the Editors:

Being now in the sixtieth week of the use of the unlimited ride, weekly pass, and having therefore accumulated some experience, I read with considerable interest the article in your June 2 issue, entitled "Why the Unlimited Pass Was Withdrawn in Youngstown."

Without doubt there were plenty of good and sufficient reasons for the action taken by our good friends in Youngstown, but it seems to me that there were several arguments used in your article which might be taken as general arguments against the use of the pass, not alone in Youngstown, but elsewhere.

As far as we are concerned, we introduced the pass so as to stimulate the riding habit, as we believed that this could be done without increasing the service. In other words, we wished to create more riding during the non-rush hours. Then, too, we sought to make regular riders out of those who had been doing some riding on the cars and some in the jitneys, figuring that if a man paid a dollar in advance for a pass he would become a regular rider. Furthermore, we figured that the pass had a good will value, which, of course, we were not able to calculate. All of our objectives have been realized during the period in which the pass has been used, namely, since May 1, 1922.

With us, the customer has to pay for twenty rides in advance, and therefore our pass sales would naturally be relatively low—at least, considerably lower than where the passenger pays for only thirteen or fifteen rides in advance; and yet it is our experience that many people do buy the pass from the standpoint of pure convenience. For instance, not so very long ago a salesman bought a pass at our office on Saturday morning, and insisted on purchasing it, despite the fact that he was in town for only that day, for, as he said, he expected to do enough riding which, plus the convenience of not having to make change, etc., would justify his buying it.

Under a system of this kind, it needs no argument to show that some people will get an extraordinary use of the cars at a very low rate; but that does not prove that every pass buyer will do the same thing, nor does experience show it to be true. There are exceptional cases, like the boy who is said in Youngstown to have ridden eighty times a day on a pass. If you analyze this statement and figure the time taken for each ride as only five minutes, this boy would be spending 400 minutes either riding on a car or waiting for a car to come along. If, now that the pass has been withdrawn, this same boy rides eighty times a day at regular fare, of course the argument is good; otherwise, it seems to me that it is not.

We are not disturbed in the slightest degree by a few exceptional cases so long as the results which we set out to obtain are realized. If the pass brings in more gross and more net, it stands to reason that it is a good system. If it did not increase the gross, and did not increase the net, the converse would be true. I was especially puzzled by the statement in the article that the street railway commissioner believed the pass to be economically unsound. To me, from the very beginning, the weekly pass has seemed to be, first and last, the most responsive to the economic law of any system of fares that has ever been devised, because it at once furnishes automatically a reduced rate to those who, in the nature of their goings about, have use for the street cars more than twenty times a week. A reduced rate for tickets purchased in quantity may be taken advantage of by the man who is least entitled to a reduced rate, simply because he has the money to invest at the time of purchase, but the system of selling the pass for $1 a week takes care of this.

Having used the pass system on our lines for more than a year, we are able to get a comparison of the workings of the system, this year versus last. This shows that during the first six weeks of the second year of the pass, while the passes sold decreased 1.5 per cent, the actual rides taken on the passes decreased 9.1 per cent. It was our observation that during the first month or two that the pass was in use a good deal of extra riding was done, until perhaps the novelty wore off and the system settled down to a utility basis.

There are other points upon which I might touch, namely, that the pass revenue is the most constant portion of the total revenue, and therefore it may be regarded as a stabilizer; and this is so because it represents income from the heads of families and the generally thrifty class in the community.

However, I did not set out to enter into a lengthy argument on this subject, and while being most ready to admit that there may and must have been many good and sufficient local reasons for discontinuing the pass at Youngstown, still those should not be used as arguments against the efficacy of the pass in general.

E. M. WALKER, General Manager.

Safety Zone with Permanent Posts

A NEW type of safety platform, or more properly speaking safety zone, is being tried in Detroit at the corner of Woodward Avenue and Park Street, or at the southerly side of the Grand Circus. It consists, as shown, of a series of iron posts planted solidly in the pavement, with about 4 ft. of post exposed. The posts

New Type of Safety Area in Detroit

are placed about 8 ft. apart. Altogether there are twelve of these posts parallel to the tracks and one post at right angles at each end, making fourteen altogether, as two-car trains are run on this route. There is a lamppost at each end of the safety zone. The one in

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the direction of oncoming traffic, or that shown in the view, is inside the safety area. The light at the other end is just outside the safety zone. The posts are connected by chains except for two openings, as shown in the view.

This type of safety zone has the advantage that it does not interfere with the removal of snow in winter as much as a raised platform. At the same time it is more substantial than the surface type of safety zone, made by removable posts set on heavy iron bases.

This safety platform area was installed by the Police Department of the city of Detroit.

Interborough Augmenting Boiler Equipment

THE Interborough Rapid Transit Company, New York City, is extending its steam-generating equipment at its Fifty-ninth Street station. Four 12,000-sq.ft. Babcock & Wilcox boilers, four Taylor underfeed stokers and four Sturtevant fans for forced and induced draft service are being added.

The boilers, two of which will be in place this summer and two early in 1924, will be designed for 350 lb. pressure, but will operate for the present at 220 lb. gage and an approximate total temperature of 600 deg. F. One boiler will be fitted with a Foster radiant-heat superheater.

The stokers will be of the seven-retort type, thirty-seven tuyères in length, the longest Taylor stokers yet built. The furnaces will be approximately 12 ft. wide by 17 ft. deep. This special design was necessitated by the existing steel structure of the plant. The stokers will be driven by variable-speed motor.

One forced and one induced-draft fan, motor-driven, will be installed for each two boilers. Economizers will not be installed at the present time, but provision will be made for them should operating conditions warrant their installation.

To take care of the change in heat balance brought about by the installation of motor-driven auxiliaries instead of steam as in the present equipment, steam will be bled from a low-pressure stage of the main turbine units.

Association News & Discussions

The Outsider's View of What Sells Transportation*

"Almost Any Concern That Starts Out with the Rendering of Real Service to Its Patrons as an Actual Creed Can Hardly Escape Overwhelming Success"

BY EDWARD HUNGERFORD

A MERCHANT'S show window should be one of his chief trade assets. He will tell you, himself, that it should be of greatest value in helping the merchandising of his wares.

I sometimes wonder how many railroad men ever think of this point. I am not referring specifically to the street railway men in this remark. In fact, I am rather inclined to a belief that in recent years they have given more attention to this phase of their problem than have most of their steam railroad brethren. The passenger trains of the average American railroad—even the so-called de luxe or limited trains—give but little external evidence of a real desire to sell their product. Internally no important progress or achievement in the high-grade American passenger train has come to pass since the creation of the wide vestibule and the observation platform.

Yet it is not even at this that I am inclined to cavil. For the moment it is rather at the outward appearance of the trains.

They have been standardized—standardized to the death, I am inclined to say. The so-called Pullman green has been made the ruling color for the exterior of the passenger trains of nine-tenths of the rail mileage of the United States. That is, it is green at the beginning; after a few months of wear upon the road it becomes a dingy neutral black, sordid and forlorn.

Up to a few years ago some of the roads attempted to relieve this forlorn monotony of their passenger equipment by striping their coaches with fine, bright gold lines. But along came standardization and ordered off the stripings; the American passenger car became as dull and as stupid in appearance as the box car; more so, in fact. Various railroads have sought boldly to place their gay individual trade marks upon the sides of their box cars. But for some reason, utterly inexplicable to me, the sides of the passenger cars have remained sacrosanct. No one has dared to use them for dignified exploitation. Standardization seemingly is a pretty cruel sort of a god.

Now, I have no particular quarrel with standardization. In fact, I have a great deal of real admiration for it. In the mechanical, in the operating, in the financial ends of a railroad it accomplishes marvels. But standardization has no place whatsoever in the exploitation of a railroad—in the delicate business, if you please, of merchandising its transportation.

Will those of you who have been overseas contrast the outward appearance of the American railroad train with that of its British cousin. The passenger train in Great Britain is a thing of beauty and a joy forever. Not only is it bright, gaily striped and immaculate, but in almost every case the coat-of-arms of the operating company is brilliantly emblazoned upon each passenger coach.

A coat-of-arms for a railway company? Well, why not? Not for our American railways—steam or electric—the British type of coat-of-arms, aping monarchial traditions in its composition, but a coat of arms distinctly American; like the swastika of the Santa Fé or the Glacier Park emblem of the Great Northern. Both of these are as American as they could possibly be. Each is thoroughly distinctive. Each registers, without a printed word alongside, the name of the great railroad that it represents.

So far I have talked of the steam railroad, chiefly. Yet everything that has been said of it here and now applies with equal, if not with greater force to the electric line. Recently some of our electric roads have begun to see the light on this thing. A year or more ago, my good friend, T. C. Cherry began painting his Rochester-Syracuse interurbans a bright, gay, beautiful orange—a bit of collegiate fidelity to an alma mater in that, I think—and we

*Address made before New York Electric Railway Association, Bluff Point, N. Y., June 23, 1923.

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Rochester folk awoke to the fact that there still was an electric railroad running between our town and the city of the saline marshes. Recently the Interborough in New York city has done Cherry the high honor of copying his color scheme, and some of the older New Yorkers realize once more that their elevated railroad is again in operation.

A small point? Not a bit of it. It is a very large point, and if I were even to attempt to lead you into its ramifications we should have to take a short course in psychology this hot June day—and that is a field into which I have no intention of leading you at this time.

It is a large point because it is a large factor in the successful merchandising of transportation. The Interborough says that it can already see good results from its step in selling enterprise. And I can aver that the Rochester-Syracuse trolley has also made a new impress upon the largest of the communities that it is trying, so faithfully and so honestly, to serve.

The outside world—the potential market, you might wish to put it—of the street railway has no deep-seated or inborn grudge against it. In fact, I often doubt if the sentiment for lowered fares which is so ingeniously engineered against it, has much real response in the heart of the average man. If he is like me he is vastly more concerned in the quality of the service that is to be rendered than in the fine shadings of the price. I am not a rich man. But for a street railroad to be of any service whatsoever to me, it must first begin to serve me.

Railway Loses by Infrequent Service

We have in Rochester, generally speaking, an excellent street railway system. Its cars are clean and modern and, being kept brightly painted, are good show windows of its transportation product. Its men apparently are careful, are courteous and seemingly most efficient. If the road has failed anywhere, it has failed in properly selling itself to the community. Which is an intricate thing into which I shall not enter now. In the rush hours the local system seems to meet its peakloads with a great deal of real efficiency. It is in the non rush-hours that its service is apt to fall to a point where the street railway ceases to be of the largest degree of real service to many folk in our community.

Undoubtedly the records of the company will show that its cars in the non-rush hours are not filled even to their seating capacity. With this there can be no quarrel. And still the statement may be made honestly that the company is not rendering the proper non-rush-hour service. Let me illustrate by personal experience.

My office is three-quarters of a mile from my house—a little less in fact. A double-track trolley line connects them. If I go out to the corner and catch a car—all well and a good. The street railway has my 7 cents and it is welcome to it. It is giving me good value for my money. But if I miss a car, I shall have to wait ten minutes for another. In less than that time I can, and do, walk to my office, and pocket the 7 cents. That 7 cents is lost to the Rochester system for all time.

When I go downtown at lunch the distance is a trifle too long to be walked swiftly and again I ride—when a car is in sight. But if I have just missed one, I again walk, easily beating the following car, and another 7 cents is lost.

My average daily riding, aside from that of the members of my family, comes to six rides; on tickets, about 40 cents. This fall I am going to buy a small closed car. It will not cost me much more to maintain than my carfare expense — particularly when I count in the riding of my family—and I shall no longer have to stand around on street corners waiting on the ten-minute interval. I am buying the car on the advice of several of my neighbors who say that they have been forced, for the same reasons, into the purchase of closed cars for winter use. Potentially they prefer, as I prefer, the street car. It is bright, warm, clean, and there is no risk or responsibility in riding in it. But their time is far too valuable for them to wait upon a ten minute headway.

Here, then, is a street railway, in almost every way highly efficient, failing in one important way to sell itself to the most profitable form of possible patron—the short-haul rider. I do not have to tell you gentlemen that he is the cream of your traffic. Nor do I have to suggest that if you leave him too entirely out of your reckoning you are missing a very good potential source of revenue.

How to Sell Transportation

There are, of course, many ways for a street railway to sell its transportation. One of the most important of these is, in my opinion, the seating arrangement. The average rider, and this is particularly true if he is going any real distance whatsoever, does not like a longitudinal seated car. The cross-bench seat—even if it does detract appreciably from the standing capacity of the vehicle—is the seat that he wants, in nine cases out of ten. Therefore why not aim to give it to him?

Putting the thing the other way around, why fret his soul with awkward or uncomfortable seats, with turnstiles and other similar devices and then expect his undying affection and support? After all, your patron is but human. He likes his motor car, because it seats him the way that he wishes to be seated. How many motor cars do you think that Henry Ford would be making each twenty-four hours if he had them rigged with longitudinal seats? Or if a man had to clamber through a turnstile to get into one of them?

Personally, if they ever put turnstiles on the cars that run by my house, I simply will cease to patronize those cars. I say this without feeling, without prejudice. If the street railway can get along without my patronage or that of my family, why that is its own business—up to a certain point at least. But I do think that the time is not so very far distant when those of us to whom it has failed to sell its transportation will come to sufficient numbers and sufficient volume that we will represent a distinct lack of revenue. It would be well for the railway if it stopped somewhere short of that point.

Enough for the negative side of this thing. Now consider, if you will, the positive side for a final moment. Last October when I had the great pleasure and honor of attending your national meeting in Chicago I also had a great joy in studying out the workings of the interurban trolley between that city and Milwaukee, 85 miles to the north. Gradually there was unfolded to me one of the most interesting transportation stories that has ever come to me. A debilitated, bankrupt, almost hopeless interurban trolley had been fanned back, not merely to life, but to something that dangerously approached being a howling success. Selling its transportation, it had come to a point where it had gained for itself, right under the very noses of two of the best operated and most alert passenger railroads in America, 68 per cent of the local riding between Chicago and Milwaukee.

How was that done?

It is too long a story to be told in detail here. Let me say, however, that it was not done by the installation of cars that were dirty, unkempt, uncomfortably seated or equipped with cumbersome passenger regulatory devices. The equipment of the trains, terminal stations, cars, all the rest of it was planned with a definite view to satisfying the necessities, the comforts, and even the whimsical desires of the passenger. That is what we call rendering service. It is my firm belief, gentlemen, that almost any concern that starts out with the rendering of a real service to its patrons as an actual creed can hardly escape overwhelming success. If its heart is in the right place its bank balance generally finds the same path.

This is the test by which we are today beginning to measure our steam railroads. Long ago we applied it to our retail stores, our newspapers, our hotels, our theaters, to all the business that come into infinitely many contacts with their public. Those that met the test have survived—and survived brilliantly, almost without exception. The street railway cannot claim immunity from such a test. On the contrary, it should be seeking it out, with pride and with dignity. It should be asking itself, all the while:

"Are we meeting, as fully as possible, the service needs of our community? Are we doing all that we possibly can do to give the largest measure of passenger transport to the town or the towns that we serve?"

That is what I mean by selling transportation.

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The painting and the cleaning of the cars, the adjustment of fares, the inclusion of clever ride-selling devices such as the ingenious weekly pass, newspaper and poster advertising, the arrangement of the seats, even the abolition of the sin-filled turnstile, are each in its own way, good steps in selling transportation. But the final step, the last measure, the full test of transportation salesmanship is in the hearts and souls of the men who actually conduct the properties. They know—and only they can ever know—whether they are rendering the fullest measure of transportation service to their communities; and so whether they are attaining the highest measure of salesmanship for their peculiar product of transportation.

New Yorkers Gather at Bluff Point

One-Day Meeting Given Over to Business Discussion in the Morning, Golf and Water Sports in the Afternoon, and a Banquet in the Evening—Keeping Employees Happy, Selling Transportation, Publicity and the Bus Were Subjects of Addresses

EMPLOYEE relations, selling transportation, publicity, and the place of the bus were the subjects considered in four addresses before the New York Electric Railway Association at Bluff Point, N. Y., on Saturday, June 23. The meeting was well attended and was presided over by President B. E. Tilton, vice-president New York State Railways, Syracuse lines, who also acted as toastmaster at the evening banquet.

At the morning session particular interest centered in the addresses by James E. Kavanagh, vice-president Metropolitan Life Insurance Company, New York, on "Industrial Relations, Unemployment Compensation, and Old Age Pensions," and by Edward Hungerford, Rochester, N. Y., on "The Outsider's View of Selling Transportation." W. Dwight Burroughs, publicity agent United Railways & Electric Company of Baltimore, entertained the audience and also gave it some thoughts to take home on how to tell the electric railway story to Bill Jones.

A paper by W. B. Potter, engineer, railway engineering department, General Electric Company, on "Co-ordinating Bus and Trackless Trolley Transportation with Electric Railway Service," was read in Mr. Potter's absence by H. L. Andrews. This paper discussed in a general way the relative economy of the different types of vehicles and pointed out the field of each from the economic standpoint.

At the close of the morning session W. H. Collins, Gloversville, N. Y., as chairman, presented the report of the nominating committee, which was unanimously adopted by the association, electing the following officers for the ensuing year:

President, Edwin Duffey, president Cortland County Traction Company, Cortland, N. Y.; first vice-president, Clinton E. Morgan, vice-president and general manager Brooklyn City Railroad; second vice-president, William J. Harvie, vice-president Auburn & Syracuse Electric Railroad, Syracuse; secretary-treasurer, William F. Stanton, Rochester, N. Y.

Keeping Employees Happy

Mr. Kavanagh, in his address, said that in many companies there is no program of "humanics," as compared to the program of mechanics which is usually very thoroughly carried out. He drew upon the experience of his own company, the Metropolitan Life Insurance Company, to show what might be done along this line. His company got into this matter fifteen or twenty years back in scheming out ways looking toward greater stability of employment. It was considered that employees' interests were four-sided—intellectual, social, financial and physical. It was undertaken to do things which would enhance these interests.

In order to insure employees fit physically, the first step is that the company engages only those who are in good health. After an employee is hired, the company considers it its duty to keep him healthy. This is accomplished by maintaining good working conditions, by insisting upon a physical examination at least once a year or oftener if it is thought one is needed, examination of teeth twice a year, provision of a gymnasium with a physical instructor, and various meets and teams which give impetus to the athletic program. Luncheon is also provided free every day to all employees, because it is believed to be a good economy. The company considers that it gets a thank-you every day and that this is better than an increase in salary because that means only one thank-you and then it is forgotten. It is also felt that it is better to supply luncheons than to put this money in the pay envelope as it pays better returns.

In developing the intellectual side of the employee, effort is made to keep his mind busy. He must be given something to occupy his mind aside from his work. If the employer does not do this, some one else will. Consequently the Metropolitan company has devised every kind of class any one can be interested in, including French, stenography, millinery, dressmaking, actuarial studies, art clubs, etc. A large proportion of the employees takes part in some of these courses. The company provides a library of 50,000 volumes, and employees are induced to read by a friendly appeal to their ambitions and a close follow-up by the librarian. Every employee outside of the main office is required to take the company's correspondence courses. These formerly were optional but are now required.

The social or recreational side is taken care of by the employment of certain people whose entire job is to provide fun for the employees. This comprises dancing, picnics, athletic meets, special parties in recognition of long periods of service, etc.

The financial side is developed by getting employees to save money. This is often done by appealing to their sentiments, as they will do things for their families that they will not do for themselves. The company takes pains to let everybody know how much John Doe has made since he came to the Metropolitan. The program in this direction has resulted in a general impression throughout the company that everybody with the Metropolitan gets rich, and Mr. Kavanagh said that this is about 90 per cent true.

The speaker pointed out that the average employee has five worries: What will happen to him or his family if he should (1) get sick, (2) have a bad accident, (3) be out of a job, (4) become aged, (5) die. It should be the employer's interest to remove these worries. The first two and the fifth are taken care of through life, health and accident insurance.

In the matter of old age, there is a large tendency to provide pensions for faithful employees. Many plans are in effect, but many are very unsatisfactory. They carry an implied peonage. Employees feel that they have to work all their life for this one company in order to get pensioned. The young man does not value it because it is too far removed from his immediate need. There is also the skepticism resulting from association of the pension fund with the corporation fund. If the company should fail or if there should be a change in management, or if the corporation merged with another, the continuance of the pension plan is somewhat uncertain. Furthermore, there is an indeterminate and constantly increasing cost which becomes very burdensome as time goes on, as it takes fifty years to get the maximum effect of the average pension plan.

Most of these objections to pension plans are overcome by the more modern pay-as-you-go plan, whereby the company contributes year by year a certain percentage of the payroll to take care of "retirement certificates," which are handed to the employee each year. This plan gives each employee a bond year by year, which is free from all strings and which he can put away against his old age disabilities. Mr. Kavanagh stated that a pension scheme granting reasonable benefits to retiring employees, based on contributions which employees are perfectly willing to pay, can be worked out at a cost to the employer of between 1 and 2 per cent of his current payroll. On this plan the pension does not depend upon the employee reaching the pension status in the employ of one firm. A delivery of the certificates to employees each year rouses the interest of the young man. The cost of the plan within reasonable limits can be determined many years

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in advance. It avoids the feeling of paternalism, since the employee has in large measure himself paid the cost of his pension protection.

Mr. Kavanagh also mentioned the possibility of unemployment insurance, which is now getting the attention of some concerns. He said that the Delaware & Hudson Railroad pays $15 a week to an employee upon his discharge for a period of six weeks maximum, or up to the time of his employment on another job. Because they know it may cost the company six weeks pension, or $90, when they fire a man, foremen are more inclined to make a real effort to put the man on another job where he may fit rather than to fire him without consideration.

An interesting side light of the plan is that on this particular railroad it has been found that there is an increase of 20 per cent and a decrease of 10 or 12 per cent representing the maximum fluctuations from normal number of employees. Thus it may be possible to work out a plan whereby the increased amount of work at any time would be taken up by increasing the length of the working day up to ten hours before employing additional men.

DON'T EDUCATE BILL JONES

In pointing out how to tell the electric railway story to Bill Jones, Mr. Burroughs defined who Bill Jones is and what he reads as an average American citizen. He said not to attempt to educate Bill Jones, that he does not like history, but enjoys a story. Mr. Burroughs then went on to show how stories of the railway have been told in Baltimore, largely through the use of still pictures. One picture lecture showed how the growth of the railway had been the growth of the city. In another, when it was desired to talk transfers, the subject matter was directed to "corners" of Baltimore and of various cities. The number of free transfers given at these corners was finally brought up in this story and the height of a stack of transfers issued in one year compared with the height of the highest mountain in the world, the transfer stack being much higher. In making such comparisons, Mr. Burroughs said that it had been the practice to give the rule by which the comparison was made, so that Bill Jones could check for himself the comparison, without taking the company's word.

These picture stories have been presented at various exhibits with an automatic stereopticon machine. People have shown a good deal of interest in them, and have asked to have the pictures brought up to their church, or lodge, etc. This has given the company a great many opportunities to tell its story. A circular was also sent to the clubs, schools, libraries, telling the subjects of these pictures, and a great many calls result from that. Mr. Burroughs' particular admonition was as follows:

"Don't educate. Don't talk high brow. If you talk low brow, the high brow will get it, but if you talk high brow you will lose most of your audience."

After the reading of Mr. Potter's paper on the place of the bus, a question was raised as to the cost of bus operation. Zenas W. Carter of the White Company, said that no two men operating buses have the same costs. The operating conditions vary materially and the costs with them. He considered, however, that it is impossible to give a service beyond a 2-mile haul for a 5 cent fare, and that in general it is necessary to charge 10 cents. Between Youngstown, Ohio, and Warren, Pa., the Pennsylvania-Ohio Electric Company is operating a bus and charging 3 cents a mile and making a large profit. The Youngstown & Suburban Railway is charging 3½ cents a mile for its bus service. Mr. Carter considered that the thing to do was to give good service and charge for it accordingly. Bus service is not comparable to rail transportation, and it is necessary to get more money for it. It is a new type of transportation which the public demands and which it must pay for on a different basis from railway service.

Prince of Wales Becomes President of Institute of Transport

AT THE dinner of the Institute of Transport, held at the Savoy Hotel, London, on May 3, it was announced that H.R.H. the Prince of Wales, K.G., K.T., had agreed to become honorary president of the Institute. In this position he succeeds the Right Honorable Lord Ashfield, chairman of the Board of the London Underground Electric Railways Company.

The president of the Institute, Sir Sam Fay, in making this announcement, said that the Institute was in its infancy and in his opinion must assuredly grow with the heir to the throne as its honorary president.

The Institute of Transport was established on Nov. 3, 1919, and since then a number of important papers on city transit have been presented before it. At its congress, which was to be held at Sheffield, June 13 to 16, a number of such papers were scheduled, with inspection of the Hadfields' special work plant, and a paper on modern track work by Sir Robert A. Hadfield.

C.E.R.A. Summer Meeting

THE program for the summer meeting of the Central Electric Railway Association on July 18, 19, and 20 at the Breakers Hotel, Cedar Point, Ohio, has been arranged as follows:

Wednesday morning, July 18, at 10 o'clock there will be a meeting of the executive committee. The convention will convene at 11 o'clock, when President James P. Barnes will make his address. Reports of committees and of the secretary will consume the remainder of the morning.

Wednesday afternoon at 2 o'clock there will be a paper on "The Interurban Possibilities from Freight Business," by T. H. Stoffel, Westinghouse Electric & Manufacturing Company. Secretary Earlywine states that a great deal of interest will be manifested in this paper, as it is the result of an exhaustive study of the freight situation in the central states. The prevailing handicaps which now exist will be pointed out, presumably with suggestions for future developments.

Thursday morning at 10 o'clock, H. L. Andrews, General Electric Company, will present a paper on "What Manufacturers Have Done for the Electric Railway Industry." There will also be another paper at this session on "Utility Information Work," by John Mellett.

Thursday afternoon, 1:30 o'clock, the Engineering Council will convene with F. R. Coates presiding. In this session devoted to the Engineering Council, addresses by the directors of the four local sections and the reports of three committees will bring before the association all the subjects discussed by the Council prior to Jan. 1, 1923. These subjects will come before the association in the nature of recommendations for standardizing equipment and practices. These recommendations will represent the combined activities of the four sections and mark the beginning of a permanent record of approved methods and practices on engineering subjects as endorsed by the association. Papers will be presented as follows:

"Purpose of the Engineering Council," by R. Moses, Youngstown, Ohio, director Eastern section.

"Support Deserved by the Engineering Council," by A. V. Brown, Sandusky, Ohio, director Northern Section.

"Benefit of the Engineering Council to the Railway Industry," by L. A. Mitchell, Anderson, Ind., director Western section.

"Future of the Engineering Council," by G. A. Stiles, Columbus, Ohio, director Southern section.

Report of the committee on track and roadway, by T. H. David, Indianapolis, Ind.

Report of committee on power supply and transmission, by G. H. Kelsay, Elyria, Ohio.

Report of committee on car equipment, by P. V. C. See, Akron, Ohio.

"Wireless and Its Application for Communication by Electric Railways and Central Stations," by C. A. Boddie, Westinghouse Electric & Manufacturing Company.

"Steel Ties," by William P. Day, president International Steel Tie Company.

Thursday evening at 6:30 o'clock, there will be an informal dinner for association members and invited guests.

Friday morning at 10 o'clock E. F. Wickwire, secretary Ohio Brass Company, will address the convention, on co-operation of manufacturers with the

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railways. After discussion of this paper and transaction of further business, the convention will adjourn at noon on July 20.

A special car furnished by the Interstate Public Service Company will leave Indianapolis at 7 a. m. on July 17 and arrive in Sandusky at 5:30 p. m.

The Engineer as a Leader in Transportation

The Ever-Widening Scope of Engineering Is Discussed at the Annual Convention of the Society for the Promotion of Engineering Education

THE story of the railroads of this country is a story of the engineer, according to E. H. Lee, vice-president and chief engineer Chicago & Northern Indiana Railroad, speaking at the annual convention of the Society for the Promotion of Engineering Education. He divided the history of the railroads into three periods: the construction period, the transition period, and the public relations period. Railroad construction was romantic and drew men of brains and ability. With no data and meager tools the engineer built the roads, made bridges and filled in the swamps. At that time the engineer was not considered a real leader in transportation, but only a necessary evil.

As railroad traffic developed during the transition period, the systems had to be improved and freight movement speeded up. Public sentiment was not so favorable to the roads at this time as it had been in the construction period. The chief reason for this change was that the real leader who had done the impossible with the physical problems was not interested or competent to handle the political, financial and human problems which were developing.

In the present or third period the question of public relations and human relations has become paramount in the successful operation of transportation systems. The ideal is to secure the best possible service under conditions which shall be the best possible for all concerned in the operation of railroads. The engineer's work has become increasingly important, not only in design and construction but also in operation. The tendency now is to advance engineers to positions of leadership. He must bring to the problem of the present period, however, the same ability and energy with which he solved the problem of the construction period and later those of the development.

The meeting was opened by an address from Dean Dexter S. Kimball, Cornell, who stated that twenty years ago the idea of a course of training for leadership was startling, but that now this topic was of major interest. Before the development of electrical engineering to its present position of importance, engineers were designers and builders. Technical requirements, however, governed the manufacture of electrical apparatus so greatly that engineers have been forced to enter the shops as managers. The same sort of development has occurred in salesmanship, technical engineers now being in demand to sell scientific equipment. The business world, according to Dean Kimball, now desires and admires the engineering way of doing things so greatly that the engineer will soon reign supreme in designing, operation and management of industry. The military leader of days gone by no longer exists, and his place has been taken by the man with legal training. The leader of the future, however, will be the engineer, because the public has confidence in his methods.

The president of the society, Prof. Charles S. Scott, Yale, told of the encouraging co-operation which had been received. A paper was read by T. H. MacDonald, chief of the Bureau of Public Roads, Washington, D. C., on "The Engineer as a Leader in Public Service." The result of the work of a joint conference committee to determine the place of the engineer in industry was presented by O. S. Lyford of the National Industrial Conference Board. He said the three important questions are: 1. Does industry need more or fewer engineers than are now available? 2. What kind of education should they have? 3. What is the responsibility of the industry in their work? He emphasized the point that the engineer should be a leader, because he has a method of attack and a scientific mind. Industry considered the underlying scientific training of the engineer to be fundamental. A man who has a scientific mind will generally receive the best education from a course of engineering, regardless of the work he intends to pursue.

"The Engineer in Business" was the subject of a talk by W. E. Wickenden. The place of the engineer as a leader in business is not assured, he thought, although the engineer's leadership in industry is certain. The business world, however, is dominated by considerations which are a handicap to engineers.

Program of the International Strassenbahn Verein

THE program for the second annual convention of the Internationale Strassenbahn und Kleinbahn Verein, with headquarters at Vienna, has just been published. It follows:

"One-man Cars," by Mr. Van Putten, Amsterdam Municipal Tramways and Mr. Hultman, Malmö Tramways.

"Track Construction and Track Maintenance," by Mr. Goetz, Leipzig Street Railway.

"Motor Control Systems," by Mr. Pforr, Berlin Street Railway.

"Average Annual Output in Car-Miles of the Train Force, when Working on the Basis of the Eight-Hour Day," by Mr. Mumssen, Hamburg Elevated Railway; Mr. Norregaard, Copenhagen Tramways, and Dr. Patz, Budapest Electric Railway.

"Design of Modern Street Railway Motors, Including Methods of Lubrication," by Mr. Wellner of the Bielitz Electrical Works.

"Anti-Friction Bearings and Lubrication of Bearings and Gears," by Mr. Pforte, Hagen Street Railway, and Doctor Videky, Budapest Institute of Technology.

"Magnetic Brakes," by Mr. Barth, Kristiania Street Railway.

"Fare Systems in Restricted City Areas," by Mr. Winter, Vienna Municipal Railway.

"Recent Improvements in the Zurich Street Railway System," by Mr. Wick, Zurich Municipal Railway.

"Car Couplings," by Mr. Paap, Berlin.

"Standardized Practice in Car Design on Standard and Narrow-Gage Steam Railroads," by Mr. Semke, Berlin.

The date and place of the next convention has not yet been settled. An invitation has been received from Münich to meet in that city during the spring of 1924.

Organization Meeting — A.E.S.C. Sectional Committee on Walkway Surfaces

THE first meeting of the sectional committee on walkway surfaces of the American Engineering Standards Committee was held on June 15 at the Engineering Societies' building in New York City. This committee has been organized under the dual sponsorship of the American Society of Safety Engineers and the American Institute of Architects.

The committee organized by electing the following permanent officers: Chairman, Dr. Lucien W. Chaney, U. S. Department of Labor; vice-chairman, F. W. Joannes, American Institute of Architects, and secretary, H. W. Mowery, American Society of Safety Engineers. An executive committee of seven members, including the three officers, was also elected, and a committee on plan and scope was appointed.

The committee will undertake to promulgate a code covering the appropriate materials for walkway surfaces as applied to walks, floors, stairs, platforms, elevators, car steps, car floors, etc., all with the view of providing adequate specifications to cover the manufacture of such materials. It is believed that accident hazards may be greatly reduced by correct application of the code which will ultimately be formulated, possibly somewhat along the lines of results obtained through the National Safety Code.

That the electric railway industry is much interested in the work of the committee is shown by the fact that the code will be applicable to railway cars, stations and platforms and will specify characteristics for walkway surfaces to include, among other things, resistance to slipping, freedom from

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the tripping hazard, durability and insulation for surfaces around electrical apparatus.

The American Electric Railway Association has been requested to name a representative on the committee but the representative has not been appointed as yet. R. C. Cram, Brooklyn, represented the association at the organization meeting.

Returns from a British Electrification

Good Results Shown in the Suburban Service of the London, Brighton & South Coast Railway by the Electric Trains as Compared with Steam

AT A MEETING of the Institute of Transport in London on May 7, 1923, Sir Philip Dawson, M.P., presented an address in which he gave some interesting figures on results with steam and electric traction in suburban service on the London, Brighton & South Coast Railway. Three of the charts presented by Sir Philip are reproduced. As the investigation was primarily to show what benefit might be expected from electrification, the "expenditure" charted indicates only the expenditure affected by the system of traction adopted. Hence, from the net receipts indicated in these charts, the cost of maintenance of track, management, taxes, etc., which are not directly affected by electric as compared with steam operation, should be deducted if the net amounts available for dividends are to be ascertained.

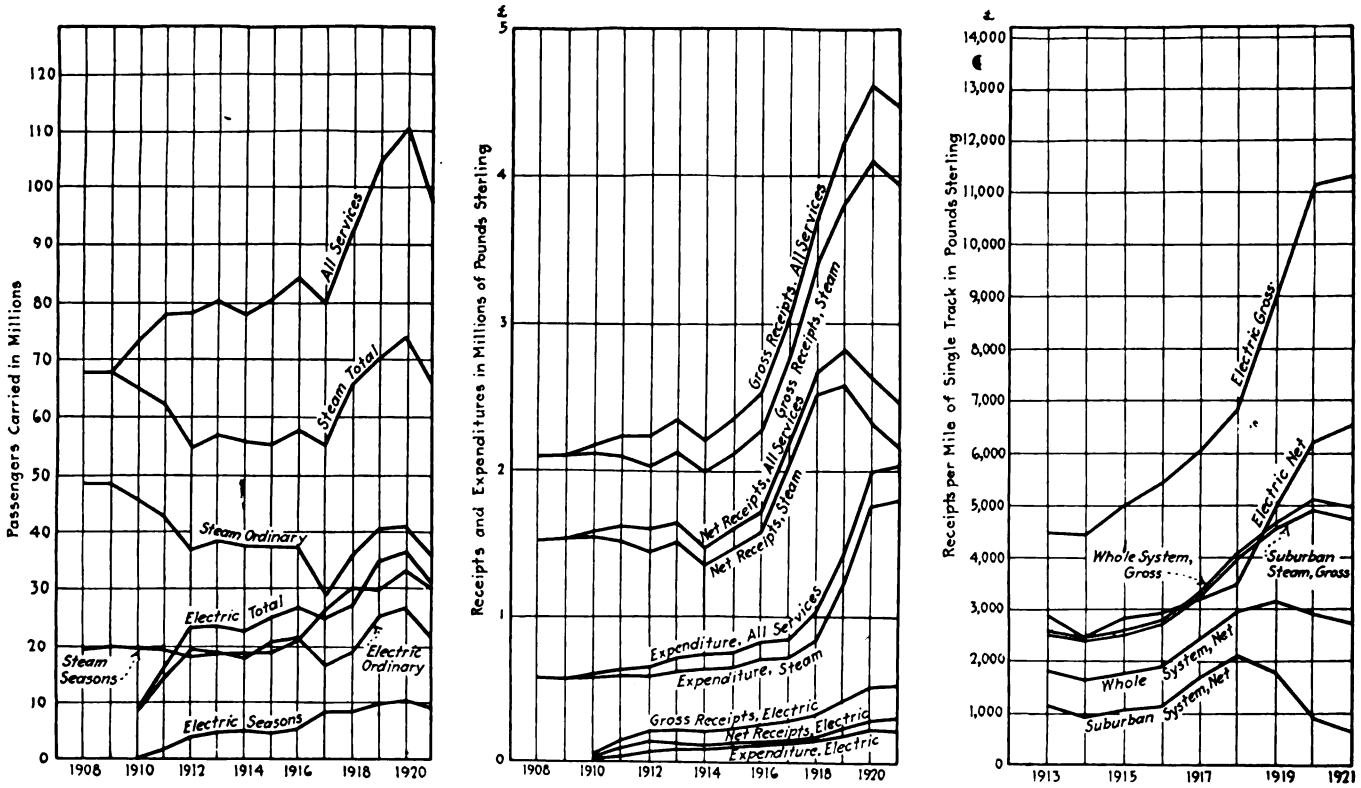
The electric division of the London, Brighton & South Coast Railway gives a suburban service only, and does not, according to the speaker, "represent the most profitable part of the railway system." Considerable suburban service is also given by steam. The average suburban steam train consists of 6.6 cars, accommodating 463 passengers and operating at an average speed of 9.31 m.p.h. The average electric train consists of 4.4 cars, accommodating 308 passengers and operating at an average speed of 21.8 m.p.h.

The first diagram shows that up to 1920 the passengers by electric trains constantly increased, while those by steam trains in 1921 are about the same as in 1909. The second diagram shows that gross and net receipts in the case of steam are decreasing, while the reverse is the case with the electric services. The third diagram shows the remarkable track capacity obtained with electric power, though as a certain number of suburban steam passenger trains operate over electrified sections and this mileage has not been taken into consideration, the suburban steam services show up more advantageously than they should.

In estimating the cost of equipping the entire line with electricity, the speaker said that if electrification would bring an increase of 70 per cent in gross receipts on the suburban line and 35 per cent on the main line, a return of 8½ per cent could be made on the expenditure required to carry out the electrification, and that these estimates of increase in growth were conservative.

In the discussion which followed the presentation of this paper, Sir George Paish, the eminent statistician, declared that the terms used in the paper, "passengers per train-mile" and "passengers per car-mile" were misleading. There were no such units. Passenger mileage can be divided by train-miles or the number of passengers can be divided by number of trains, but number of passengers cannot be divided by train-miles. Sir Philip Dawson in his reply acknowledged the theoretical correctness of the criticism but said that as passenger mileage was a very difficult figure to obtain, the ratio used was employed as a matter of interest, and as between lines where the average length of ride is about the same, was a convenient one.

Sir William Acworth, director of the London Underground Railways and also author of various books on railway economics, suggested that the best way of deciding the "battle of the systems" was to toss a coin and then abide by the result. He said that if that had been done during the dispute between the advocates of the vacuum brake and the air brake in the early days, it would have been a good thing for the British railways. Another instance of the kind was the adoption of various railway gages in India. Sir Philip Dawson, however, pointed out that electrification was not quite the same thing as gages, because if, after a number of years, it was found advisable to alter or modify the electric system it could be done at a comparatively small cost compared with the cost of unifying different gages.



Comparative Results of Steam and Electric Traction on Suburban Lines of the London, Brighton & South Coast Railway

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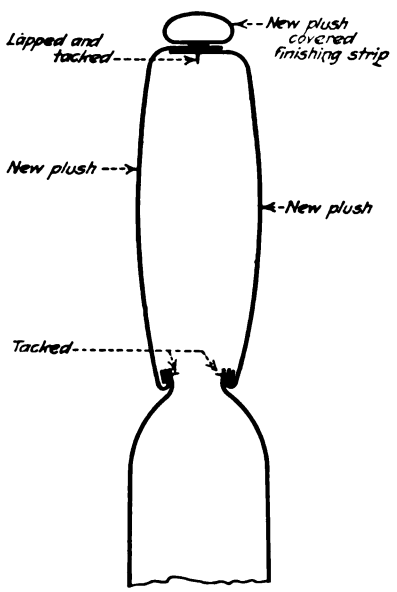
Maintenance of Equipment

Economical Method of Covering Seat Head Rolls

WHERE plush covering is used on car seats, the head rolls at the top of the seat backs become greasy from the hair of passengers and so are very unsightly. This grease is of such a nature that its



Method of Covering Head Rolls of Seat Backs

removal by any of the various commercial cleaners is almost impossible, and about the only satisfactory method is to re-cover the soiled parts. As plush covering is expensive, the replacement with new material is costly unless the material is used economically. The accompanying illustration shows a plan used by the Lehigh Valley Transit Company, Allentown Pa., in which new plush is placed over the old head-roll covering without disturbing it. In starting strips of plush are placed with their face against the lower part of the seat back. The upper edges are then tacked along the depression. The back and front strips are then folded over the heads of the tacks and brought together at the top of the seats so as to overlap. Here they are again tacked, and a finishing strip is nailed over the top. This strip is covered with a plush sleeve.

By this method no tacks or seams are visible. As the head rests are about the only part of the seats to be seen, when a passenger looks down the car the seats finished in this manner present the appearance of being entirely new.

Improved Construction for Cores of Sweeper Brooms

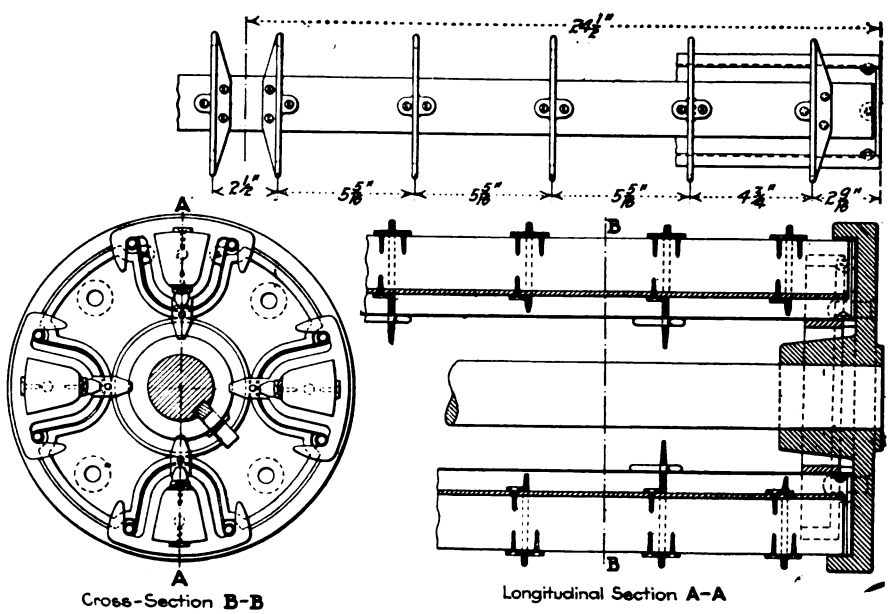
A MACHINE for filling snow sweeper brooms as used in the Harvard shops of the Cleveland Railway was described in the ELECTRIC RAILWAY JOURNAL for July 10, 1920, page 87. Some additional details regarding the construction of the cores of the brooms which are filled with this machine are now available, and the accompanying line drawing illustrates the construction.

The shell in which the rattan is inserted is made of a single piece of sheet steel with cast ends. The sheet-steel core has four U-shaped recesses for receiving the rattan. The cast ends are riveted to the shell by four rivets which come in between the recesses. Maple bars fit into the recesses of the cores for holding the rattan in place. Brass hooks are fastened to the maple strips at intervals of 5⅛ in. These hooks are put in place by slipping them over the ends of the bars before the latter are inserted in the slots. Four of these hooks have projections at the bottom which extend through the shell and are held in place by cotter pins. A method of securing the maple strips is thus provided, so that they cannot separate or fly out centrifugally as the brush revolves.

The end castings have four pockets into which the maple cleats fit. A flange around the end casting prevents endwise and radial movement of cleats. An inner casting is also provided at the center, which is split and hinged at one side. The type of construction permits easy removal of the cleats for filling.

Metering Car Energy Reduces Maintenance Cost

FOR several years the West Penn Railways has had the cars on its Allegheny Valley division equipped with Economy meters for measuring the car energy and checking the performance of the motormen. This has produced a substantial saving in energy consumption. According to Daniel Durie, superintendent, the principal advantage, however, has not been in this saving of energy, but in the reduced maintenance of equipment. The use of the meters makes the motormen careful in their handling of the equipment, and this in turn eliminates many of the causes of motor failure. The brake shoe



Improved Core Construction for Sweeper Brooms

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mileage, which was from 3,000 to 4,000 miles without the meters, has been increased to 8,000 miles by their use. This division is quite level, so that the wear on brake shoes should be a minimum.

Installing Additional Side Feeders

WHEN the overhead wires on a double-track line extend for a long distance without any taps connecting with a feeder cable, it is often desirable to connect the two trolley wires electrically at intervals between the feeder taps. Unless this is done one wire may carry a heavy load, while the other carries very little.

The intervals between side feed spans should be short in order to keep the two wires at nearly the same potential. This will also tend to prevent a wire becoming annealed, should it break and become grounded. In that case all of the current must pass through on wire from the nearest feeder tap to the point of grounding. After such an occurrence the wire is so soft as to be quite useless and has to be taken down and a new wire put up. The nearer the side feed spans are to each other the shorter will be the length of wire which is damaged in this way.

Occasionally section insulators may be so close together that there would normally be only one side feed span between them. In such cases it is better to put in at least one more connection between the feeder and the wire or between the two trolley wires, so that if the trolley ear at the side feed span becomes disconnected from the wire the trolley will not be dead.

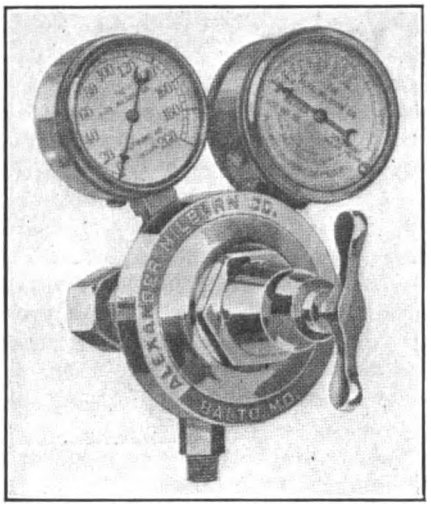
New Equipment Available

Regulator for High Pressure Gases

A NEW regulator for controlling the delivery of acetylene, oxygen, hydrogen and other high-pressure gases is being marketed by the Alexander Milburn Company, Baltimore, Md. It is designed to maintain a constant, predetermined pressure regardless of fluctuations in the initial pressure line and variations in consumption.

The front cap contains an adjusting key, a top spring button and a tension spring. In front the body contains a flexible metal diaphragm. Soldered on and over this diaphragm is screwed a bronze diaphragm plate or spring button to hold the tension spring. Inside this body is a fixed nozzle containing a loose operating pin. Over the nozzle and loosely assembled is the valve sleeve, which has a roll of gas ports drilled through its circumference and carries the valve seat. The seat closes against the nozzle by initial gas pressure on the valve sleeve and pressure of a compensating spring resting in the recessed tank coupling. The loose operating pin inside the nozzle is actuated at one end by the deflection of the diaphragm and at the other by pressure of the valve sleeve.

The regulator closes with instead of against the gas pressure. This



New Gas Flow Regulator

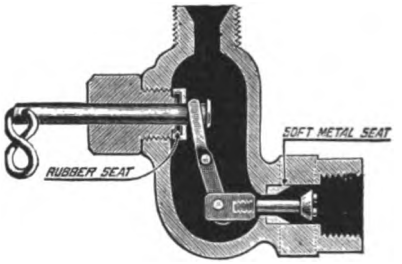
enables the sealing to be effected by pressure of several pounds instead of hundreds of pounds, as would be the case if the sleeve were yoked to the diaphragm. In this design the sleeve is entirely independent. An equilibrium is maintained in the regulator at all times, throttling the supply when the desired pressure is built up, and opening when the consumption lowers the pressure and an increased supply is needed.

The regulator is adapted for use with various gases by a change of the gages shown in the illustration. The rear connection is also changeable so that the regulator can be attached to various containers.

This regulator is the invention of A. F. Jenkins, who has long been associated with the acetylene industry.

Safeguard for Welding

A SAFETY valve for gas welding equipment has recently been placed on the market by the Mattingly Automatic Valve Company, St. Louis, Mo. This is designed to safeguard the welder and reduce fire hazards and losses of gas should the hose line become ruptured or



Safety Valve for Gas Welding

disconnected. In operation this valve is applied to oxyacetylene welding and cutting outfits between the hose and the gas tanks and does not interfere with the regular operation of the torch or regulator. An accompanying illustration shows a section of this valve. It consists of a right-angle body arranged for two connections. That at the right is connected to the regulator and the upper connection is for the hose. A valve with a soft metal seat operates between the connection to the regulator and the right-angle body. This valve is connected through a pivoted lever to a stem which extends to the left.

After the hose has been connected and all joints are tight, the stem connected to the valve is pulled to the left until pressure is built up in the hose line. With the normal pressure established any rupture or excessive leak will cause the pressure to drop suddenly in the right-angle body. The rush of gas from the tank will then automatically close the valve against the soft metal seat.

One of the most important advantages claimed for the valve is the feeling of security given the welder. The safety valve has no packing and the escape of gas around the stem used for holding the valve open is prevented by a soft rubber-seated valve which seats against a cone-shaped bushing through which the stem passes. This bushing can be unscrewed for any necessary attention.

Regular stock valves are carried for outfits using hose lines from 10

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ft. to 60 ft. in length. Where other lengths are used, special valves are provided.

Brush-holder with Twenty-four Adjusting Points

THE new brush-holder for Westinghouse No. 508 railway motors shown in the accompanying illustration uses a "no-harness" type of spring mechanism fitted with cotter pin adjustment. Twenty-four adjusting steps are obtained by one revolution of the shaft. The inside end of the spring is anchored to the shaft, while the other end has a flat copper contact tip which bears on the top of the carbon brush.

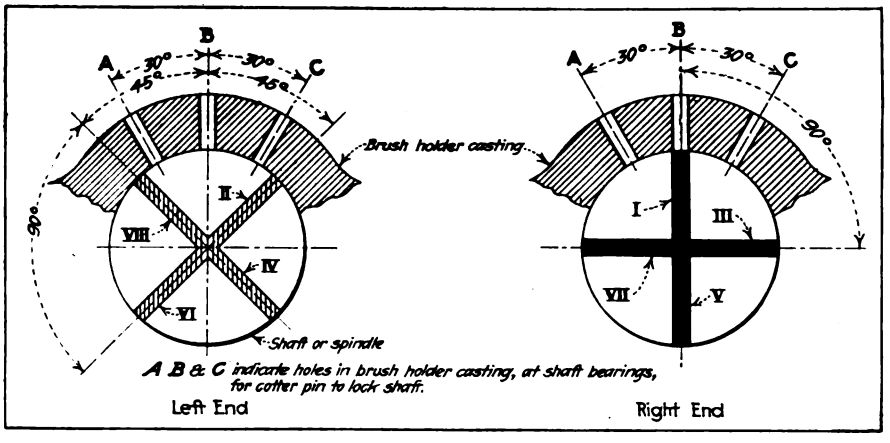
Two sets of three adjusting or locking holes, marked *A*, *B* and *C* on the accompanying diagrams, are drilled 30 deg. apart in the same plane in the brush-holder casting at the shaft bearings. Four adjusting holes, marked *I, III, V, VII*, are drilled 90 deg. apart in the same plane at the right end of the shaft, and four adjusting holes marked *II, IV, VI, VIII* are drilled 90 deg. apart in the same plane at the left end of the shaft.

These two sets of four holes are staggered with relation to each other.

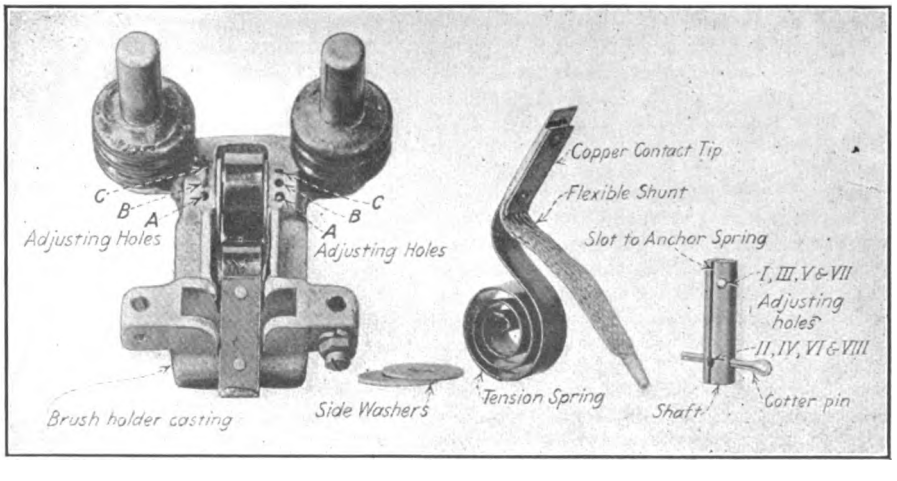
The use of the two sets of three holes in the brush-holder casting and the two sets of four holes in the shaft are necessary so as not to weaken the shaft construction.

To increase the tension on the top of the carbon brush it is necessary to wind up the pressure spring. This is accomplished by means of a screw-driver placed in the slot at the right end of the shaft. Starting with slot *I* at the right end of the shaft, which is in line with hole *B* in the brush-holder casting, and turning the shaft until slot *II* at the left end of the shaft lines up with hole *C* in the brush-holder casting, the shaft is advanced 15 deg. or one-twenty-fourth of a revolution.

It will be noted that with this arrangement on each consecutive adjusting step the cotter pin used to lock the shaft must be shifted from one end of the spindle to the other. Further, it must be placed in different locking holes *A*, *B*, and *C* in the brush-holder casting. Only one cotter pin is required to lock the spindle.



Sections of Shaft in Brush-Holder Casting



Brush-Hold er Details

Compensating Fixture

A NEW lamp fixture for use in the series system of electric car lighting provides a means whereby the burning out of one or more lamps will not affect the remainder in the same circuit. This is being marketed by the Electric Service Supplies Company, Philadelphia, Pa. The accompanying illustration shows the "Type K" device in combination with a standard Safety Car Lighting Company's fixture and a reflector suitable for use in electric railway cars.

The control of the circuit is had by means of an enameled type resistor mounted in an ornamental fireproof canopy. Normally this resistor is out of the circuit; but the removal, breakage or burning out of a lamp automatically inserts the resistor in its stead.

In operation, if the circuit is opened, due either to removal of a lamp or breakage of a lamp filament, a small series solenoid is deenergized. The armature of the solenoid drops, establishing connections to substitute the resistor in place of the burned-out lamp. Placing a good lamp in the receptacle automatically energizes the solenoid and restores normal conditions.

This Fixture Has Device to Shunt a Burned-Out Lamp with Resistance

There is a growing tendency in car lighting to use high-powered incandescent lamps, with a corresponding reduction in their number and a simplification of the car wiring due to having fewer circuits. With such arrangements burning out one lamp would cause an entire circuit to be put out of service and would interfere seriously with the lighting. The use of this type of fixture is particularly suitable for such installations.

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The News of the Industry

Operation to Cease on July 21

Commission Unable to Operate Spartanburg Property—Buses Will be Used—City Reticent

Another chapter in the railway affairs of the South Carolina Gas & Electric Company was concluded on June 22 when the Railroad Commission issued an order authorizing the discontinuance of operation within the city limits of Spartanburg on July 21. Service will be continued on the Clifton and Saxon lines and buses will be used inside the city limits to connect with the interurban cars which the company will continue to operate. It is expected that application will be made shortly to the city administration for permission to operate the new buses. The inability of the company to earn money is the reason given for the abandonment in the order of the commission. The company has been operating under the supervision of the commission since Jan. 13.

COMMISSION PRACTICED ECONOMIES

The railway problem in Spartanburg, referred to from time to time in the ELECTRIC RAILWAY JOURNAL, really came to a head on Dec. 31, 1922, when the operating company on the plea of heavy losses ceased to operate. On Jan. 13 after conferences with representatives of the company as well as a conference with the City Council of Spartanburg the commission took charge of the property, ordered service resumed, fixed schedules, rates, etc. At the very start the commission practiced the strictest economies so as to reduce operating expenses, but it was brought out at later conferences at which the public were heard that the service was not frequent enough. The commission went a step further and reduced rates from 10 cents to 5 cents in the desperate effort to furnish service to the residents of Spartanburg and environs at a rate which it thought would stimulate riding.

However, it was proved more and more conclusively that operation of this railway was a losing proposition and that something would have to be done in the near future. After operation by the commission for some sixty days the company petitioned the commission to arrive at a definite conclusion and take action. The commission went to Spartanburg for a public hearing in conjunction with the Chamber of Commerce. Nothing resulted from the meeting until the recent order of the commission.

The substitution of buses in Spartanburg was first advanced by the railway in the summer of 1922 after the foreclosure and reorganization of the property. The city, however, never acted on the proposition. It was the failure of the company and the city to reach an agreement over bus operation which led the company to place its cars in the carhouse in East Spartanburg on Dec. 31 last and leave them there until the commission took over the operation of the line.

The order which was issued by the commission in connection with the matter is in part as follows:

> Even in the face of the losses, the commission has kept the service moving since Jan. 13, 1923, until the present time, with practically the same result as shortly after the line was put into operation.
>
> The commission is fully cognizent of the decisions of the courts in many cases that while it has the authority to supervise service, rates, etc., it does not own and cannot operate and control these properties, and only in its earnest desire to furnish service to the people of Spartanburg has the commission gone as far with this matter as it has.
>
> Every effort and every method for improving the amount of traffic that is known to this commission has been tried, but all efforts have failed to develop sufficient traffic to warrant a continuance of the service. This could not be regretted more by anyone than by the Railroad Commission itself.
>
> The commission has realized from the beginning that anything it might promulgate and put into effect was only as a try-out and would furnish the commission with an actual basis for action one way or the other, and this matter has been publicly stressed through the press, by representatives of the commission, and by every means known to the commission, so that the commission could not be misunderstood in connection with the requirements of the law and its duty in matters of this kind. The results obtained have not been from hearsay evidence but are actual results from the rendering of service itself.
>
> The commission finds itself faced with the law requiring such rates as will yield reasonable return on the investment. In this case the commission has never been able to pull the revenue up as a result of the service to such point where a return of the investment could be figured at all, having been unable to even meet operating expenses. Therefore, to continue this service further would mean a violation of the provisions of all laws, as well as provisions of the constitution of our own state, and would without question result in the confiscation of this property. The commission's records will show many other things that could be put in evidence which would warrant the commission in issuing such order as it finds itself compelled to issue. It is not a pleasure or the desire of any member of the commission, but an absolute necessity to perform this duty.

George B. Tripp, president of the South Carolina Gas & Electric Company, said that the company would, of course, comply with the order of the commission and would do everything possible to work out successfully the problem of operating the Glendale-Clifton line with bus connections to the city proper. It is expected that the city authorities will resort to the courts, but Mayor John F. Floyd announced that the commission's order would not be discussed by the City Council until City Attorney Daniel returned from New York City, where he had gone on business.

Strike Threatened in Des Moines

Employees of Des Moines City Railway Show Evidence of Rejecting the Recent Wage Award

Des Moines is again facing the threat of a tieup of its railway lines. The present emergency is based on a threat of the men to strike following their dissatisfaction at the wage award made by the arbitration committee in a report brought in during the week ended June 23.

The findings of the arbitration board, composed of Rev. Elmer Nelson Owen, rector of St. Paul's Episcopal Church; J. G. Gamble, representing the company, and J. Ben Wiley, representing the men, provided for a scale during the year March 1, 1923, to March 1, 1924, of from from 48 cents to a maximum of 54 cents an hour. This is an increase of approximately 2 cents an hour, whereas the men were seeking an increase of 18 cents. Rev. Owen said that the new scale compared favorably with rates elsewhere and that any wage increase must also be considered with the effect it would have in bringing about a decrease in fare as provided by the franchise, thus benefiting the entire riding public of Des Moines.

Mr. Wiley signed the agreement, but immediately came out with a charge that he had been forced into signing by the threat that unless the increase was accepted as satisfactory the Reverend Owen would take a stand for no increase at all. This claim is not taken seriously. It is pointed out that in the event of a development such as Mr. Wiley cites the position of the men would have been improved had he refused to sign and then thrown the case before the public.

The men have appealed to the company from the finding, but were met with a statement from F. C. Chambers, president of the railway, that he could see no use of further negotiations.

Mr. Wiley has stated in the newspapers that the men will make every effort to avoid a walkout, and as this story is written the men say they will ask that the question of whether or not the contract calls for an arbitration of an award be submitted to the five judges of the court in Polk County.

There is a general feeling that the matter of wage disputes as covered in the agreement provides for submitting the question to three arbiters and that the decision of the arbiters should stand. The public therefore sees no occasion for a strike, particularly when the wage granted is comparable with that paid trainmen elsewhere.

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Eight Killed in Brooklyn Elevated Accident

Cars Leave Structure and Fall Into Street at Busy Corner—Inquiries Under Way to Determine Responsibility—Cars Had Been Inspected Recently

EIGHT persons had died and thirty-seven were still in hospitals on June 29 as a result of an accident on the elevated railway in Brooklyn on June 25. Shortly after 2 o'clock on Monday afternoon both cars of a two-car train of the Brooklyn Manhattan Transit Company slid off the structure into the street, the rear truck of the rear car being the first to leave the track. The cars were of wood construction rebuilt in 1907 by the company. They were completely demolished in the fall. The accident occurred to a Bay Ridge two-car train westbound to New York as it was approaching the station in front of the Long Island Railroad terminal at the junction of Flatbush and Atlantic Avenues.

Inquiries into the cause of the disaster are under way by the public authorities, including the Transit Commission, and the company itself under the direction of President Menden. A statement issued by W. S. Menden, president of the railway, shortly after the accident was as follows:

The investigation of the cause of the accident this afternoon, while not complete, indicates that the rear truck on the rear car of the two-car train was derailed, for some cause not yet ascertained, at the frog of the switch just east of the Atlantic Avenue Station, causing the rear car to be precipitated into the street, dragging the forward truck of the rear car and the entire forward car, with its trucks, into the street, leaving the truck which was first derailed on the structure, practically at right angles to the running rails.

The track and switches at the location in question had been inspected in the morning, and found in good condition. Both cars of the train had been inspected on June 15, 1923, in accordance with the established practice, and found O. K. The two cars in the train had been operated on the same line over the same switch and frog for nine trips on the same day without any difficulty of any kind. The train was in charge of an experienced motorman with a good record.

The investigation is being continued in co-operation with public authorities to ascertain more definitely the cause of the derailment.

Investigations made by engineers of the railway, the New York Transit Commission and the city indicate that the rear truck of the rear car was the first to leave the track. The derailing occurred at a frog preceding a trailing switch, through which the train was operating. The switch controls movement through a cross-over which is used only for turning back trains at that point and forms a trailing connection between the two tracks of the elevated structure. The derailing occurred on a tangent level track, and the train had operated a distance of approximately 300 ft. on tangent track after it had passed around a curve from Fifth Avenue into Flatbush Avenue.

Information tending to show where the derailment occurred is furnished by the condition of the frog and ties immediately following it. The heel of the frog showed slight abrasions, and the first indications of cutting by the wheel flange on the ties was immediately following the frog. This cutting of the ties continued up and across them for a distance of approximately 10 ft. beyond the point of the switch, where the rear truck apparently was wrenched loose from the car body. This rear truck, according to a statement issued by Mr. Menden, remained on the elevated structure, all others being carried to the street below with the car bodies.

The real reason for the derailing at the frog has not been ascertained. Various conjectures as to what might have happened have been given out but definite information is lacking which would tend to give a solution.

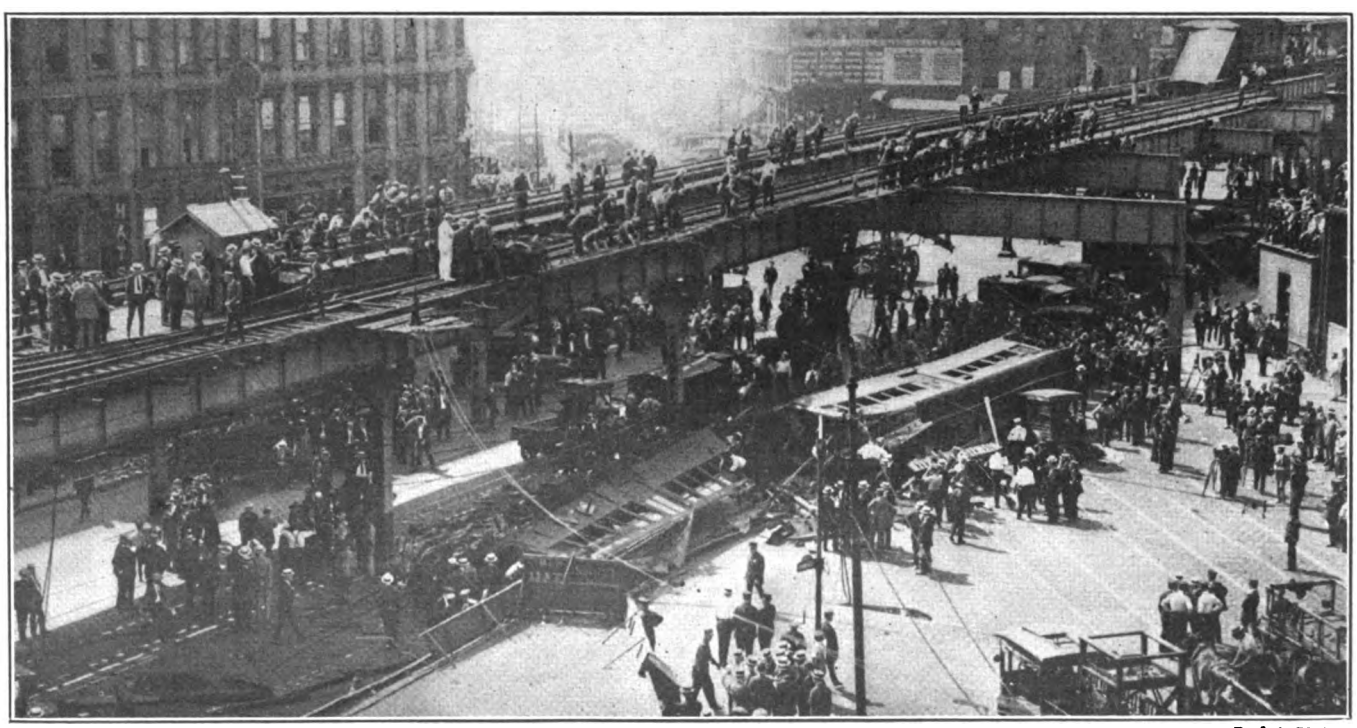
The cars in the accident were numbers 913 and 919. They were originally purchased from the Wason Manufacturing Company in 1898. The motor trucks were Baldwin and the trailer trucks Wason.

One of the first among those to arrive on the scene was Mayor Hylan. He climbed the structure, looked over the scene and then submitted to being photographed as he examined a piece of the shattered guard rail. He rushed into print with a statement that somebody should and would be indicted; that he believed the accident was the result of using wooden cars; that he thought the switch had been tampered with after the accident occurred; that the truck probably was defective; that the Transit Commission was responsible through its inaction; that he would ask the Governor to call a special session of the legislature, and that the guard rails along the structure were unsafe.

These inept remarks merely brought down upon him fiery editorial protests from the *Eagle*, *Sun*, *Herald*, *World* and *Tribune* for seeking to make political capital out of a catastrophe to the community.

The protest thus made in the name of humanity was reiterated by Mr. Harkness of the Transit Commission, who spoke for that body in the absence of Chairman McAneny. Mr. Harkness said:

It seems to me that the accident is sad and deplorable enough without anyone try-



P. & A. Photo

View Taken Shortly After Brooklyn Accident, Showing Officials Examining Elevated Structure Near Switch

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ing politically to capitalize it. I will not jump to any conclusions about it. We promptly sent engineers to the scene of the wreck and they in due time will turn in a report. A curbstone judgment on the cause of the accident is out of place.

Upon his return to the city Mr. McAneny reiterated the views expressed by his colleague on the commission. He accused the Mayor of playing politics with a heart-rending situation. In a later statement he said:

There may continue to be considerable difficulty in determining what actually did occur, but beyond the theory advanced by the commission's engineers that a bolt dropped from the mechanism of one of the trucks and caused the derailment. there is nothing as yet that offers a definite solution.

On Tuesday District Attorney Dodd announced that in order to assist him in his inquiry into the cause of the accident and to help fix responsibility for it, he had retained J. C. Brackenridge, now an independent consulting engineer but some years ago an officer of the Brooklyn Rapid Transit. He quoted Mr. Brackenridge as stating that the guard rails were intended to prevent such an occurrence as the accident, and that "if the timbers had been in good condition they doubtless would have done that."

To this statement Mr. Menden replied:

No guard rails could keep derailed cars from going over the side unless they were as high as the cars themselves. The beams are there to keep the trucks on the structure, and under ordinary circumstances the car bodies remain with the trucks. That the beams served their purpose in this instance is shown by the fact that the rear truck on the second car—the first one derailed—remained on the structure.

According to a report issued by the Transit Commission an inspection of the stretch of guard beams between Atlantic and St. Marks Avenues, a distance of 6,666 lineal feet, was made last December and revealed 36 ft. of damaged guard rail in three sections. These sections were reported on Jan. 9 as being "rotten and split from end to end." W. S. Menden acknowledged receipt of the report on Jan. 24.

Mr. Menden gave out a statement June 28 explaining that the commission's report covered a number of items and that he had given preferential consideration to more important ones. An inspection by B. R. T. engineers satisfied him that the beams complained of did not require immediate replacement. He said:

The designation "rotten and split from end to end," is a designation which has regularly been used by the commission's inspectors, and our check of these reports has shown that this heading did not properly describe the condition found either by the commission inspectors or by ours, and was not intended to indicate that the timbers were in such condition as to require immediate repairs.

Upon receipt of this report we had an inspection made of this line, and arrangements were made to give the matter all necessary attention, giving the more important items preferred attention, as indicated in letter to the executive officer of the commission dated Jan. 24.

Our inspection as well as that made by the commission's engineers indicated that the section between Thirty-sixth Street and Sixty-fifth Street required earlier attention. Our inspection did not indicate that immediate repairs were necessary to any part of the timber construction of the track between Fifth Avenue and Atlantic Avenue, all of which had been rebuilt new in 1913.

Reports of these physical surveys as made by the inspectors of the Transit Commission are sent to us from time to time as part of the routine inspection system in effect by the commission. These reports usually reach us about thirty days after the inspection has been made and are sent us for our information and attention.

We have always thoroughly inspected our property ourselves and have relied on our own inspection. We have never taken the position that we should await reports from the Transit Commission or any one else. Our own inspection has been thorough and reliable, but following any report from the Transit Commission we have immediately checked the results of that report, and this we did on the receipt of the report mentioned above.

CHAIRMAN DAHL DEFENDS EMPLOYEES

Gerhard M. Dahl, chairman of the executive committee of the B. M. T., in an announcement on June 28 regarding the switch at the scene of the wreck, which officials said was tampered with after the accident, stated that the investigation proved that the derailed truck might have thrown the switch and reversed the signal, so that it showed red. He also stated that if any individual threw the switch after the accident to mislead the authorities, he is a criminal and a fool. The statement by Mr. Dahl read in part as follows:

The motorman says the switch was in proper position, as he approached it. The signals showed green, meaning safety. The motorman is an old, trusted and experienced employee and we accept his statement as the fact.

It is undisputed that immediately after the accident the switch was in the reverse position, with the red or danger signal showing. It is also accepted that the switch was locked. The theory has been advanced that immediately after the accident, some one—presumably an employee with a key to the lock on the switch—unlocked the switch, reversed its position and changed the signals from green of safety to the red of danger.

We have no quarrel with either the honesty of purpose, sincerity, or good faith of those who advance this theory. But we do not agree with it, and in justice to our many employees, some of whom might rest under the cloud of suspicion, we believe it our duty to them and to the public to state our reasons.

The motorman of the train escaped with only minor injuries.

On Tuesday the Mayor announced that he would leave the matter in the hands of Mr. Dodd, and the inquiries into the causes of the wreck were in a measure merged. The Transit Commission, however, announced that it reserved to itself the right to conduct its own public hearings after the District Attorney had concluded.

Three engineers have been appointed by the B. M. T. to make an inspection of the structure where the accident occurred in an effort to determine the cause of the wreck. They are Dwight P. Robinson, J. H. Davies and George Pegram, chief engineer of the Interborough.

B. M. T. HAS MORE TROUBLE

One woman was killed and a woman and a man severely injured when an auto in which they were sitting was crushed beneath a shower of bricks after wind had hurled the 30 ft. wall at the rear of the carhouse of the Brooklyn Company backing on Bushwick Avenue into the street.

Accepts Beeler Report

The Commission Council of New Orleans passed a resolution on June 26 accepting the report on the local railway system by John A. Beeler, consulting engineer, New York, as a guide for all future action with respect to railway matters. At the same meeting the Council ordered all the standard gage track changed to wide gage to conform with the remainder of the system. This embodies about 34 miles of track, and it means that the standard gage cars will also have to be changed for wide gage operation. Provision was originally made in the trucks of these cars so that this change in structure can be readily made.

The Council also ordered the railway to build the Broadway extension, the St. Claude-Rampart cutoff, the Paris-St. Bernard extension and rerouting, to make the rerouting of the South Claiborne and Freret lines and to build the Elysian Field track and the Gentilly extension and make the new routings. These are all in conformity with the Beeler report and involve the construction of 10 to 12 miles of track by the company.

Publicity vs. Propaganda

"How do you distinguish between legitimate publicity and propaganda?" That was one of two questions addressed recently by Paul L. Harrison of the department of journalism, University of Kansas, to William Randolph Hearst, the publisher. The Hearst newspapers answered the question as follows:

"Legitimate publicity" is the spreading of truthful information, or facts, about any cause or condition which is of interest or importance to people generally, and not for the pecuniary or other advantage of the person spreading it.

Propaganda is the giving out (or hiring of) opinions, arguments or pleas to induce people generally to believe what some individual, group of individuals or organizations want them to believe, for the pecuniary or other advantage of the individual, group or organization giving out (or hiring) the propaganda.

Public opinion, meaning all the people, cannot acquire facts and information necessary to reach a correct conclusion on any question without full publicity.

Public opinion is often deliberately misled, deceived or seduced by propaganda or hired opinions.

To see no difference between "publicity" and "propaganda" is to see no difference between nutritious food and insidious poison.

Wages to Be Arbitrated.—The union of conductors and motormen in the employ of the Boston Elevated Railway, has made a demand on the company for an increase in wages to 91 cents an hour. Their present schedule is 61 cents. In negotiations between the union committee and the management of the company an offer of 65 cents an hour was made, but that offer was rejected by the union on June 22. The question of wages will now go to arbitration. The union has selected James H. Vahey as its arbitrator. A second arbitrator will be selected by the company, and these two men will select the third member, who will be chairman of the board. The present agreement expires on July 1.

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University of Iowa Holds Conference on Public Utility Regulation

Iowa Mayors, city attorneys and public utility men were invited by the college of law of the University of Iowa to attend a conference on public utility, regulation and rate making in June. Various subjects were discussed by authorities on public utility affairs in the state and several experts from the East spoke.

Methods of valuing and inventorying utility concerns for the purpose of taxation and rate making were discussed by Dean William G. Raymond of the college of applied science, University of Iowa. Many important rate cases have been decided by Dean Raymond, as the referee.

The work of the State Railway Commission was reviewed by Dwight N. Lewis of Des Moines, a member of the commission, and Mayor Alfred C. Mueller of Davenport and O. N. Elliott, city attorney of Cedar Rapids, discussed rate-making practices of Iowa municipalities.

Connecticut Company and Men Agree on Five-Cent Advance

Following a referendum held on June 15, which resulted in a four to one vote by the men that they accept an increase of 5 cents an hour in their pay, the Connecticut Company announced that it would grant the increase to its motormen and conductors. About 2,600 men are affected by the agreement. This ends the negotiations concerning the annual contract which have been going on for the past few weeks. The new agreement is retroactive to June 1.

By accepting the 5 cents an hour increase, the Connecticut Company raised its original offer 1 cent. The company had offered the employees 4 cents an hour increase, but this had been refused in an earlier referendum. The men then voted to bring the matter to arbitration, but the sentiment was very strong against arbitrating the wage question.

Under the old scale two-men car operators, started at 47 cents an hour. At the end of three months the pay was 49 cents and at the end of six months, 52 cents. With one-man car operators the scale was 54, 56 and 59 cents. The men originally requested a scale of 60, 62 and 65 with a 75, 77 and 80 cents scale for one-man car operators. In their second referendum vote, however, the men were willing to accept the scale of 52, 54 and 57, with 59, 61 and 64 cents an hour for one-man car operators. This was the scale accepted in the referendum vote of June 15, rather than let the matter go to arbitration.

J. K. Punderford, vice-president and general manager of the company, stated that for a number of years the company had always made its final proposition in the original offer, but as the committee now had power to sign an agreement and to close the matter without further discussion, hoping that the company's action in granting the additional cent would be appreciated and encourage the men to better efforts on behalf of the public, it was willing to grant the increase requested.

Chicago Arbitration to Start July 9

Arbitration of Chicago's street car and elevated railroad wage dispute scheduled to begin on June 25 was postponed until July 9, after a brief session held in the office of Mayor Dever. The hearings will be held in the City Council chambers. The postponement was decided upon in order to permit the City Council to adjourn for the summer vacation. The boards of arbitration plan to hold daily sessions. The proceedings will be open to the public.

Couzens Claims Detroit Railway Operates at Lower Cost

Senator James Couzens, former Mayor of Detroit, has written a letter to the New York *Tribune* criticising some statements made in an article in that paper on the Detroit Municipal Railway. The article, which is one of several on this subject, challenged the statement that the lines had made $1,000,000 profit. Instead, it claimed there was a deficit, if all costs properly chargeable to operation had been included.

In his letter, which is in the issue of June 29, Mr. Couzens said that the test of efficiency of the operation of the lines is best based on a comparison between the Detroit lines and street railways in other cities. He compares the operating statistics for April, 1923, with March, 1923, and says that the results are that in every division of operating activity the Detroit Municipal System showed a lower cost than railways in other cities. On the subject of track paving the letter says that it is admitted that the car tracks and paving are not in good condition but "it is proved that they are in better condition than when owned and operated by the Detroit United Railway a little more than a year ago."

Mr. Couzens in his letter did not claim anything miraculous in railway operation but he did make the claim that the Detroit Municipal Railway operated at a lower cost than private companies do. In an editorial under date of June 29 the *Tribune* states that it was not trying to demonstrate that the Detroit Street Railways were better or worse run than other street railways. It merely undertook to investigate the claim of a $1,000,000 profit in Detroit in 1922-1923.

Brooklyn Wages Increased

A general wage advance for the employees of the Brooklyn City Railroad was recently announced by Clinton E. Morgan, vice-president and general manager. The increase, effective on Aug. 3, averages from 4 to 5 per cent, and affects about 2,500 motormen and conductors. Corresponding increases apply to the supervisory force, including inspectors, starters, and workers similarly employed.

Under the new schedule, Mr. Morgan explained, Brooklyn City employees, during the first year of their service, will receive 50 cents an hour, with gradual increases during the initial five-year period of employment as follows: Second year, 52 cents an hour; third year, 54 cents; fourth year, 57 cents; fifth year 62 cents.

The hourly wage under the existing arrangement is 45 cents for the first six months, 48 cents for the second six months, 50 cents for the second year, 52 cents for the third year, 55 cents for the fourth, and 60 cents for the fifth. All increases will take effect on the same date. A similar increase for employees of the Brooklyn-Manhattan Transit Corporation was announced on June 25.

Wages Increased. — Railway employees of the Dubuque Electric Company have been granted an increased wage scale. The new scale is arranged in three steps. First-year men are to receive 40 cents an hour, second-year men 44 cents an hour and men over two years in the employ of the company 49 cents. An additional 5 cents an hour will be paid men operating one-man safety cars. The old wage scale ranged from 35 cents to 45 cents and was divided into four steps. The scale proposed by the union provided for a maximum of 60 cents, or approximately an increase of 33⅓ per cent.

Third Arbiter Named.—A new wage agreement is being prepared for the Eastern Massachusetts Street Railway, Boston, Mass. The men and the company have agreed upon working conditions, to be embodied in the new schedule, but they could reach no understanding on wages, and decided to submit that question to arbitration. The union has selected James H. Vahey as its representative on the special board of arbitration, and the company will be represented by Fred A. Cummings, assistant to the chairman of the board of public trustees. The third member, who will be chairman, is Henry C. Attwill, chairman of the Massachusetts Department of Public Utilities.

Wages and Fares Increased.—A wage and fare increase, affecting the employees and patrons, of the Homestead & Mifflin Street Railway, Homestead, Pa., was recently announced by officials of the company. The wage advance, effective June 1, will bring the schedule up to 70 cents and hour. The men were receiving 60 cents. The increase in rates of fare, effective June 15, will mean a cash fare of 10 cents, instead of 8 cents as formerly charged. Tickets will be sold at the rate of fifteen for $1, instead of eighteen for $1. Officials of the company stated that the increase in the rates of fare was due to the result of an increase in wages and the cost of power and material.

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Financial and Corporate

Montreal Tramways & Power Company Reports

A report of the Montreal Tramways & Power Company, Ltd., a holding company for Montreal Tramways, Canadian Light & Power and several other companies, covering the fiscal year ended Nov. 30, last, has been issued, the first of its kind made public.

Total assets are $28,799,071, representing various securities of subsidiary companies which also include a profit and loss balance of $1,774,071. The liabilities include issued capital stock of $17,578,330, and five-year 6½ per cent notes of $7,300,000. In addition there is a Montreal Public Service loan account of $2,592,500, accounts payable $1,276,199, and accrued interest $52,041.

The profit and loss account for the year shows that the income from securities owned was $672,514. Of that amount $526,529 was disbursed in interest and after a few smaller disbursements there was a credit balance of $98,274.

Sale of Oakland Properties Ordered

Judgment of foreclosure and decree of sale of the San Francisco-Oakland Terminal Railway and subsidiaries were signed on June 18 by Superior Judge James G. Quinn in Oakland. Commissioner of Sale J. B. Lanktree is directed to conduct a public sale of the properties not earlier than twenty days. Judgment given by the court amounts to $24,000,000. Mr. Lanktree has suggested July 17 as a tentative date for the sale.

Operative property of the company was valued at $19,000,000 by the Railroad Commission on Aug. 11, 1919, and the non-operative properties were valued at $6,327,680 in 1915 by the same commission.

Judge Quinn decreed that no bid less than $10,000,000 can be accepted.

Sale of the property to satisfy the bondholders was ordered by Judge Quinn after a hearing of the suit brought by the Mercantile and the Union Trust Companies, trustees.

New articles of incorporation recently filed by officials of the company provide for three companies, the Key System Transit Company with a capitalization of $17,500,000; East Oakland Railway, capital stock $250,000, and the Oakland & Hayward Railroad, capital stock $250,000.

The reorganized company will have a total capitalization outstanding in the hands of the public of $28,239,785, of which $2,500,000 will take the form of 6 per cent notes, $11,861,385 bonds and the balance common, preferred and prior preferred stocks. Previous capitalization of the entire system was $48,332,000, of which $20,157,000 is represented in bonds and notes.

Prices of Traction Bonds Carried to Low Level in Recent Liquidation

Traction bonds are on the bargain counter, says the *Wall Street Journal*. It ascribes this to the recent wave of liquidation, following failures of several brokers, which carried prices of many traction bonds down to low level of the year, and in some instances to record low prices. This weakness was due solely to market conditions, and not to any development in traction companies or their individual securities. The *Wall Street Journal* recognizes that the traction industry has shown marked improvement throughout the United States, and particularly in New York City, during the past year. It says that the financial structures of the companies as a whole, as well as earning power, are in better condition than any time since the war.

A compilation of traction bonds, listed on the New York Stock Exchange follows, showing high prices reached in 1917, high and low levels in 1922, and closing or last prices on June 20, 1923, with income return:

Interest on Hudson & Manhattan adjustment income 5 per cent bonds is payable if earned, and is cumulative. Interest is being paid regularly, and all accumulated interest has been paid. Interest on Third Avenue Railway adjustment income 5s, 1960, is payable if earned, and is cumulative. Payments are being made regularly, and in past year 1¾ per cent was paid on accumulated interest now totaling 20 per cent.

Doherty Interests Buy Toledo-Western Line at Foreclosure

The Toledo & Western Railroad property was sold on June 19 by special masters at Sylvania, Ohio, to Frank R. Coates, representing Henry L. Doherty & Company. The purchase price was $600,000. The sale is subject to confirmation by the Federal court at Toledo, and was made in satisfaction of a decree in foreclosure brought by holders of the first mortgage bonds.

The line extends from Toledo to Pioneer, Ohio, with a branch to Adrian, Mich. It has been in the hands of receivers nearly three years. The company does a large freight business in that territory and some passenger business, with only a beginning made in the business of distributing power along the line.

Attorney Morton Seeley, Toledo, counsel for Mr. Coates, made the successful bid in opposition to Marion M. Miller, president of the Home Savings Bank and chairman of the bondholders' protective committee.

The sale gives the property to the Doherty interests at about $8,000 a mile, clear of all encumbrances, except some car trust obligations and customers' deposits. There were two underlying mortgages—one of $1,250,000 on the Toledo & Western and one of $250,000 on the Toledo, Fayette & Western, which, together with matured coupons unpaid, amounted to $1,773,096 at the time that the decree of sale was issued.

There was also a second mortgage amounting to $500,000 held by the Doherty interests.

The reorganization of the company will enable it to finance itself and provide new capital for improvements and betterments.

Issue:	1917 High	1922 High	1922 Low	1923 June 21	Per Cent Yield
B'way and 7th Ave 5s, '43	100	78	50	62	9.19
Brooklyn City con 5s, '41	101¼	91	75	84¼	6.44
Brooklyn Union El 5s, '50	101¼	90¼	75	80¼	6.57
Chicago Rwy 1st 5s, '27	97¼	85	67	79¾	11.59
Conn Ry & Lt 4½s, '51	101¼	82¼	75	84	5.65
Detroit United 4½s, '32	86½	86½	63¼	84	6.92
Ft. Smith Lt & Pr 5s, '36	84	..	..	70½	8.91
Hudson & Man ref 5s, '57	69¼	88½	75	80¼	6.44
adj income 5s, '57*	25½	67½	47½	55½	9.01
Interborough R T 5s, '66	73½	78¼	54	63	8.06
10-year 6s, '32	..	83¼	72½	61	13.40
convertible 7s, '32	..	98¼	93½	88	8.99
Kings Co. Elev 4s, '49	86¼	81	64	70	6.39
Manhattan Rwy 4s, '90	94	72½	57½	59	6.86
second 4s, 2013	60	63½	48½	55¼	7.02
Manila Electric 7s, '42	..	..	..	97½	7.25
Manila El Ry & L 5s, '53	85	84	64½	82½	6.30
Market Street Ry 5s, '24	81½	92½	81	92¾	13.00
5-year notes 6s, '24	..	97	90¾	97	9.21
Milwaukee E R & L 5s, '26	103¾	99	91¼	98	5.73
ref & ext 4½s, '31	93	90	79½	89¼	6.19
general A 5s, '51	91½	..	..	91¼	5.62
Milwaukee E R & L 1st B 5s, '61	..	..	..	84¼	6.00
Montreal Tramway 5s, '41	97½	92¼	83	88¾	6.03
Nassau Electric 4s, '51	74½	65	27	59½	7.45
N. Y. & N. Jersey 5s, '32	100¼	97½	92	96¾	5.45
N. Y. State Ry 4½s, '62	87½	73	61½	62¼	7.42
1st cons 6½s, '62	..	..	..	94¼	6.91
Northern Ohio T & L 6s, '47	..	97½	92	92¹	6.61
Portland Rwy ref 5s, '30	88½	91½	81	86¼	7.50
Portland Ry Lt & P 5s, '42	78½	90	78½	82¼	6.63
refunding B 6s, '47	..	..	..	94½	6.46
refunding 7½s, '46	..	108½	102	105	7.06
Rapid Transit Sec 6s, '68	..	..	..	70½	8.62
Public Service of N. J 5s, '59	..	90½	73	83½	6.15
St. Paul cable 5s, '37	102½	..	..	92	5.84
Third Avenue ref 4s, '60	80½	69¾	56¼	54½	7.83
adj income 5s, '60*	73½	68¾	44¼	49½	10.10
Third Avenue Ry 5s, '37	108	98½	88	92	5.84
Toledo Tr L & P 6s, '25	..	100	98½	98¼	6.75
Union Elevated 5s, '45	84	..	..	70	7.90
United Rwy Invest 5s, '26	70	91	75	92	8.05
United Rys St. L 4s, '34	61½	69¾	51½	62	9.69
Virginia R & P ref 5s, '34	93½	88¼	72	84	7.12

* Direct return.

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More than $200,000,000 Valuation

Present Seven-Cent Rate in Philadelphia with Four Tickets for a Quarter Declared Neither Unreasonable Nor Preferential by Pennsylvania Commission in Rate Case Dating Back to 1920

THE Public Service Commission of Pennsylvania has sustained the right of the Philadelphia Rapid Transit Company to the present rates of fare charged. The decision of the commission was rendered late on June 21. It means that the company will continue to charge a 7-cent cash fare and to sell four tickets for 25 cents. On the question of value the commission has ruled that the holdings of the company are in excess of $200,000,000. The contention of the company on that matter was for an allowance originally of $290,729,742 and of $316,423,557 as of May 1, 1923, while the city held out for a value for rate-making purposes of $189,265,781.

After discussing the details of the case the commission reached the following conclusion:

1. We do not find it necessary in this proceeding to arrive at a final determination of the present fair value of the property of the company. However, our consideration of the items of evidence before us, including the questions of depreciation and going concern value and of matters in dispute between the company and the city, leads us to the conclusion that under established legal principles the present fair value of the company's property is substantially upward of $200,000,000.

2. With regard to operating expenses, we are not disposed to interfere with the budget submitted by the company as long as the company continues its present policy of improved service and a high standard of maintenance.

3. In this connection we are of opinion that the company has established its rights to share in additional profits resulting from approved economies and efficiencies in its operation.

4. Looking to the future, we feel the present fares and the revenues and credit which they produce should make possible further and continued improvement and expansion of transportation service and facilities in Philadelphia to meet the growing needs of the city.

5. An assumed rate base as low as $200,000,000, with 7 per cent as the fair rate of return, results in the amount of $14,000,000 available as the fair return. This, plus the allowed operating expenses, as appears in respondent's budget of $30,868,000 and taxes of $2,818,000, gives an allowable annual gross revenue requirement of $47,686,000. The operating revenue for the year 1922 being in actuality $42,530,000, and the unimpeached estimate of operating revenue for the year 1923 being but $44,736,000.

The respondent's rates of fare as contained in its Tariff No. 81, now in effect and originally established under order of Oct. 18, 1920, are neither unjust nor unreasonable nor under the evidence are they unduly discriminatory or unjustly preferential.

The right of the company to continue to collect the fares thus established and in effect is confirmed and the complaint dismissed.

The commission says in effect that it would in any event allow a 7 per cent return as a minimum on the present fair value of the property and that were a definite valuation found necessary the fact that a 7 per cent return would produce a surplus after providing for a liberal operating budget is the best proof not only of the revenue-producing effect of the economies and efficiencies introduced by the company but also of the fact that the company is securing its fair share of these. In other words, as the commission sees it, the company is entitled to share in the results of the economies and efficiencies which it has brought about.

The proceeding had its inception on June 1, 1920, when the company filed a tariff which would effect an increase in gross revenues by the abolition of the free transfers and of certain exchange tickets then in use. The city protested and asked for a valuation of the property in connection with the determination of the general question.

This tariff was subsequently withdrawn. On Oct. 4, 1920, a petition was filed for a new tariff, but this the commission refused. In this proceeding the commission found that the proposed rates would be unreasonable and unjustly discriminatory, but as it appeared the company needed a greater revenue, the commission by an order entered Oct. 18, 1920, directed the company to file a tariff providing for a 7-cent cash fare, with four tickets for 25 cents, the transfer and exchange privileges to remain as theretofore. Throughout these various steps dealing with the rates of fare the commission reserved the matter of determining the value of the company's property and the order last referred to was an interim order pending such valuation and in terms effective for six months from Nov. 1 of that year. As the valuation had not been concluded at the expiration of the interim period, the company then filed a tariff continuing the rates originally prescribed by the commission and those rates are the ones now in effect.

VOLUMINOUS RECORD MADE

The record in the case comprised more than 6,000 pages of testimony and more than 2,100 pages of exhibits. It also contained detailed studies directed to the question of the reasonableness of the rates, based on comparisons, with charges for like service in similar cities and with the decreased purchasing power of the dollar.

The commission in its decision pointed out that respondent at the argument raised for the first time the point that there had been no complaint filed against the present tariff, and that, therefore, technically, the burden of proof rested upon the complainant city in the proceedings. It was the view of the commission, in the light of all the testimony presented, that this question was largely academic. The commission said that a full and comprehensive investigation has been made, and evidence presented on the part of the complainant and respondent, with a view of determining what are the just and reasonable rates which the company may charge and the allowable gross revenue which the company may receive. So full and complete was the testimony presented that the commission expressed the opinion that the case ought not turn on any narrow construction with respect to technical rules where there has been a full disclosure of all relevent facts necessary to reach a conclusion on the merits.

As noted in the ELECTRIC RAILWAY JOURNAL for May 19, page 863, arguments in the case were concluded on May 15. Early in the present month both sides presented briefs. In this controversial matter neither side was very sparing of the other in attempting to drive home its arguments, but all this is largely a matter of history now. In short, in its brief the company renewed its claim for a valuation of $316,423,557 on the price trended to May 1, 1923, and asked the commission carefully to consider the evidence in the case, "which tends strongly to show that a return of 7 per cent is within the realm of confiscation and that at least 8 per cent is necessary to achieve the protection the company requires."

The brief of the city pointed out that there necessarily were many differences in judgment between the company's experts and its experts, but it asked that certain paragraphs of the company's brief, considered by it not to be in good taste among opposing counsel be suppressed. This document alone was one of sixty-nine printed pages. In it specific reference was made to the operating contract of 1907, between the city and the company. Counsel for the city said that this contract fixes the rate of fare at the then prevailing rate and stipulates that it shall continue unchanged without the city's consent during the life of the contract, which expires in 1957. It was not suggested by the city that the commission in ordinary cases is without power to alter rate provisions of contracts between utilities and their patrons, but the city did call the attention of the commission "special circumstances which take this contract beyond the power of the commission to alter the rate of fare provisions in it."

Mayor Moore was one of the members of the party on the Leviathan when the decision was announced, but immediately upon his return he stated that the city would appeal the decision. The idea that has been conveyed is that if the contract of 1907 is to be modified, it should not be done without the consent of the city.

$73,114 Profit for Detroit Lines in May

Ross Schram, assistant general manager of the Detroit Department of Street Railways, reports that the earnings of the department for May showed gross revenue from transportation of $1,762,166, a daily average of $377 above that received for April. Operating expenses were $1,352,337, with profit at $73,114.

Line Purchased.—The West Chester, Kennett & Wilmington Electric Railway, Kennett Square, Pa., was purchased by a committee of bondholders at the sale held on June 1 at the office of the trustee, the Integrity Trust Company, Fourth and Green Streets, Philadelphia.

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City Wants $27,474,767 Cut from St. Louis Valuation

A complaint that the Missouri Public Service Commission valuation of $52,838,110 for the United Railways, St. Louis, is excessive, unlawful, unjust and unreasonable to the extent of at least $27,474,767 is made by the city of St. Louis in an application for a rehearing filed with the commission this week. The railway will ask for a rehearing on the ground that the sum set is too low.

The items attacked by the city and the reasons are as follows:

Construction Overhead Costs.—No deduction for depreciation of this item was made, and it hence is at least $2,179,585 too high. The item itself should be cut $5,252,013.

Depreciation of Physical Property.—The deduction for this item was at least $6,039,815 too low.

Pricing of Physical Inventory.—The commission made a grossly excessive allowance for increase of prices to reflect present value, and this item should be reduced $8,753,355.

Going Concern Value.—The commission allowed $2,500,000. The city asserts no allowance should have been made.

Promoting, Financing and Consolidation.—The entire allowance of $2,700,000 should be deducted.

Working Capital.—This item should be reduced $49,999.

The company's appeal probably will be filed soon. In the meantime reorganization plans are held up.

As to the 7-cent fare charged in St. Louis by the United Railways under the commission's order, the city's motion reads as follows:

The fares prescribed by the commission, by its supplemental order, made and entered in the above entitled proceedings on April 2, 1920, and thereafter from time to time extended as the maximum fares to be charged by the receiver for the United Railways in the city of St. Louis, to wit, 7 cents for adult passengers and 3 cents for half fare passengers, are excessive, unjust and unreasonable, yielding, as they do, an amount available for return on capital after paying thereout the operating expenses, including taxes and $1,500,000 per year, for depreciation, which is equal to a return of more than 13 per cent upon the true fair present value of said property, and the said order of the commission, made and entered in the above entitled proceedings, on June 4, 1923, is erroneous and the commission erred therein in its finding and conclusion that no reduction of said fares will be justified until operating conditions shall have been improved either from increased revenues or decreased operating expenses.

Said order is erroneous and the commission erred therein in its finding and conclusion that no reduction in the fares charged by the receiver for the United Railways in St. Louis will be justified until operating conditions shall have been improved by either increased revenues or decreased operating expenses; the said finding being based upon the erroneous valuation of the property of the said company aforesaid, and upon the erroneous assumption that the gross income of $3,425,155, being the amount available for return on capital after paying out of revenues the operating expenses, including taxes and $1,500,000 a year for depreciation is equivalent to a return of more than 13 per cent upon the true fair present value of said property, which return is excessive, unjust, unreasonable and unlawful.

Seattle Mayor Opposes Boston Negotiations

Immediate negotiations between the city of Seattle and the trustee for the holders of the Municipal Street Railway purchase bonds of $15,000,000 has thus far been blocked by Mayor E. J. Brown, who states that he is "unalterably opposed to any trips to Boston," where the trustee states the conference must be held between the bondholders and representatives of the city. The City Council announces that it will adopt an ordinance immediately which will instruct the Mayor, Corporation Counsel, president of the City Council and chairman of the finance committee to go to Boston to negotiate an extension of the street railway bonds, and the proposition will then be up to the Mayor.

The ordinance contains no thirty-day alternative clause so if the Mayor vetoes the ordinance, the proposal will be abandoned, and it will then be up to Mayor Brown to make a better proposal. The Council states that it has no intention of over-riding the Mayor; it merely believes the Boston trip would be the best plan, and is putting it up to the Mayor.

According to an opinion by Corporation Counsel T. J. L. Kennedy, extension of time on the remaining purchase bonds of the municipal railway, if agreed to by the city and the bondholders, would amount to a ratification of the purchase contract and would prevent the city from rescinding the contract by future litigation on the ground of fraud and deceit. Such an agreement might not prevent the city from bringing suit for damages, he said.

The present plan is to ask an extension that would permit the city to pay $250,000 on the principal every six months, or more if the money were on hand. The utilities committee has found that under the present conditions the street railway will be on a warrant basis until September, 1924, and the largest total of outstanding warrants will be $592,057 on July 25, when supplies, salaries and appropriation for principal and interest must be met.

London's Municipal Trams Report Surplus.—The London City Council reports for the year a surplus of £230,000 from the municipal tramways operations.

Auction Sales in New York.—At the public auction rooms in New York on June 27 there was offered $2,000 of the Cleveland, Elyria & Western Railroad extended 7 per cent bonds, due 1923, 60 per cent.

Will Not Oppose Track Abandonment.—The Twin State Gas & Electric Company, Brattleboro, Vt., now intends to abandon its tracks by Sept. 1. West Brattleboro residents, who obtained a stay of the proposal, are said to have decided to withdraw their opposition to the substitution of buses for the railway.

Net Income Increased. — For the eleven months period ending May 31, 1923, the Brooklyn City Railroad realized a passenger revenue of $10,702,607 against $10,406,126 for the similar period ending May 31, 1922. After considering income deductions the net corporate income for the period of this year was $2,011,550. This compares with $1,566,169 for the eleven months ending May 31, 1922.

First Run Over Section of Old Shore Line.—A trial run was made a few days ago over the revamped section of the old Shore Line Electric Railway from New Haven to Trap Rock, Conn. A. William Sperry, New Haven, who has undertaken to reclaim the road, was aboard the first car. Among others who witnessed the test were representatives of the bankers interested in financing the new company which will operate the line.

To Be Sold at Auction.—The Concord, Maynard & Hudson Street Railway, Maynard, Mass., was to be sold at public auction on June 29. Operation was suspended in March of this year when a bus service was organized to supplant the railway. The property went into the hands of a receiver in March, 1922, and operation was ordered discontinued by the court because it could not be made to pay. The discontinuance of this line has been referred to previously in the ELECTRIC RAILWAY JOURNAL.

Quarterly Dividend Reduced.—The directors of the United Electric Railways, Providence, R. I., have reduced the quarterly dividend from 1½ per cent to 1 per cent, payable on July 2, to holders of record on June 20. Because of the unusually heavy operating expenses in the first quarter of the current year, and the inability of the company to start, as soon as was expected, many increases in operating efficiency which had been planned when the fares were reduced to 5 cents, the directors found it necessary to take this action.

Stabilizing Fund Reduced in Toledo.—The fare stabilizing fund of the Community Traction Company, Toledo, was reduced by $17,906 following May operations, which brought into effect the increase in wages for trainmen and shopmen and was followed by a slump in riding. It is expected the operations for the next few months will show deficits even though two months ago the peak was reached in surplus earnings. Bus feeder operations are more satisfactory with the Oak Street line earning 78.86 per cent of operating expenses. The Erie Street line, however, is only bringing in 20.98 per cent of the cost of rendering the service.

Gold Bonds Offered. — Bonbright & Company and W. C. Langley & Company are offering $2,500,000 of first and refunding mortgage gold bonds of the Carolina Power & Light Company, known as 6 per cent series of 1953. The bonds are dated June 1, 1923, and are due June 1, 1953. The bonds are offered at 97½ and accrued interest to yield more than 6.15 per cent. The proceeds from the sale of these bonds will be used to pay, in part, for the acquisition of a new power station which will have an initial installation of 15,000-kw. and for other corporate purposes. The Carolina Power & Light Company operates the entire electric power and light, street railway and gas service in Raleigh, the gas service in Durham, the electric power and light service in Goldsboro, Henderson, Oxford, Sanford, Dunn and Jonesboro, and supplies electric power to sixteen other communities in North Carolina.

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Traffic and Transportation

Saginaw Approves a Fifteen-Year Car-Bus Franchise

After a suspension of street car service since Aug. 10, 1921, Saginaw is again to swing into line with other cities of the country having approved a fifteen-year street car-bus franchise at a special election held on June 25. The vote was 9,112 to 3,061, which is 1,808 more than the required 60 per cent for approval. The franchise provides for a 10-cent cash fare with four tickets for 25 cents.

More votes were cast than at any special election in the history of Saginaw and the franchise received a 60 per cent approval in twenty-five of the twenty-seven voting precincts and in the two it received a majority vote.

The franchise approved is a modification of two grants that were submitted on Nov. 7 and again on April 2, both of which lacked only a few votes of the required 60 per cent. With the new city administration taking office on April 9, steps were immediately taken to eliminate from the other contracts features that the present Council members believed were the cause of the failures of the franchises, and as soon as the finished document was approved by the bond owners' protective committee of the bankrupt Saginaw-Bay City Railway Company, the Council submitted the measure.

While there was some work done in behalf of the measure the election was exceedingly quiet. A few days before the election the Mayor and three of the four councilmen issued a public appeal to the electors to support the measure. One councilman asked that it be defeated.

Probably four to five months will be required before the system becomes operative. Motor buses must be purchased, the rolling stock renewed, painted, etc., tracks repaired, special crossings that were removed by steam railroad companies will have to be replaced and much new track laid. All told, at least $400,000 will be required to rehabilitate the property.

The company when organized will be operated independent of any other local utility and at least six of the nine members of board of directors must be citizens of Saginaw.

Token Fare Now 8½ Cents in Seattle

Increase in the fare on the Seattle Municipal Railway went into effect on June 16, without a hitch. Special messengers of the railway were stationed at all transfer and junction points, and several automobiles were pressed into service in an effort to keep conductors supplied with the new 8½-cent tokens. The fare is now 10 cents cash, or three tokens for 25 cents. The increase was made after an experiment with the 5-cent cash fare which lasted three and one-half months. New fares provide transfer privileges to all car and bus lines in the city, as well as the privately owned Seattle & Rainier Valley lines. An increase in revenues of $5,000 a day is expected under the new fare.

Advertising Value of the 5-Cent Fare Capitalized

The cars now being built for the San Francisco Municipal Railway have the words "Fare 5 Cents" neatly painted on the sides near the entrance at either end. The letters are gold leaf, 2 in. and 4 in. high, so the words can be easily read from the sidewalk. Being near the entrance they suggest to the passenger the idea of having the fare ready and to the visitor they advertise the low fare which the city's residents enjoy on the municipal railway.

Payment of Taxes Deferred to Prevent Fare Increase in Cincinnati

An ordinance to defer consideration of the franchise tax of the Cincinnati Traction Company until January, 1924, as a factor in fare rate making was passed by the City Council, by a vote of twenty-seven to three, two members being absent. Passage of the measure prevents an increase in fares.

When Councilman-at-Large W. E. Hess, a member of the street railway committee, protested that the ordinance had not been before that committee, Councilman Charles O. Rose insisted that the rule of reference be lived up to, whereupon Floor Leader C. E. Martin withdrew his motion for suspension and the ordinance took the regular course.

The ordinance, however, was not passed until Councilman Edwin E. Kellogg again had advanced arguments against the measure that he had made on former occasions when similar action was taken by the Council to prevent an increase in fares.

Councilman Martin in answering the argument of Councilman Kellogg said the tax could be paid only if "earned" and it could be earned only out of the car riders. He said if the ordinance was not passed fares would automatically advance one-half a cent. The ordinance must be accepted by the traction company before it is in effect. It is understood the fare will remain at the present rate.

Under the terms of the service-at-cost franchise the tax of $350,000 annually is not due until it is earned. The ordinance defers payment of the tax for another six months.

Authorizes Six-Cent Fare Continuation in Dallas

The 6-cent fare charged by the Dallas Railway was extended for eighteen months from June 27 on condition that the railway spend $705,915 in extensions, rebuilding and repairs and in the purchase of thirty additional cars during the eighteen months. The company is given ten days to signify its acceptance or rejection and the 6-cent fare is extended for ten days.

The program of improvements demanded by the city includes the extension of the Junius Heights line into Lakewood Heights, a distance of about 1 mile; extension of State Street line for ten or twelve blocks and local car service over the new Denton Interurban. In addition to these extensions the railway must take over the Trinity Heights line and establish the 6-cent fare some time during the eighteen months. The company, however, is left to work out the details of taking over this line, which is now operated by the Texas Electric Railway.

It was at first proposed by the city officials to demand improvements costing only $500,000 during the year in return for the fare extension, but Mayor Louis Blaylock said that a close examination of the earnings of the Dallas Railway showed that the company could well expend a larger sum and still show a fair return on its investment. The extensions and other improvements demanded are such that they increase the earnings of the traction company, Mayor Blaylock said.

John W. Everman, supervisor of public utilities, has made a close study of the traction company earnings, needs of traffic, etc., and the program of improvements demanded by the city is in line with his recommendations.

Formal application for extension of the 6-cent fare was made to the City Commission by Judge Holland, president of the Dallas Railway Company, but in this formal application the traction company did not suggest any extensions or improvements to be made in return for the fare extension, and this fact caused some surprise among members of the City Commission.

In his application for a continuation of the 6-cent fare Judge Holland said that the earnings from a lesser rate of fare would be wholly inadequate to enable it to provide the character of service required by the people of Dallas to make the remaining improvements designated in the Everman plan.

Court Decides Bus Competition Will Not Be Tolerated

The Supreme Court of Illinois on June 24 affirmed a judgment recently handed down by the Superior Court of Cook County wherein it reversed the order and decision of the Commerce Commission relative to the operation of a bus line in competition with an electric railway.

The opinion of the court was delivered by Chief Justice Farmer. It is regarded

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as bringing to light phases of public utility operation and ownership relative to service and rates of fare which may serve as a precedent in future controversies of the kind.

The bus company had secured a certificate of necessity and convenience from the Illinois Commerce Commission, and after complying with the rules and regulations of the commission it started to operate buses along a route which in many places parallels the existing railway.

Notwithstanding the opposition of the railway when the bus line first sought an operating permit, the Illinois Commerce Commission decided to issue a certificate of necessity and convenience to the bus company, but this order was reversed by the Superior Court of Cook County. The bus company then appealed the decision to the Supreme Court of Illinois.

In a few words, the ruling of the high court of the state is interpreted to mean that a bus company will not be granted the right to operate through a territory served by an electric railway unless the public as a whole as distinguished from any number of individuals is convenienced by such an operation.

The bus company has petitioned the Supreme Court of Illinois for a rehearing. If this is not allowed it is expected the case will be carried to the Supreme Court of the United States on the ground of confiscation of property.

Louisville Railway Subsidiary Starts Bus Operation

The Kentucky Carriers, Inc., the $200,000 subsidiary of the Louisville Railway, started service on Third Avenue on June 24, using four buses, each seating twenty-six people, and being of the single-deck type. These four cars maintained a ten-minute schedule under a 10-cent fare, on a route from Main Street to the Confederate monument, a distance of twenty blocks.

The first installment of cars consists of six, with six more to arrive about July 1. They come from Cleveland and represent Bender bus bodies on White bus chassis, equipped with double pneumatic tires in back and single pneumatics in front.

A total of twelve double-deck buses will be placed in service in September or October, these also to be built on the White bus chassis, using bodies of the Yellow Coach Company, Chicago, and to seat sixty-eight persons.

One operator is employed on the single deckers and two will be employed on the double deckers. Drivers are being picked from the company's own organization, a call having been issued for men who have had experience in driving White or similar trucks.

The trucks are finished outside in royal blue and on the inside are upholstered in leather and finished in mahogany.

The plan of the company to use buses was reviewed in the ELECTRIC RAILWAY JOURNAL for June 2, page 944.

City Will Fight Houston Fare Rise

The city of Houston will fight to the last ditch the suit filed by the Houston Electric Company in the United States Court for the Southern District of Texas, seeking a higher fare for the company in Houston. The company in its petition for a bill in equity set forth that the present fare of 7 cents with four tokens for 25 cents is inadequate and amounts to a confiscation of its property, and in support of this allegation the company sets forth a long statement of its earnings and operating expenses. The figures given in this statement are the same as those filed with the City Council some weeks ago in its petition for an increased fare, which the city declined to grant, but in return agreed to cut the number of jitneys operating in Houston to 150.

Judge J. C. Hutcheson, before whom the petition was filed, has set the matter for hearing on July 5. The hearing will be upon the question of an injunction to restrain the city from prohibiting the company in its efforts to charge and collect a higher fare than that fixed by the city. It is regarded as probable that Judge Hutcheson will appoint a special master in chancery to hear evidence as to the valuation, earnings, operating costs and other factors entering into rate-making questions. The special master will make a report of his findings to Judge Hutcheson, who will then render final judgment.

Mayor B. F. Holcombe says the city will fight to the end any effort of the traction company to secure a fare increase through the courts. The city will employ traction experts to make surveys of the company's property and fix valuations thereon and to examine the company's books and make report of earnings and operating costs. Among the things to be attacked by the city will be the traction company's valuation figures, it being contended by the city that the valuation is fixed too high, and that a fair return would be showed under the present fare, if the property valuation figures were placed at the proper level.

Buses Now Operating in Grand Rapids

Six Fifth Avenue Coach Company passenger buses, type J, of the single-deck variety, have been purchased by the Grand Rapids Railway to augment the service being rendered under the new franchise granted the company about a year ago.

Four of the buses now are in daily use on the Alpine-Avenue line, running to the corner of Richmond and Tamarack in the outskirts of the city. The downtown terminal of this auxiliary line is opposite the new Rowe Hotel, situated at one of the most prominent street crossings in the business district.

In traversing the route from the Rowe to the city limits terminal, the buses penetrate an industrial section hitherto without any transportation service. Nearing the outskirts, the buses pass through a residential district. Opposite the city limits terminal is situated the new Richmond municipal playground, which the city plans to make one of its chief amusement and recreation centers.

Fares are the same as on the railway lines and transfers are issued exactly as on city street cars. The rate is 10 cents a single ride with seven tickets sold for 50 cents.

Five-Cent Fares to Continue.—Five-cent car fares for passengers having identification cards and 10-cent fares for those who do not obtain cards, will be in effect for another year in Muscatine. A contract to this effect between the city of Muscatine and the Clinton, Davenport & Muscatine Railway, was renewed by the City Council for another twelve months.

Agree on Rate.—Discontinuance of further proceedings against the Fonda, Johnstown & Gloversville Railroad to bring the rate in West Main Street in Amsterdam to 5 cents in place of the present 8 cents was consented to by Corporation Counsel Fitzjames at a hearing before the Public Service Commission on June 20. The city also consented to the continuance of the present 8-cent fare. No further hearings will be held by the commission.

Two-Cent Rate Continued on Interurban.—A report from Lansing, Mich., says the Public Utilities Commission has directed continuation of the 2-cent-a-mile fare on the Detroit United Railway. The order is said to be based on tentative appraisals and valuation fixed by the commission. The total, including Detroit city and interurban property, was placed at $33,975,613. The commission fixed the value of interurban lines and the value of the use of city lines for interurban purposes at $26,691,320. It is the opinion of the commission the 2-cent fare will return the company 7 per cent of this valuation.

Wants Six-Cent Rate.—The Fairburn & Atlanta Railway & Electric Company, Atlanta, Ga., has applied to the Public Utilities Commission for permission to increase its passenger rate between Fairburn and Atlanta from 5 cents per zone to 6 cents. The company operates passenger-carrying gas cars between Atlanta and Fairburn. The company was formerly granted permission by the commission to increase its zone charge to 7 cents, but in order to meet the jitney competition voluntarily reduced its rate to 5 cents. Later the company itself operated a number of buses in competition with the independent jitneys, and the result of the rivalry has been that both sides have lost money. It is now claimed that the rival jitneys have been forced out of the business by reason of their losses. The company now proposes to discontinue its own motor buses and revert to the old method of handling all the traffic on its gas cars. It claims that it is necessary to charge the 6-cent rate in order to operate at a profit.

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Personal Items

H. S. Clark Promoted by Westinghouse Brake Company

Horace S. Clark has been appointed Pacific district manager of the Westinghouse Traction Brake Company, to succeed C. P. Cass, who has resigned to devote more time to the Westinghouse Pacific Coast Brake Company, of which he is president. Mr. Clark, who was assistant manager of the Pacific district, will continue to maintain headquarters in San Francisco. Before going to the Pacific district, Mr. Cass had been located in St. Louis as Southwestern district manager and president of the Safety Car Devices Company. Both Mr. Clark and Mr. Cass have a wide acquaintance among railway men throughout the country. The Westinghouse Traction Brake Company has also announced the appointment of E. R. Fitch as Southwestern district engineer, with headquarters in St. Louis. Lawrence Wilcox, mechanical expert at Chicago, has been promoted to representative and transferred to the office at Columbus, Ohio. S. T. Reid succeeds Mr. Wilcox in Chicago.

H. S. Clark

Changes Made in East Penn Electric Company

Samuel H. Sarena, the new superintendent of the railway department of the East Penn Electric Company, first became identified with the electric railway business in May, 1899, when he entered the employ of the New York & Queens County Railway, later becoming superintendent of this property. This system was one of the large ones in Greater New York and, previous to the Interborough Rapid Transit Company's operating its trains in Queens, served most of the Borough of Queens, operating 300 cars daily. In December, 1907, Mr. Sarena entered the employ of the Public Service Commission of New York State in the transit bureau. He remained there until Aug. 1, 1909, when he was reappointed superintendent of transportation of the New York & Queens County Railway. He remained in this capacity until Feb. 1, 1923, when he became superintendent of railways of the East Penn Electric Company, with headquarters at Pottsville. This company is controlled by the J. G. White Management Corporation of New York.

Along with the announcement of Mr. Sarena's acceptance of the above-mentioned post came the news that Samuel Cochrane of the East Penn Electric Company had been promoted to the position of superintendent of maintenance of the railway department.

L. C. Bewsey Leaves Michigan United

L. C. Bewsey, superintendent of the Michigan United Railways at Kalamazoo since July, 1921, severed his connections with that company and on June 16 became general manager for the holdings in Cuba of the Electric Bond & Share Company of New York. His headquarters are in Santa Clara. Mr. Bewsey has been associated with electric railways since 1899, when he became identified with the Lafayette Street Railway. He remained with this company until 1904, when he was made superintendent of the Union Traction Company of Indiana at Indianapolis. Ten years later he took on the work of general superintendent of the Buffalo, Lockport & Rochester Railway, Rochester, N. Y. From 1917 to 1921 Mr. Bewsey was engaged in the Philippine Islands in the capacity of superintendent of transport and motive powers for the Manila Electric Company and for one year as electrical engineer in charge of estimates, designs and construction for the engineering department of the Pacific Commercial Company. He left the last mentioned position to become superintendent of the Michigan United Railways, which he held up to June 15 of this year.

James Dalrymple, general manager of the Glasgow Corporation Tramways, expects to visit the United States in September and to prolong his stay so as to permit him to attend the convention of the American Electric Railway Association in Atlantic City in October. Mr. Dalrymple will be accompanied by Mrs. Dalrymple. In a combined business and pleasure trip they expect to travel across the country as far as Vancouver.

James H. Mulligan, car inspector of the United Traction Company, Albany, has resigned to join his son in business. Mr. Mulligan has been in the service of the company for thirty-three years, during which time he worked under six general managers. His first job was changing horses on the cars. In 1890 he was appointed conductor and in 1892 was promoted to inspector. He held this position until Aug. 14, 1897, at which time he was promoted to chief inspector. Later, when J. F. Hamilton was made general manager of the company, the position of chief inspector was abolished and Mr. Mulligan went back to the old position of plain inspector.

E. E. Carpenter Appointed Chief Engineer in Vancouver

E. E. Carpenter has been appointed chief engineer of the British Columbia Electric Railway, Vancouver, B. C., and has already assumed his new duties. Following his graduation from Stanford University in 1898 with the degree of B. S. in civil engineering, he filled successfully various railway engineering positions for some seven years. He served at one time as chief engineer for Sanderson & Porter, in charge of the design and construction of the power development installation — 5,000 hp., initial—for the British Columbia Electric Railway at Jordan River, Vancouver Island, Canada. As a member of the firm of Baker & Carpenter, engineers, San Francisco, he engaged in general consulting and executive engineering practice. Among the major projects undertaken by that firm and with which Mr. Carpenter was connected was the shipbuilding plant at Raymond, Wash., for Sanderson & Porter. Mr. Carpenter is a member of the American Society of Civil Engineers, the American Association of Engineers as well as a member of the firm of Baker & Carpenter.

E. E. Carpenter

C. Melvin Sharpe has been made executive assistant to President William F. Ham to assist particularly in the direction of the activities of the Washington Railway & Electric Company. Mr. Sharpe formerly was associated with the Chamber of Commerce of the United States, but comes to his new position from the La Salle Extension University of Chicago.

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Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Record Production of Hard Coal

The revised estimate of the Department of the Interior for anthracite production in May, based on final data on shipments, places the total at 8,573,000 net tons, including mine fuel, local sales and the product of washeries and dredges. Output during May has only twice, in 1917 and in 1918, exceeded this figure, which is 6 per cent above the average for the eight years 1914 to 1921. The total production of anthracite in the first five months of the present calendar year was 42,504,000 net tons, which is the maximum production recorded for a like period, and is 15 per cent more than the average for eight years preceding 1922.

Properties of a Good Wood Preservative

To protect wood from decay a preservative must first of all be poisonous to wood-destroying fungi. Decay in wood, according to the American Wood Preservers' Association, is not due to direct chemical action, or action of the elements, but is always the result of the activity of low forms of plant life which feed on the wood and thus destroy it.

The preservative must also be able to penetrate the wood sufficiently to form a continuous exterior treated shell deeper than any surface checks which are likely to develop, and to retain its toxicity, or poisoning power, under service conditions.

Electric Steel Founders Standardize Practices

At a recent meeting in Pittsburgh of the several companies which constitute the Electric Steel Founders' Research Group a standard set of trade practice rules was adopted. Suitable pattern equipment for economical molding shall be furnished by the customer. The foundry will not be responsible for correctness of pattern equipment, except when such equipment is made for the customer under the supervision of the foundry. Repairs on pattern equipment shall be paid for by the customer except when caused by carelessness of the foundry. Patterns must have distinctive colors to identify separately the core prints, machined surfaces and rough casting. All patterns, core boxes and loose pieces thereof must be properly numbered for identification. All transportation charges on pattern equipment to and from the foundry shall be paid by the customers. The foundry will not carry insurance on the customer's pattern equipment. Free replacement will be made of defective castings if reported and returned to the foundry within a reasonable time. The foundry will not be responsible for any expense on defective castings incurred by the customer. The customer will be charged with the cost of mold and cores discarded by the foundry due to change in patterns or core boxes.

Progress Is Slow in Lamp Standardization

In spite of the clearly defined tendency toward standardization of commercial products during recent years, little progress in this direction has been made so far as the manufacture of electric lamps is concerned. Commercial installation of incandescent electric lamps began in 1880. A few years later, after the first central station generating and selling current had been built in New York City, there were only two standard lamps, of 8 cp. and of 16 cp. Twenty years ago about a dozen types were being made. Today there are more than 200 standard types of lamps, exclusive of the miniature sizes. Although it might appear from this that no progress whatsoever is being made in the direction of lamp standardization, nevertheless the situation is not really so bad as that, and manufacturers say that it may reasonably be hoped that in the not distant future steps will be taken materially to reduce the number of standard types.

There are today several thousand different types of lamps that are occasionally manufactured. In spite of this situation, and the existence of 200 standard types already mentioned, nevertheless the fact remains that about 90 per cent of the total demand is now covered by twenty lamp types. This factor has aided materially in reducing the cost of lamp manufacture.

A further reduction in the number of types of electric lamps in common use may be expected, manufacturers say. It has been proposed that the more important lamps, which are sometimes called the "bread and butter" types, now made in 10, 15, 25, 40, 50 and 60-watt sizes, be standardized to three sizes each for the Mazda B and for the Mazda C. The scheme is that in the future Mazda B lamps shall be manufactured in sizes 15, 25 and 50 watts only. Mazda C lamps are to be manufactured in sizes of 50, 75 and 100 watts.

Because of this economic advantage such standardization of commercial lamp sizes should have a definite appeal to the general public. Centralization of production, which has resulted in material saving in the cost of manufacture, is impractical in the lamp business. In order that shipment of these fragile articles shall be reduced to a minimum distance it is necessary that each factory manufacture all the different types of lamp.

Price of Food Has Doubled in Past Decade

As compared with the average cost in the year 1913 the cost of food in May, 1923, was 53 per cent higher in Richmond, 51 per cent in Washington, D. C.; 49 per cent in Baltimore, Detroit, New York, Philadelphia and Scranton, 48 per cent in Birmingham, Chicago and Providence, 47 per cent in Boston, Buffalo and Charleston, 45 per cent in Fall River, Manchester, Milwaukee and Pittsburgh, 44 per cent in Minneapolis and St. Louis, 43 per cent in Cleveland and New Haven, 41 per cent in Atlanta, Cincinnati, Dallas, Newark, New Orleans and Omaha, 40 per cent in Indianapolis and Kansas City, 39 per cent in Little Rock, 38 per cent in San Francisco, 37 per cent in Los Angeles, 36 per cent in Jacksonville, Memphis and Seattle, 34 per cent in Louisville, 33 per cent in Denver, 29 per cent in Portland, Ore., and 22 per cent in Salt Lake City. Prices were not obtained from Bridgeport, Butte, Columbus, Houston, Mobile, Norfolk, Peoria, Portland, Me.; Rochester, St. Paul, Savannah and Springfield, Ill., in 1913, hence no comparison for the ten-year period can be given for these cities.

General Electric Company's Business Grows

The General Electric Company reports that it has booked during the first five months of the present year new business amounting to approximately $143,000,000. In 1922 this company billed out slightly more than $200,000,000 worth of goods, or about $16,600,000 a month. For the first four months of 1923 outgoing shipment averaged about $20,000,000 a month in value. Much large equipment which has been for a long time in process of manufacture will soon be shipped, and it may be expected that the coming months will show an even greater volume of business.

Metal, Coal and Material Prices

Metals—New York	June 26
Copper, electrolytic, cents per lb	14.687
Copper wire base, cents per lb	18.00
Lead, cents per lb	7.00
Zinc, cents per lb	6.12
Tin, Straits, cents per lb	40.25
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$5 625
Somerset mine run, Boston, net tons	2.625
Pittsburgh mine run, Pittsburgh, net tons	2.05
Franklin, Ill., screenings, Chicago, net tons	1.80
Central, Ill., screenings, Chicago, net tons	1.625
Kansas screenings, Kansas City, net tons	2.625
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft	$7.50
Weatherproof wire base, N. Y., cents per lb.	18.50
Cement, Chicago net prices, without bags	$2.20
Linseed oil (5-bbl. lots), N. Y., per gal	$1.11
White lead, in oil (100-lb. keg), N. Y., cents per lb	13.125
Turpentine, (bbl. lots), N.Y., per gal	$.95

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Hot Air and Electric Heating Compared

Maker of Hot Air Apparatus Furnishes Figures Which Show Decided Advantage in Economy for Coal System

AN ARTICLE which appeared in the Manufactures & Markets Department of the JOURNAL for June 16 pointed out that there has been an increasing activity in the market for electric heaters for cars. In the discussion of contributing conditions for this tendency, the high price of coal and the increased amounts paid for labor were mentioned as reasons for increased interest in electric heating. In this connection, a large manufacturer of hot-air heating equipment points out that there is still considerable margin of economy in favor of heating by hot air as compared with electric heating and has furnished some figures to show actual and estimated heating expense by the two systems for comparison.

Table I is a tabulation of actual costs for heating by hot air for an electric railway operating 271 double-truck cars in a northern climate where extreme winter conditions prevail. The average total cost per car per season when heating with hard coal and air heaters is shown to be $190.72, including interest and depreciation. This is compared to tests made with electric heaters on cars of corresponding size and with similar climatic conditions, showing an average cost in excess of $400 per car per season of 160 days, exclusive of interest and depreciation.

The last item of $40 per car per season for attendance and handling fuel is considered by the manufacturer to be about 40 per cent too high as judged from the similar item on other properties. It is attributed to an expensive method of handling in which changes are to be made next winter.

Table II gives test data from a Pennsylvania property for electrically heating a Peter Witt car, 46 ft. 3 in. long by 8 ft. 2 in. wide, using sixteen electric heaters with thermostatic control and hand operated ventilators. The actual energy consumption of the heaters was measured with a Sangamo watt-hour meter and the test covered the period from Jan. 8 to April 2, 1923, during which the car was out of service fourteen days. The average mean temperature during the period was 27 deg. F., average maximum temperature of 33 deg. and average minimum of 21 deg. Estimated costs for heating the same car by means of coal are given in the lower part of the table.

Table III gives similar test data from the same railway for heating a single-truck, one-man car, 26 ft. 2 in. long by 7 ft. 8 in. wide, using twelve electric heaters without thermostat. The energy consumed by the heaters was measured by a Sangamo watt-hour meter and the test extended over the period from Jan. 8 to March 12, 1923. The average mean temperature during the period was about the same as given above for the data of Table II. For comparison the estimated cost of heating this car with coal is printed in this case also, as a part of Table III.

In both these test cases, the meters were installed and the data collected by the railway and a copy of the report furnished weekly to the manufacturer.

TABLE I—ACTUAL EXPENSES FOR HEATING CARS—SEASON FROM AUGUST 1, 1921, TO JULY 31, 1922

Month 1921	Fuel for Heating	Labor Heating Cars	Maintenance of Equipment: Stove	Motors	Stacks	Hot-Water Heaters	Total Expense for Season
August	12.55	36.89	7.76	196.13	2.40	.....	255.72
September	0.93	19.90	302.76	561.93	58.96	.....	944.48
October	.....	101.98	486.92	549.77	386.00	.....	1,524.67
November	228.47	1,630.92	569.08	523.01	136.20	68.84	3,156.52
December	7,750.89	2,086.35	30.85	81.21	1.66	177.23	10,128.19
1922							
January	6,579.87	2,083.37	149.21	94.91	17.34	140.61	9,065.31
February	5,796.28	1,828.78	107.07	94.05	27.06	66.04	7,919.28
March	4,290.88	2,004.29	64.55	125.36	0.75	27.66	6,513.49
April	1,125.64	628.38	4.86	25.73	1.35	4.92	1,790.88
May	.....	18.82	0.60	.....	29.93	.....	49.35
June	67.80	.....	.....	.....	1.12	.....	66.68
July	.....	59.64	6.68	.....	3.71	.....	70.03
	25,717.71	10,499.32	1,730.34	2,252.10	666.48	485.30	41,351.25

271 cars in operation—Double-truck. Body 34 ft. inside bulkheads.

Average operating cost per car per season	$152.59
Add for operation of blower motor per car 810 kw.-hr. at 0.00695 (estimated)	5.63
Add interest at 6 per cent on $250 cost of equipment per car	15.00
Add depreciation at 7 per cent on $250 cost of equipment per car	17.50
Total	$190.72
Fuel consumption per car per season	4.8 tons
Cost of anthracite coal per ton	$19.80
Maintenance of heating equipment per car per year	19.00
Attendance and cost of handling and distributing fuel per car per season	40.00

TABLE II—TEST DATA FOR ELECTRIC HEATING OF PETER WITT TYPE CAR WITH ESTIMATE OF COST TO HEAT SAME BY COAL

Car-hours operated during test period	952.37
Car-miles operated during test period	8,605.22
Kilowatt-hours consumed during test period	13,070.
Kilowatt-hours consumed per car-hour	13.72
Kilowatt-hours consumed per car-mile	1.285
Total cost of current for electric heat during test period of seventy days = 13,070 kw.-hr. x 1.4 cent	$182.98
Average cost of current per car-hour = 13.72 kw.-hr. x 1.4 cent	0.1921
Average cost of current per car-mile = 1.285 kw.-hr. x 1.4 cent	0.018
Average cost of current per car-day =	2.61
Average cost of current per car per season of 160 days on the above basis	417.60
No items of interest, depreciation, maintenance or heater haulage included.	
The average cost of heating by a hard coal-fired hot-air heater, during the period of electric heating test is estimated as follows: (Car out of service fourteen days).	
Total thermal value of 13,070 kw.-hr. consumed during the electric heat test period of seventy days =	44,594,840 B.t.u
Quantity of 13,000 B.t.u. per pound hard coal required to produce 44,594,840 B.t.u. = 3,430 lbs. at 100 per cent efficiency of heater.	
Efficiency of heater is actually about 50 per cent; therefore total quantity of coal required, would have been 6,860 lb. or	3.43 net tons
Fuel cost—heating car while in service = 3.43 net tons at $13.00 per ton delivered	44.59
Fuel cost—banking fires, while car is not in service = 2 lb. coal per hour, twelve hours per day for seventy days = 0.85 net ton at $13 per ton delivered	11.05
Kindling and kerosene—lighting fires at 2 cents per day x seventy days	1.40
Attendance—labor kindling fires, removing ashes, etc., at 15 cents per day x seventy days	10.50
Cost of power—to operate blower motor—250 watts per hour x eleven hours per day x seventy at 1.4 cents per kilowatt-hour	2.70
Maintenance—952 car-hours at 0.75 cents per car-hour	7.14
Stove haulage—8,605 car-miles x 315 lb. (weight of heater) + 2,000 lb. = 1,350 ton-miles at 0.3475 cent	4.69
Total cost for seventy days	$82.07
Average cost per car-hour	$0.086
Average cost per car-mile	0.0095
Average cost per car per day	1.17
Average cost per car per season of 160 days	187.20

TABLE III—TEST DATA FOR ELECTRIC HEATING OF SINGLE-TRUCK ONE-MAN CAR

Car-hours operated during test period	1,012.
Car-miles operated during test period	8,505.
Kilowatt-hours consumed during test period	8,115.
Kilowatt-hours consumed during test period per car-hour	8.02
Kilowatt-hours consumed during test period per car-mile	.954
Total cost of current for electric heat during test period of sixty-three days = 8,115 kw.-hr. at 1.4 cent	$113.61
Average cost of current per car-hour 8.02 kw.-hr. x 1.4 cent	0.1123
Average cost of current per car-mile 0.954 kw.-hr. x 1.4 cent	0.0134
Average cost of current per car per day $113.61 ÷ sixty-three days	1.80
Average cost of current per car per season of 160 days on the above basis	288.00
No items of interest, depreciation, maintenance or heater haulage are included.	
The operating cost of heating car with hot-air heater during the sixty three-day test period would have been about as follows:	
Thermal value of 8,115 kw.-hr. consumed in electric heating of car during the sixty three-day test period =	27,688,380 B.t.u
Quantity of 13,000 B.t.u. per pound hard coal required to produce 27,688,380 B.t.u. = at 100 per cent efficiency of heater	2,130 lb.
Efficiency of heater is actually 50 per cent; therefore total quantity of coal required would have been 4,260 lb. or	2.13 net tons
Fuel cost—heating car while in service = 2.13 tons hard coal at $13 per ton delivered	$27.69
Fuel cost—banking fires when car is not in service = 2 lb. coal per hour at eight hours per day x sixty three days = 1 ton hard coal at $13 per ton delivered	6.50
Kindling and kerosene for lighting fires at 2 cents per day. =	1.26
Attendance—labor kindling fires, removing ashes, etc., at 15 cents per day x sixty three days	9.45
Cost of power—to operate blower motor = 250 watts per hour x 16 hours per day x sixty three days = 252 kw.-hr. at 1.4 cents	3.53
Maintenance—1,012 car-hours at 0.75 cents per car-hour	7.59
Stove haulage—8,505 car-miles x 315 lb. (weight of heater) + 2,000 lb. = 1,334 ton-miles at 0.375 cents	5.00
Total cost for sixty three days	$61.02
Average cost per car-hour	$0.06
Average cost per car-mile	0.0072
Average cost per car per day	0.97
Average cost per car per season of 160 days	155.20

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Rolling Stock

Long Island Railroad, New York, N. Y., announces that of the ninety-two new steel passenger cars on order twenty-one have thus far been delivered. The company also reports that the contractors are making rapid progress with the seventy-one steel cars under construction and scheduled for delivery this year.

San Francisco Municipal Railway on June 20 received the first of the twenty cars which are being built for it by the Bethlehem Shipbuilding Corporation at San Francisco. Owing to the steady increases in traffic, San Francisco's Municipal lines now have barely enough cars to maintain service with the minimum number of spares in repair and paint shops. This has been due to the rapid building up of outlying residential districts. In the Richmond district the traffic has increased 60 per cent since 1914 and in other districts increases of 70 per cent or more have been recorded since the Municipal system has been in operation.

Northwestern Ohio Railway & Power Company, Oak Harbor, Ohio, as was announced in the June 23 issue of this paper, has purchased four new passenger cars. The specifications for these cars are as follows:

Builder of car body	Kuhlman Car Company
Seating capacity	56
Total weight	34,500 lb.
Bolster centers, length	24 ft. 6 in.
Length over all	47 ft. 6 in.
Width over all	8 ft. 6¼ in.
Body	Steel
Interior trim	Cherry
Headlining	White
Roof	Arch
Air Brakes	G. E.
Armature bearings	Ball
Control	"K"
Curtain material	Pantasote
Designation signs	Hunter
Gears and pinions	G. E.
Hand brakes	Peacock
Heater equipment	Consolidated
Headlights	G. E.
Lightning arresters	G. E.
Motors	G. E. 264, Inside hung
Seats	Brill
Seating material	Brown imitation leather
Trucks	Brill 77E
Wheels	Rolled steel 26 in. x 3½ in.

Track and Roadway

Mississippi Valley Electric Railway, Iowa City, Ia., expects to build 1,700 ft. of new track and to pave 1,200 lin.ft. of track.

Northwestern Ohio Railway & Power Company, Oak Harbor, Ohio, is stringing 30 miles of high-tension wire between the Toledo city limits and Port Clinton.

Johnstown & Somerset Railway, Somerset, Pa., contemplates extending its line to Jerome, a distance of 5 miles. Work on the extension will be started on Aug. 1.

Seattle Municipal Railway recently awarded to the Pacific States Electric Company, Seattle, the contract for furnishing 10 miles of No. 2 hard-drawn, round copper trolley wire in 1-mile reels. The contract totals $4,020.

Laredo (Tex.) Electric & Railway Company, is preparing to extend its lines to give service to many portions of the city of Laredo not now served. Workmen are now laying track on Matamoros Street for an extension of one of the lines. Approximately $250,000 will be spent in extensions.

Department of Street Railways, Detroit, Mich., has started construction on two new extensions of the municipal system, the Linwood and Warren Avenue east lines. Plans are also made for an extension on Warren Avenue west. The Linwood extension from the present line at Joy Road to Davison Avenue will include about 1½ miles of double track and the East Warren extension from Bewick Avenue to St. Jean Avenue will include about ½ mile of double tracks.

Power Houses, Shops and Buildings

Springfield (Mass.) Street Railway is about to construct a new office building in Westfield. It will be of brick and will cost $5,630.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has received an order from the Brazilian Hydro-Electric Company, Ltd., a subsidiary of the Brazilian Traction, Light & Power Company, Ltd., of Rio de Janeiro and São Paulo, Brazil, for seven power transformers and a large amount of switching equipment for a new plant located on the Parahyba River, about 100 miles northeast of Rio de Janeiro.

Trade Notes

Stone & Webster, Inc., have been engaged to supervise the construction of the Paducah Electric Company's $400,000 electric generating plant.

A. Gilbert & Sons Brass Foundry Company, St. Louis, Mo., announces that it has just doubled the size and capacity of its machine shop to take care of its growing business.

Magnus Electric Company, Inc., New York, N. Y., manufacturer of electrical specialties, wiring devices and radio accessories, has established a new district sales office at 231 North Wells Street, Chicago. The office is in charge of Leo Hirschfeld and M. B. Geiger.

Dr. W. R. Whitney, director of the research laboratory of the General Electric Company, was recently elected a member of the corporation of the Massachusetts Institute of Technology for a term of five years. He was graduated from the Massachusetts Institute of Technology in 1890 and has been for some time a non-resident professor of theoretical chemistry at that institution.

Roller-Smith Company, 233 Broadway, New York, N. Y., announces the appointment of H. D. Baker, 525 Woodward Avenue, Detroit, as its representative in the State of Michigan. Mr. Baker will handle the Roller-Smith Company's lines of instruments, circuit breakers and radio apparatus in that territory. Mr. Baker has been associated with the Roller-Smith Company in various capacities for several years, knows the company's products well and has a wide acquaintance in his territory.

Peter Smith Heater Company, Detroit, reports a number of recent orders. Among recent orders or shipments are the following: ten heaters, type O-C-2, for the new passenger cars of the Chicago, North Shore & Milwaukee and ten heaters of the 2-P type for the parcel freight cars of the same company, 125 heaters of the 2-P-O type for the Toronto Transportation Commission; fifty heaters of the 2-P-N type for the Cleveland Railway; four heaters of the 3-P-O type for the Chicago & West Towns Railway and fifty of the 3-P-O type for the St. Louis Railways. The company has also supplied many heaters for the gas rail cars used by a number of the steam railroads.

New Advertising Literature

Bethlehem Shipbuilding Corporation, Ltd., Bethlehem, Pa., has issued a new sixty-five-page catalog on pumps for feed and other duties. The catalog also contains a description of the corporation's line of pumps for handling oil.

Conveyors Corporation of America, Chicago, has just issued an eight-page booklet, "Representative Installations." It contains illustrations of a number of buildings and power plants which are equipped with the company's American steam jet ash conveyor, a method of ash removal which has come into marked favor among power plant engineers during the past four or five years. Copies will be sent to any who are interested in the steam jet method of ash handling.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has issued its 1923-1924 supply catalog. In appearance the new catalog does not differ greatly from its predecessor. The former editions have proved so useful and satisfactory that no essential features were altered, the improvements being largely a matter of detail and refinement. The catalog is indexed according to subjects and to sections, and also has a style number and a thumb index. In addition, a new feature—a classified index—has been added to the introductory section under the title "How this catalog serves." Here is listed apparatus of particular interest to central stations, electric railways, industrial plants, mines, contractor-dealers and architects. The catalog announces the opening of a new plant at Homewood, Pa. In all, 1,300 pages are devoted to descriptive matter, technical data, dimension drawings, specifications and prices. The material includes all new apparatus developed in the last two years.

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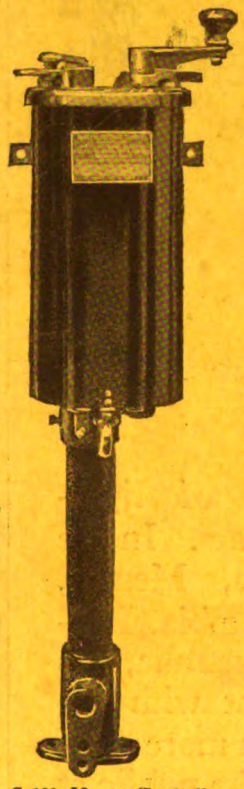

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Barcelona Underground Railway, Spain	10
Chicago & West Towns Railway	8
Interstate Public Service Co., Indiana	3*
Mexico Tramways	6
New York Central Railroad	30*
Hudson & Manhattan Railroad	25*
Java State Railways	25
Georgia Railway & Power Company	20
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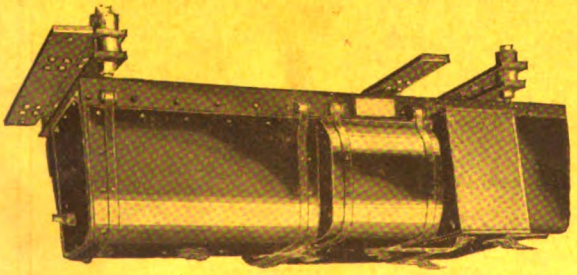

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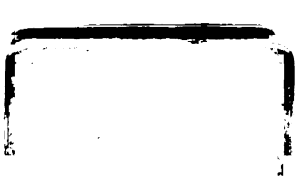

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